



# de Souza interprofessional practice cancer competency framework

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## Abstract

**Purpose** As the demand in cancer care continues to increase, health systems require a workforce of highly educated specialists and generalists to provide continuity of care across settings.

**Objectives** Led by de Souza Institute in Canada, an interdisciplinary working group was formed to develop a competency framework with relevance across regulated health professionals involved in cancer care.

**Methods** The working group was presented with results from a scoping review of national and international guidelines, standards, and competencies in oncology, as well as data from needs assessments on continuing education opportunities and oncology topics most relevant to clinicians. Fifty-one professionals from, e.g., family medicine, pharmacy, social work, psychology, occupational therapy, and nursing participated in seven focus groups. An additional 32 nurses participated in a nursing-specific needs assessment survey. Using modified Delphi technique, working group members conducted three iterative rounds to review data and built consensus on competency items in relation to three levels of expertise, from early learner/novice practitioner, advancing practitioner, to expert practitioner.

**Results** A final consensus was reached for the selection of competencies that reflect optimal cancer care mapped into three levels of expertise, as well as knowledge, skills, and attitudes expected of each level. Examples for the competency for early learner/novice practitioner include the following: Have awareness of common ethical issues in cancer care (knowledge); demonstrate ability to discuss, educate, and counsel patients and their support persons(s) regarding preferences (skills); and appreciate the impact of culture, the sensitivity, and diversity of attitudes in relation to cancer (attitude). Expert practitioner examples include: recognition of need for, and ability to advocate for challenges involving equity and

**Relevance:** The manuscript describes an interprofessional practice cancer competency framework that supports person-centered oncology care across disciplines. It is therefore relevant to policy and/or programs.

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access in order to improve health outcomes (skill) and awareness of workplace complexities, such as provider roles, team functioning, and organizational environments affecting patient-practitioner relationships (attitude).

**Conclusion** The de Souza Interprofessional practice cancer competency framework provides a set of shared competencies and a novice to expert pathway for clinicians across disciplines and supports a more standardized learning and comprehensive approach in organizing professional development towards a coordinated, high quality, and person-centered care.

**Keywords** Oncology · Interprofessional practice · Competencies and standards · Educational framework · Quality of care

## Introduction

Cancer is the second leading cause of death globally with an estimated 9.6 million deaths in 2018 [1]. Advances in treatments and technologies have resulted in cancer care requiring increasingly complex skill sets including therapeutic communication [2]. Patients and family members are often confronted with very challenging situations, from cancer prevention, to complex treatment regimens, persistent residual symptoms post-treatment, and/or end-of-life care issues during palliation [3, 4].

To meet the demand, health systems require both expert specialists and a workforce of high quality generalists to provide continuity of care across settings. With the exception of education for oncologists, the current educational system has yet to match the requirements for specialized healthcare professionals required in cancer care. Health care professional degree programs have to cover an ever-expanding curriculum of diseases and treatment options and thus cannot prepare graduates sufficiently for specialty care [5].

One strategy for raising capacity to meet demand is to recruit new graduates into the cancer system. A Lancet report called for the development of health professionals who have breadth in core competencies needed for specific areas of care (e.g., disease-specific symptom management), as well as specialized in-depth knowledge and skills (e.g., management of complex health systems, co-morbidities; or advances in genomics) [5]. Additionally, there is need for curricula on interprofessional competency to provide the best team-oriented biopsychosocial care to oncology patients [6–8].

There have been other calls for transforming the educational system. The Institute of Medicine Report stated, that “a healthcare system that delivers the right care - quality care that is patient centered, accessible, evidence-based, and sustainable - at the right time will require transforming the work environment, scope of practice, education...” [9]. Professional development over one’s lifetime is thus required to gain the competencies beyond the generalist training [9]. Health care and educational systems both require methods that support the transition from formal educational settings to practice settings, with greater emphasis on quality continuing education (CE) and competencies spread across a broad scope of practice domains [10–12].

From 2011 to 2014, the de Souza Institute, a national knowledge transfer center in Canada focusing on oncology, established a working group with the goal of developing a competency framework to guide CE and professional development to meet the educational needs of diverse professional bodies, and to support quality improvement in cancer care.

Specific competencies emphasize observable and measurable performance metrics that can be used to identify a specific level of practice or knowledge [13, 14]. Gruppen et al. [15] suggest that while learning objectives focus on “what the learner should know,” competencies focus on what the “learner should be able to do.” A key advantage of having a set of competencies is its provision of a structure for teaching, learning and assessment [13]. And, in practice settings, leaders can utilize a set of competencies to assess whether their staff followed certain learning pathways and achieved the knowledge and skills expected of their level. The mapping of competencies can also be used to plan tailored professional development programs. For example, for an early stage practitioner, outcomes at the level of “knows” or “knows how” may be sufficient [16]. However, for the more advanced practitioner, educational goals typically are at the level of “shows” and “does” [16, 17]. Tailored educational programs can build in objective observations of performance or demonstrations of knowledge in clinical settings from novice to expert practitioners [18].

Linking competencies to specific quality improvement initiatives is another area where a competency-based framework can be useful. For example, local, regional, or national organizations can support competency-based learning for a specific practice to ensure safe and standardized care across the system. Finally, a competency-based approach can support recruitment of health care professionals with predetermined areas of knowledge or skill [17].

There is evidence that competency-based education improves knowledge [19, 20], confidence, attitudes, and skills of health professionals in cultural competency [19, 21], interprofessional practice [22], evidence-based health care [23], and health literacy [24]. A recent study demonstrated that a complex competency-based intervention improved clinical performance in addressing pain, fatigue, depression, and anxiety symptoms in cancer [25]. Evidence is somewhat limited on the impact of competency-based education on patient outcomes [20, 22, 26], either because of limitations in study design or the lack of

validated tools linked to the competencies being studied [21, 27, 28]. A key challenge is that competency-based frameworks focus on the individual learner, while successful implementation is affected by organizational factors that enable or hinder uptake and sustainability [22, 25].

Professional development for busy clinicians must be provided in such a fashion that learning is *accessible, desirable, and seamless* during periods of transition over professional careers. Accrediting bodies, higher education institutions, healthcare organizations, and continuing education programs from multiple health professions can collaborate to ensure that healthcare providers have the opportunity, resources, and educational support to engage in lifelong learning.

## Aim

The overall aim of this project was to develop a framework with *relevance across regulated health professionals* involved in cancer care to ensure a strong foundational and shared set of competencies required for oncology practice. These competencies can be used by healthcare institutions in their goals to consistently implement evidence-based care and build a high-performing system.

## Methodology

A first step of the project involved the establishment of a working group. Selection of membership occurred through an invitation to participate. A total of 13 interdisciplinary clinician leaders, educators, and researchers joined the working group chaired by the lead author of this paper, MJE. The membership included physicians, psychologists, social workers, nurses, rehabilitation specialists, and epidemiologists, as well as leaders in cancer care and research. Members had the necessary expertise to contribute to the development of the framework and to support its implementation by knowledge users and change agents. The framework development was informed by a needs assessment, a scoping review, and a modified Delphi technique.

### Needs assessment

The needs assessment was conducted among health professionals to identify relevant areas of education to inform oncology practice. Phase I involved focus groups which aimed to determine overall interest in expanding continuing education and to identify the major areas of content, skills (“gaps”) existing in current approaches to formal education and ongoing CE support. The focus groups also explored the notion of attaining shared competencies in oncology care towards increased specialization.

**Focus groups (six to nine participants per group)** Invitation for the focus groups as well as a nurse sample using semi-structured interviews occurred through an email distribution by Cancer Care Ontario, which included the description of the project and its goals to develop a framework of competencies to support oncology care across the spectrum from prevention to end of life care. Focus groups were held in Toronto, London, Sudbury, and Thunder Bay in Ontario. Two physician groups, one pharmacist group, three mixed groups (e.g., with social workers, OTs, psychologists), and one nursing focus group were held. Data were gathered on local interest in continuing education opportunities and on the cancer-related topics considered most relevant and necessary to support practice. As the focus group for nurses occurred in Toronto only, the qualitative phase also included 9-in depth telephone interviews with nurses outside of Toronto (Hamilton  $n = 5$ ; London  $n = 2$ ; Ottawa  $n = 1$ ; Sault Ste. Marie  $n = 1$ ). A total of 51 clinicians participated in this part of the study.

**Survey** Given the large body of nurses providing cancer care, an additional survey was conducted to solicit their views in relation to educational preparation and current need. Purposive sampling was used to recruit oncology nurses by age and by type of work setting. Participants were asked to respond to questions on current oncology expertise and skills; values concerning their practice; areas where they feel less confident or skilled; and aspirations in terms of career potential and availability of educational support.

### Scoping review

Following the focus groups and survey, a scoping review of national and international guidelines, standards for cancer care, and relevant competencies [29–40] was completed. From these multiple sources, the working group identified core competency domains, including physical, psychological, social/cultural, and spiritual care across the cancer care continuum, from prevention to acute and palliative care. These domain areas were considered to be relevant for any regulated health professional.

### Modified Delphi technique

A modified Delphi technique was used to guide the process for consensus building on the selection of specific competencies [41]. Delphi technique is an iterative multistage process designed to transform opinion into group consensus. Individuals identified as “experts” are selected for the purpose of applying their knowledge to a particular issue. Recommendations suggest that two or three rounds are preferred to achieve results that balance production of meaningful results without causing sample fatigue [42]. While there is no universal standard about the proportion of participant agreement to determine consensus,

recommendations range from 51 to 80% agreement for items [43]. For this study, we utilized 80% or greater agreement.

For round 1, possible competency items derived from the literature review identified relevant to cancer care and from the needs assessment were considered. Respondents from the working group were asked to identify whether or not each competency item was relevant across the broad scope of physical, psychological, social, spiritual needs domain areas, and from a patient/person-centered perspective. For example, participants were asked to identify (a) which competencies were relevant and (b) to what extent. They were also asked to indicate if a competency statement is clearly written and if any particular competency items were lacking in a domain area. In round 2, participants were asked to consider a new set of competencies derived from round 1 to provide opinion on relevance and redundancy. The group members were asked to respond to four questions about each of the competencies using a Likert scale ranging from 1 = not at all, 2 = somewhat, 3 = moderately, and 4 = very much so. The first question was related to how essential the competency was for the framework for practitioners in cancer care. A second question focused on the level of the competency (early learner-level 1, advancing learner level 2, or later career stage-level 3). A question concerning clarity of the competency was included, and stated, “Is the competency statement clearly written?” If participants answered “No” in response to whether the statement was clear, they were asked to provide suggestions in how it might be rewritten.

For round 3, each participant received a further refined set of competencies and was asked to rate if the competency was an *attitude*, *knowledge*, or *skill* and to provide an opinion on which level the competency item belonged to, in relation to the following levels: *early learner/novice practitioner*, *advancing practitioner*, and *expert practitioner*. Following each round of questionnaires, a working group meeting was held where summaries of updated competencies were provided, along with a list of areas of disagreement or identified gaps. The meetings were utilized for consensus building and to resolve any remaining areas of disagreement.

## Analysis

For the focus groups and interviews, thematic analysis was used to collate and synthesize participant expressions about the areas of knowledge and skills required for oncology practice. For the nursing-focused survey, content analyses (NVivo) were used to derive at an overall theme and key sub-themes by age and by work setting. Themes generated from the analysis were used to inform the framework.

For the Delphi Process, qualitative data from the first round was focused on grouping similar items together to create a thematic description. Subsequent rounds involved

quantitative data to ascertain collective opinion and utilized descriptive statistics. The task was to determine frequencies for each competency item on the questionnaire for the response categories of “appropriate,” “uncertain/unclear,” and “not appropriate.” Content analysis was used to analyze and organize the data collected from open-ended questions in areas of uncertainty or lack of clarity to facilitate discussions in the working group meetings.

Finally, the working group collaborated with a design team to create a visual depiction of the domain topic areas for optimal cancer care, as well as the increasing depth of expertise and knowledge as a health professional builds up competency towards a specialty (see Fig. 1 and Supplement Fig. 3).

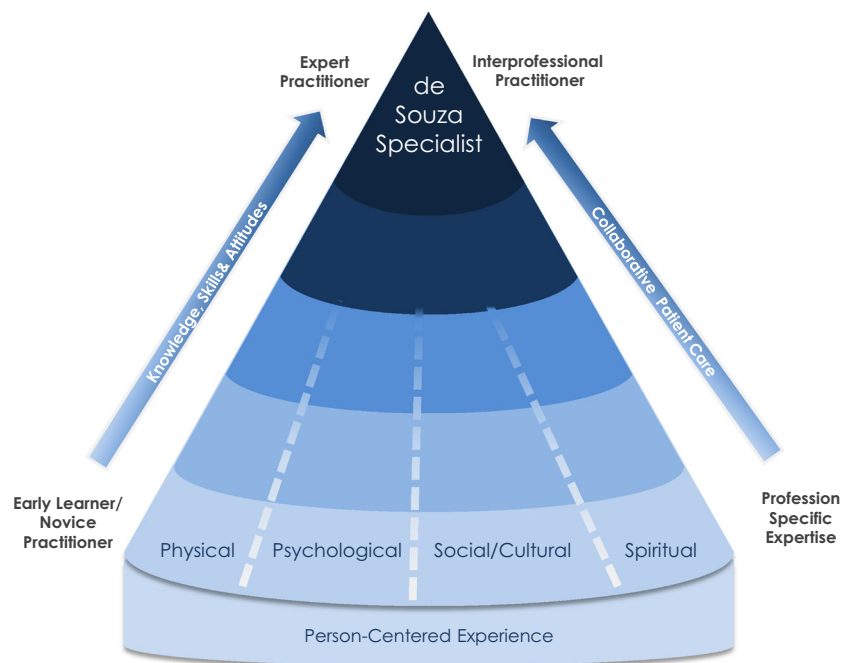
## Results

### Needs assessment findings (see Supplement Table 3 for further details)

**Focus groups** Major themes that emerged from the focus groups (51 participants) included cancer being a subject that is *broad*, *complex*, and *continuously evolving*. All professionals reported pressure to keep pace with emerging technology and knowledge. Common areas of educational needs included emotional care, major cancer tumor sites and their treatments, treatment side effects, critical thinking, navigating the cancer system, and managing survivorship issues. Mentorship was identified among nurses as being highly valued. One theme involved potential challenges in providing interdisciplinary education, given the differences between professions in knowledge and skill sets, as well as in their roles when supporting patients. Time efficiency was deemed important in relation to education, as well as the value of clinical case-based learning. Physicians and pharmacists in rural areas reported limited access to education.

**Nursing-focused survey** The first 32 nurses who responded to the invitation and met the purposive sampling criteria were invited to the survey. Their mean age was 44.2 years (SD 11.0), with an average of 16.5 years in practice. Eighty-four percent ( $n = 27$ ) had undergraduate training and 16% ( $n = 5$ ) at master’s level. Twenty-two percent ( $n = 7$ ) were from teaching hospitals; 44% ( $n = 14$ ) from community hospitals; 13% ( $n = 4$ ) from rural hospitals; and 22% ( $n = 7$ ) from community care-non hospital setting. Seventy-five percent ( $n = 24$ ) of nurses identified interprofessional collaboration as the top need for support, followed by professional development at 47% ( $n = 15$ ) and knowledge expansion in cancer care at 41% ( $n = 13$ ). Nurses younger than 30 years considered mentorship support and learning cancer basics as high priorities, while for older and experienced nurses, knowledge expansion and training for technology were priorities. Nurses working in teaching hospitals identified needs for more

**Fig. 1** de Souza specialist person-centered model



education in research; while for nurses in non-teaching hospitals and community care, knowledge expansion and access to technology were ranked as top needs.

### Competency item development and selection

For the modified Delphi technique, in the competency consideration of the first round, 58 competencies were selected from a potential pool of 183 competencies identified from the scoping literature, or developed by the working group experts. Working group members rated the relevancy and clarity of each competency and provided feedback on refinement needs of 35 of the competencies.

In the second round, the revised set of 58 competencies was emailed to the same working group members. Competency statements were rated using the same Likert ranking scales. Four additional competencies were added, i.e., one focused on self-care, others on transformative leadership in a complex health care system. A consensus (80% or greater in agreement) was reached and a final set of 62 competencies was established by round 3 (see Table 1).

### The interprofessional de Souza specialist framework of competencies

The model (Fig. 1) of early learner to expert practitioner depicts a de Souza Specialist who has attained cancer care competencies relevant across multiple health professions. To reflect varying levels of knowledge, a color gradient depicts increasing specialization. The model indicates that to best incorporate a person-centered approach into cancer care

practice, a professional must be aware of the challenges that a person faces along the cancer continuum across biopsychosocial domains. The model emphasizes that each person living with cancer has a unique experience requiring a personalized approach to care, which includes respect for people's values, preferences, and expressed needs; a tailored healthcare service for each patient; coordination and integration of care; provision of information and education; emotional support to alleviate fear and anxiety; involvement of family and friends; and provision of continuity of care to enable patients to actively participate in care planning and delivery. The framework can support quality improvement initiatives in better defining a standard for holistic and person-centered care, and in providing better transitions in care between and across services.

The model allows for variations in domains; for example, one clinician may reach expert level in one domain while working on expanding skills in the other domains. By increasing and building on a set of foundational knowledge, skills, and attitudes within physical, psychological, social/cultural, and spiritual domains, as well as by collaborating with other health professionals, an early learner/novice practitioner will move towards an identity as an expert interprofessional practitioner in the field of oncology.

The de Souza model addresses recommendation made by Frenk et al. [5] that a reform in interdisciplinary education requires educational competencies at three levels of learning (see Fig. 2).

**Level 1—informative learning** This level represents a stage where the health professional is acquiring generalized knowledge



**Table 1** de Souza competencies by level

Domain	Competencies
Section I: Competencies for Early Learner/ Novice Practitioner	
Knowledge	<ol style="list-style-type: none"> <li>1. Demonstrate foundational knowledge of oncology terminology, common cancers &amp; their usual treatments, disease variations associated with specific prevention strategies, diagnostic &amp; treatment options, as well as cancer genes in heritable cancers.</li> <li>2. Demonstrate a foundational understanding of the cancer journey, including psychosocial, physiological and systems factors, prevention, early detection, treatment, rehabilitation, survivorship, advance care planning and palliative care.</li> <li>3. Demonstrate an understanding of projected disease course &amp; the psychosocial impact on the person, caregivers, families &amp; social supports.</li> <li>4. Demonstrate a basic understanding of the most common late effects of treatments experienced in survivorship, including ongoing physical side effects (e.g. lymphedema, fatigue etc.), the need for screening &amp; surveillance, uncertainty of cancer recurrence, follow up care &amp; rehabilitation, impact on infertility, sexuality &amp; intimacy, cancer-related distress, returning to work, self-care &amp; management, community engagement, relationships with family &amp; friends, building meaning, spirituality and financial challenges.</li> <li>5. Appreciate a palliative care approach in relation to symptom management, nutrition, mobility, decision-making, grief &amp; loss, quality of life, team functioning, work-life and best practices in care.</li> <li>6. Demonstrate understanding of the principles of health promotion, both primary &amp; secondary, and their application in practice with patients, groups and systems. Have awareness and list of available screening programs in one's practice jurisdiction.</li> <li>7. Demonstrate understanding of the concept and context of patient use of complementary and alternative therapies, including indicators of risk, patient choices and self-management.</li> <li>8. Demonstrate foundational knowledge of access and equity issues that play a role in the uptake of healthcare interventions and potential outcomes.</li> <li>9. Have awareness of common ethical and legal issues and related policies in cancer care, and ability to engage with patients, teams and how to navigate systems to address these issues.</li> <li>10. Recognize the need for self-care, reflective practice &amp; mutual team care in order to build resilience as a health professional providing cancer care, and be able to engage in strategies that recognize burden due to the witnessing and suffering of loss.</li> <li>11. Demonstrate an understanding of interprofessional team collaboration and the skills to teach and learn with, from and about professions on the cancer care teams with whom the patient &amp; family interacts.</li> </ol>
Skills	<ol style="list-style-type: none"> <li>1. Demonstrate ability to use distress screening tools, identify various levels and types of distress exhibited by the person with cancer. Ability to use these tools with professionals, teams and patients to integrate care and improve outcomes as per CAPO (Canadian Association of Psychosocial Oncology) Guidelines.</li> <li>2. Demonstrate ability to perform person/family-centered care assessments during all stages of the cancer journey from prevention to end of life care.</li> <li>3. Demonstrate ability to incorporate family assessment information on potential cancer risk or predisposition to cancer to facilitate medical decision-making concerning risk-reducing options.</li> <li>4. Demonstrate ability to provide person-centered emotional support to patients to enhance holistic care throughout the cancer journey (e.g. adherence to Person-Centered Care Guideline, CCO).</li> <li>5. Demonstrate ability to discuss, educate, and counsel patients &amp; their support persons(s) regarding preferences, choices, needs, care planning, interprofessional teams, throughout the cancer journey, including palliative care.</li> <li>6. Demonstrate ability to incorporate communication strategies in conveying and discussing specific cancer information to patients &amp; their families in a manner that improves health literacy to better access, understand and use information for health.</li> <li>7. Demonstrate ability to incorporate communication strategies that encourage the process of grieving and building meaning for patients &amp; their families.</li> <li>8. Demonstrate ability to collaborate, provide care and coordinate as a member with other cancer care professionals and interprofessional teams to maximize care, patient partnerships and mutual learning, education and evaluation of practices.</li> </ol>
Attitudes	<ol style="list-style-type: none"> <li>1. Appreciate the impact of culture, the sensitivity and diversity of attitudes in relation to the topic of cancer and its life threatening nature, its potential existential impacts and the importance of hope.</li> <li>2. Aware of the interaction of genetic, environmental &amp; behavioral factors in predisposition of cancer, onset of cancer, response to treatment &amp; maintenance of health, as well as the sensitivity to mitigate stigma and understand attribution theories.</li> <li>3. Understand the importance of family history in assessing a predisposition to cancer, the role of cancer risk and relevant risk-reducing options.</li> <li>4. Aware of lifelong need to maintain and incorporate up to date knowledge on best practice guidelines, with latest evidence and recent literature in cancer care.</li> </ol>

## Section II: Competencies for Advancing Practitioner

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|-----------|--|
| Knowledge | <ol style="list-style-type: none"> <li>1. Demonstrate advanced knowledge of oncology terminology, common cancers &amp; their usual treatments, disease variations associated with specific prevention strategies, diagnostic &amp; treatment options, genes in heritable cancers, as well as knowledge of relevant best practices matched to scope of practice.</li> </ol> |
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**Table 1** (continued)

Domain	Competencies
	<ol style="list-style-type: none"> <li>2. Demonstrate an advanced and comprehensive understanding of treatments/therapies (including medical, psychosocial, &amp; rehabilitation), and the role they play in the holistic care of the individual.</li> <li>3. Demonstrate advanced and comprehensive understanding of the cancer journey, including common reactions (emotional &amp; physical), starting with prevention and early detection, to treatment, survivorship, advance care planning, and including palliative care and end of life care.</li> <li>4. Have advanced knowledge of the complexities associated in survivorship, including ongoing physical side effects, comorbidities, the need for ongoing screening, uncertainty of cancer recurrence, impacts on sexuality, follow up care, challenge in returning to work, altered relationships with family &amp; friends, and financial challenges due to cancer treatment.</li> <li>5. Appreciate the concept of integrated palliative care in relation to symptom management &amp; quality of life.</li> <li>6. Have advanced knowledge of grief &amp; bereavement and able to engage in appropriate interventions for patients, families &amp; teams.</li> <li>7. Have advanced knowledge of resources available to assist clients seeking information or services when transitioning throughout the cancer trajectory and skills to leverage these resources.</li> <li>8. Have expert knowledge of screening procedures &amp; able to provide appropriate referrals to available screening programs.</li> <li>9. Have advanced knowledge of the impact of grief &amp; bereavement on self, and of strategies and resources available to facilitate self-care with ability to assess fit, in order to use these resources in one's own practice, in coaching &amp; on teams.</li> </ol>
Skills	<ol style="list-style-type: none"> <li>1. Demonstrate ability to incorporate cultural competencies &amp; clinical skills to professional practice (including incorporation of indigenous knowledge and complimentary healing practices). Understand &amp; leverage appropriate supports and communication services.</li> <li>2. Demonstrate ability to provide education &amp; training using educator competencies to one's own profession and to other healthcare professionals and students within one's own areas of specialty.</li> <li>3. Demonstrate ability to communicate effectively &amp; mindfully with the person affected by cancer, their family members, &amp; other members of the healthcare team to facilitate timely and comprehensive assessment, and identification of current and potential adverse effects of having cancer &amp; cancer control efforts.</li> <li>4. Demonstrate ability to effectively, mindfully, and compassionately support cancer survivors, their families and caregivers as they cope with daily living, including lifestyle, employment, school, sexual relationships, fertility issues, &amp; intimacy.</li> <li>5. Demonstrate ability as a cancer professional to provide, or refer to appropriate cancer support services or resources for cancer prevention, screening and management of precancerous conditions; specifically, knowledge of how &amp; when to make a referral to an appropriate professional, service, or community group.</li> <li>6. Demonstrate skills to provide grief &amp; bereavement interventions &amp; appropriate resources for teams, patients, support partners &amp; families.</li> <li>7. Demonstrate application of reflective practice as a health professional to determine when &amp; what self-care resources are needed, when issues are effecting care &amp; when a team or systems care approach is needed.</li> <li>8. Demonstrate application and integration of all aspects of the patient journey and domains of cancer care to design a care plan through open communication with the patient, the care team and their support team.</li> </ol>
Attitudes	<ol style="list-style-type: none"> <li>1. Cognizant that each individual with cancer has a unique cancer experience, therefore requiring an individualized &amp; holistic approach when developing a care plan for each patient.</li> <li>2. Practice in a way that is cognizant of, and works with the specific social and psychological impacts of cancer on the culture, dignity, values, beliefs, &amp; quality of life, as well as rights of people affected by cancer.</li> <li>3. Demonstrate collaboration focused on shared goals, decision-making &amp; integrated care with members of the healthcare team. Ability to assess, prioritize, plan, provide care/intervention and make decisions to optimize patient and family health outcomes, work with team processes and improve quality of care to match the potential needs of the person affected by cancer.</li> <li>4. Demonstrate the ability to adapt to and be flexible to assume diverse roles in interprofessional groups and support team members in changing professional environments.</li> <li>5. Establish &amp; maintain effective interprofessional working relationship partnerships with patients and families &amp; other team members, teams and/or organizations to support achievement of common goals.</li> </ol>

## Section III: Competencies for Expert Practitioner

Knowledge	<ol style="list-style-type: none"> <li>1. Have expert understanding and awareness of the various factors that influence the patient's ability to use cancer related services, such as ethnicity, culture, health beliefs, social status, economic status, mobility, systemic &amp; physical barriers, language, communication abilities, disabilities, &amp; health literacy.</li> <li>2. Have an integrated expert knowledge base of the complexities involved in all aspects of a person's/family's care &amp; potential outcomes. Have expert understanding of complex actions and reactions related to illness experience, including those impacting relationships, and knowledge to incorporate the perspective of relational theory and its role in coping &amp; adaptation.</li> <li>3. Have expert and integrated knowledge of interprofessional care, including a full understanding of one's own role, shared roles, group process, and team development skills.</li> <li>4. Having expert knowledge of mentorship models and coaching strategies to support team members in developing competencies for provision of oncology care.</li> </ol>
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**Table 1** (continued)

Domain	Competencies
Skills	<ol style="list-style-type: none"> <li>1. Ability to develop appropriate continuing care plans using patient education best practices and resources, for cancer survivors and their families that provide continuity and integration of cancer care, primary care, community, &amp; self-management support services and resources.</li> <li>2. Ability to build, lead, and evaluate programs or practices to address factors that influence the patient's ability to use cancer related services, such as ethnicity, culture, health beliefs, social economic status, mobility, systemic &amp; physical barriers, language, communication abilities, disabilities, &amp; health literacy.</li> <li>3. Demonstrate ability to integrate, translate, and apply knowledge from various cancer domains to screen for, and manage more complex issues, such as patient reactions and comorbidities into care.</li> <li>4. Ability to discuss, identify and prioritize hospice palliative care management issues and team processes across the lifespan for each person with cancer, at the appropriate time during their cancer journey.</li> <li>5. Recognition of need for, and ability to advocate for challenges involving equity &amp; access in order to improve health outcomes.</li> <li>6. Ability to establish a culture within the team for trust and idea sharing, ensuring that communal expectations and mutual goals can be identified.</li> <li>7. Ability to address conflicting and/or competing messages, goals, or processes shaping the flow of communication within interprofessional teams, including the interplay between autonomous professional practice &amp; interprofessional team collaboration in order to support effective communication and team cohesion.</li> <li>8. Ability to use advanced clinical knowledge through integration and contribution to understand and translate knowledge at a population health, academic work and systems level through quality improvement &amp; research.</li> <li>9. Recognize unhealthy work environments or situations where personal health &amp; safety is at risk or may endanger the health &amp; safety of others, such as team members or patients, and have strategies to address these with colleagues and within systems.</li> </ol>
Attitudes	<ol style="list-style-type: none"> <li>1. Demonstrate leadership to create effective interprofessional team functioning through a variety of strategies, including reflection, promotion of effective decision-making, and identification of factors that contribute to, or hinder team collaboration.</li> <li>2. Practice in a way that encourages curiosity, academic practice and interprofessional ethics to foster a deeper understanding of unsolved and complex issues, build effective and reflective processes, and evaluate to improve cancer care.</li> <li>3. Aware of workplace complexities, such as provider roles, team functioning, and organizational environments affecting patient-practitioner relationships and the quality of care provided to the person with cancer.</li> <li>4. Participate in, and advocate for continuous life-long learning environments and opportunities, while promoting awareness and application of up to date research evidence in all oncology-related domains of care.</li> </ol>

and skills to practice within a specific health profession, with a goal of becoming an “expert” in oncology practice over time. At this stage, the health professional achieves a beginning level of competency. The de Souza learning pathway provides foundational curricula in broader areas of oncology practice to support further specialization. Examples of courses may include Cancer Basics, Introduction to Psycho-social Oncology, or Introduction to Palliative Care.

**Level 2—formative learning** Here, the health professional moves beyond acquiring a foundational knowledge and skill set to obtain further knowledge concerning practice with additional expertise in the social needs and values of current society. Once succeeding in the competencies within this level, the health professional will have attained the knowledge, skills, and attitudes to perform specialized oncology practice. Examples of curriculum include Education in Palliative and End of Life Care or Sexual Health in Oncology.

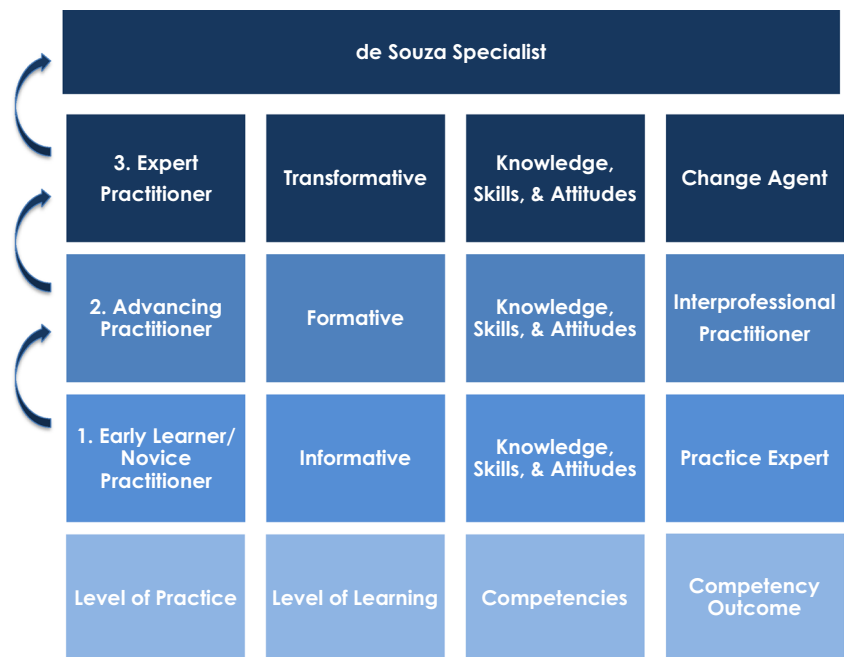
**Level 3—transformative learning** This learning level involves the development of leadership attributes with the

optimal goal of creating “change agents.” Professionals with leadership attributes, along with advanced and specialized knowledge, are expected to thrive within the oncology health system and contribute to its evolution and growth. Transformative learning is associated with a shift in learning, from facts, concepts, and skills to one of critical reasoning to search, analyze, and synthesize information for decision making. These skills are integrated along with effective teamwork in health systems, for example, through the use of communities of practice, for creative adaptation of global resources to address priorities at a local level [5]. At this level, we provide leadership courses or advanced care courses (i.e., Survivorship Care), and encourage clinicians to achieve a de Souza Scholar designation.

This approach to successive knowledge acquisition aligns with the levels associated with a health professional gaining increasing specialization. Within the framework, competencies at each level are identified to support the varying levels of knowledge, skills, and attitudes required to meet the needs of cancer or palliative care populations. For example, a nurse may become an expert in palliative



**Fig. 2** Level of learning, practice and competencies for de Souza specialist



care or in cancer prevention, whereas a social worker could develop greater expertise in complex cancer survivorship areas, such as the management of sexual functioning issues impacted by cancer and its treatments.

As health professionals advance in their education, they will not only learn relevant physiological, psychological, social/cultural, and spiritual knowledge, but they will begin to develop interprofessional practices for optimal team work and skill in change management and leadership. Incorporating these skills into practice provides opportunity for health professionals to break down silos within health systems, and to gain skill sets outside of one's main domain, ultimately providing the best and most seamless oncology care possible (see Table 2).

### de Souza specialist educational model

Table 1 and Supplement Fig. 3 provide an overview of the specific competencies within each level of learning and specialization relevant for any regulated health professional working along the cancer care continuum. The competencies described reflect the knowledge, skills, or attitudes associated with at least one of the practice domains (physical, psychological, social/cultural, and spiritual) involved in cancer care. These competencies can be mapped to align with specific education programs, tailored to build on the healthcare professional's own baseline level of professional competencies (left side of Supplement Fig. 3), and incorporated into a comprehensive learning pathway.

**Creation of designations** The competencies are currently being used to inform “early learner” to “expert” learning

pathways. The de Souza Institute has created a “de Souza designate” program that is becoming recognized by healthcare institutions as a meaningful way to indicate when a professional has reliably completed specialization across the cancer care continuum. The model has been applied to describe various levels within the nursing field (e.g., generalist, specialized and advanced practice nurses) [44]. Beyond nursing, radiation oncology and rehabilitation medicine have expressed interest in curricula and a designation system. Social workers and psychologists have also explored opportunities for certification or credentialing, indicating specialized expertise in the field of psycho-oncology.

### Preparing for application of the framework

Following the development of the framework, de Souza Institute Educators reviewed the existing de Souza curricula to ensure alignment with the framework in preparing

**Table 2** The shared set of competencies in oncology practice

- Interprofessional collaboration
- Recognition of the biopsychosocial and spiritual impact of cancer and the underpinnings of a person living with cancer
- Foundational understanding of the cancer experiences and the cancer journey
- Person-centered care, including symptom recognition, referral process, and resources
- Communication skills to address the needs of patients, families, their networks, and their health care members
- Regular review of competencies, including evidence-based new knowledge and the use of technology in care delivery
- Awareness of one's own limits and ability for self-care

learners from different healthcare disciplines. Other established curricula from higher education and/or well established CE programs were also reviewed. A de Souza course calendar supports agencies interested in standardized continuing education ([www.desouzainstitute.com](http://www.desouzainstitute.com)). An online learning system, including individualized progress tracking, was also launched for learners across professions.

The framework was presented to universities and cancer agencies, as well as at national and international conferences for further feedback and to enhance awareness and uptake of the competency-based pathways and curricula. Emphasis was focused on how the framework and learning pathways can be seamlessly linked to topics offered within formal higher education for the health professions and in CE programs. Feedback was reviewed with knowledge users, including policy makers, researchers, and healthcare professionals and patients.

## Discussion and implications

A modified Delphi technique attained consensus among experts in cancer care to create the de Souza interprofessional practice cancer competency framework. The main feature of the framework is that it highlights the shared competencies that bring professionals together, while recognizing the individuality of each profession as possessing distinct and complementary skills. A set of recognized competencies can help address challenges in team-based care and the complexities inherent in oncology. This framework aims to advance transformative learning in a way that embraces the integration or interdependence of education.

The framework has assisted to strategically develop and adapt a standardized curriculum on supportive cancer care across professions and jurisdictions. It also is used to inform a multiple credit-based professional CE curricula supporting all disciplines. The model has been well-received by clinicians and educators and has demonstrated impact in improving knowledge and self-confidence of participants across several cancer care domains [44]. The framework has been sought out by regional and national organizations to provide standardized education to support quality improvement initiatives. The framework has also assisted in providing a useful template for potential funders considering standardized programs to support workforce development. The framework has received positive feedback by several professions and educational agencies, such as universities, for its alignment with job market needs.

The development of the framework is timely and complements prior discipline-specific work for cancer or interprofessional approaches in palliative care [8, 17, 30].

Stakeholders, such as educators and clinical leaders, are seeking new ways to support a more comprehensive approach in organizing professional development that allows for a transition from a degree program to practice, which can be tailored to local contexts and that can address issues of access, safety, and quality of care. Conceivably, this framework could be applied to other chronic disease areas, where healthcare agencies and systems are similarly challenged to help their healthcare practitioners keep pace with advancing knowledge and to manage the complexities in care.

In summary, the de Souza interprofessional model provides a set of shared competencies and an educational framework relevant for person-centered oncology care across disciplines and supports educational needs ranging from the early stage of a health professional's career to that of a more advanced expert.

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

The authors have full control of all primary data and agree to allow the journal to review their data if requested.

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