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Reproductive Health in the Adolescent and Young Adult Cancer Patient: An Innovative Training Program for Oncology Nurses

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Abstract

In 2008, approximately 69,200 AYAs were diagnosed with cancer, second only to heart disease for males in this age group. Despite recent guidelines from professional organizations and clinical research that AYA oncology patients want information about reproductive health topics and physician support for nurses to address these issues with patients, existing research finds few oncology nurses discuss this topic with patients due to barriers such as lack of training. This article describes an innovative eLearning training program, entitled Educating Nurses about Reproductive Issues in Cancer Healthcare (ENRICH). The threefold purpose of this article is to: (1) highlight major reproductive health concerns relevant to cancer patients, (2) describe the current status of reproductive health and oncology communication and the target audience for the training, and (3) present a systematic approach to curriculum development, including the content analysis and design stages as well as the utilization of feedback from a panel of experts. The resulting 10-week curriculum contains a broad-based approach to reproductive health communication aimed at creating individual- and practice-level change.

Introduction

Despite being a leading cause of mortality among female and male Adolescent Young Adult (AYA) populations (i.e., between the ages of 15–39), there has been relatively little progress in cancer treatment and survival in this age group. In 2008, there were approximately 69,200 AYAs, diagnosed with cancer second only to heart disease for males in this age group.[1] The 5 most common incident cancer sites for women in the AYA population include breast, thyroid, melanoma, cervix/uteri, and Hodgkin's lymphoma. The most common sites for men include gonadal germ cell, melanoma, non Hodgkins lymphoma colorectal, and thyroid.[2]

While there are many unique medical and psychosocial considerations in this group, reproductive health is an important area of concern identified by cancer patients [3–7] and professional organizations.[8–10] Available research suggests that cancer-related loss of fertility can cause long-term distress and impaired quality of life in cancer survivors [11], especially if they did not receive sufficient information on fertility preservation options before the start of their treatment.[12, 13] Even 5–10 years after treatment, the grief associated with interrupted childbearing continues to strongly impact quality of life.[11]

Importantly, a recent study demonstrated that women who received specialized counseling about reproductive issues reported less regret and greater quality of life.[12] Traditionally, fertility has been the primary topic addressed in the context of reproductive health and cancer.[5, 12] However, recent studies suggest that other reproductive health topics such as sexual health and functioning are also important to patients, and in some situations, may be of more interest than fertility.[14] Reproductive health has the potential to impact across physical, emotional, social, and spiritual well-being of AYA cancer patients and encompasses a spectrum of issues related to fertility, sexuality, gynecologic/urologic health, and family building.

Issues Related to Cancer and Fertility

The American Society of Clinical Oncology (ASCO) suggests all patients receiving chemotherapy should be informed about the possibility of infertility and fertility preservation options, and that those who are interested be referred to a reproductive specialist [10]. As reproductive technology continues to advance, there are options available that are most efficacious prior to initiation of cancer treatment. For AYAs, those options related to preserving fertility for those of reproductive age are likely to be of particular interest.

Male cancer patients who undergo chemotherapy may experience toxicity to the gonads leading to permanent spermatogenesis impairment.[15] In general, men have a longer history of availability of fertility preservation options, particularly semen cryopreservation or sperm banking. With recent advances in cryopreservation of testicular tissue and semen, samples can be taken from most post pubertal males. ASCO and the American Society of Reproductive Medicine (ASRM) specifically recommend all male cancer patients should be offered the option of SCP and referred to a licensed facility prior to the initiation of cancer treatment.[16–18]

For women, fertility preservation after a cancer diagnosis may be more complex.[15] Ovarian transposition and embryo cryopreservation are the two established options.[17, 19, 20] For patients whose treatment includes pelvic radiotherapy, ovarian transposition is a surgical technique used to protect ovarian function by moving the ovaries out of the field of radiation before delivery of gonadocidal doses of radiation therapy. The second established option is embryo cryopreservation which requires controlled ovarian stimulation and oocyte retrieval with cryopreservation of embryos prior to or during an appropriate break in cancer treatment.[21] However, this type of preservation is unsuitable for patients without a male partner or who decline donor sperm.[19] In such situations, additional experimental preservation options include embryo or oocyte cryopreservation [22] and banking of ovarian tissue [23] warrant consideration.

Issues Related to Cancer and Sexuality

The focus of communication to patients of childbearing age is typically on preserving the potential for cancer patients to attain biological parenthood upon completion of cancer treatment.[24] Thus, messages about the risks of fertility loss and associated preservation options are conveyed by health care providers to their patients.[25–27] AYA cancer patients may over-attend to these messages, inadvertently leading patients to believe that contraception or abstinence is not necessary during and/or after cancer treatment. However, to maximize current and future reproductive health for individuals with cancer, it is important for health care providers to address a broader spectrum of topics related to reproductive health at or near the time of cancer diagnosis.

The broader topics of reproductive health that encapsulate sexuality include risks of pregnancy. Some cancer treatments, including chemotherapies with antimetabolites and alkylating agents, have known teratogenic risks to a developing fetus, ranging from spontaneous abortion to severe congenital malformations.[28–30] Another issue to consider regarding reproductive health, contraception, and cancer is the issue of risk for sexually transmitted infections (STIs) as a result of unprotected sexual activity.[31] Undergoing cancer treatment increase physiologic susceptibility for STIs due to compromised immune systems, that may in turn result in negative reproductive health outcomes associated with persistent STI.[32] Patients are expected to become neutropenic at various times throughout their treatment putting them at significant risk for contracting STIs if sexually active. This is particularly important to address in an oncologic setting given that adolescent cancer patients do not appear to decrease sexual risk-taking behaviors (e.g., unprotected sexual intercourse) compared to their siblings without a cancer diagnosis.[33] For AYAs treated in adult oncology settings, healthcare professionals may neglect the traditional risk-taking behaviors of this population and miss the opportunity to discuss sexual health.[33]

Sexual dysfunction can result from premature menopause (see section below of gynecologic/urologic health), or it can occur as a separate side effect from treatment. Though patients are more likely to experience some form of sexual dysfunction as a result of their treatment rather than the actual cancer,[34] the symptoms of the disease can adversely affect sexual patterns. Types of physical sexual dysfunction include sterility, low levels of testosterone, impotence, and pain. Types of psychosocial sexual dysfunction include poor body image, stress, avoidance, and fear of rejection from the partner.[35] Treatments for sexual dysfunction can include pharmacologic and/or psychologic therapy. One randomized clinical trial attempted to boost libido among women using testosterone supplements, however no significant difference was observed.[36] Despite the potential impact of sexual dysfunction across multiple domains of quality of life, available research shows that this topic is not consistently addressed within an oncology setting.[37]

Patients often rely completely on their oncology clinicians for a variety of issues during this emotionally and physically fragile time. It is common for patients to expect oncology care providers to offer information regarding various psychosocial and quality of life issues early in the cancer diagnosis and treatment process.[38–40] This creates an important opportunity for clinicians, including nurses, to address sexuality, sexual activity, and preferences for contraceptives that may be contraindicated with their cancer and/or treatment among sexually active patients.[32]

Issues Related to Gynecologic/Urologic Health

Side effects from cancer treatment encompass a variety of potential long-term gynecologic or urologic issues for AYA patients including pre-mature menopause for females and andropause for males, hormone imbalance, and sexual dysfunction. The definition of premature menopause varies throughout the literature though a general consensus is cessation of menses for at least 12 months prior to the age of 40.[41, 42] Much of what is known regarding premature menopause is based on studies of young adult women diagnosed with breast cancer who are put on a hormone therapy regimen to lower estrogen levels after surgery to reduce the risk of recurrence from hormone-receptor-positive tumor or those that take drugs to temporarily stop ovarian function that in turn stops estrogen production.[43] One study found that patients who experienced treatment-induced menopause during breast cancer therapy have a higher risk of becoming permanently menopausal after treatment.[44] However, some patients may only experience temporary menopause, complete with common symptoms like hot flashes, and return to a normal menstrual cycle post-treatment. Premature menopause (whether temporary or permanent), has the potential to cause physical

and emotional effects ranging from hot flashes, vaginal dryness, and osteoporosis [45] to sexual dysfunction [46] and depression.[47]

Though the risk of experiencing premature menopause can be assessed before, during, and after treatment, it is difficult to assess how long after the completion of treatment an AYA will enter permanent menopause, which may still occur naturally later in life. Wallace et al has offered a calculated approach to determine the risk of premature ovarian failure, which is related to premature menopause, for patients who have received radiation, indicating that ovarian failure is immediate following specific radiation doses at specific ages from birth to 30 years of age.[48] It is conceivable that future screening technologies will aid treatment teams in determining when menopause is likely to occur based on individualized factors, enabling patients and their families to make informed decisions about pursuing reproductive assistance pre-treatment. However, clinicians must be aware of these late effects and have the skills to discuss with patients.

Treatment for some cancers can initiate premature andropause in AYA males. During andropause men experience a marked decrease in levels of testosterone leading to similar menopausal symptoms such as osteoporosis and sexual dysfunction.[49] Andropause is a relatively new area of study and much of what is known is based on men diagnosed with prostate cancer prior to the age of 50. Hormonal ablation is a common prostate cancer treatment which reduces the amount of testosterone that the body produces. Artificially reducing the testosterone levels puts male patients at an increased risk for premature andropause and associated symptoms.[50] While andropause occurs naturally among aging males, it is difficult to predict when an AYA male will experience these symptoms after cancer therapy. Some screening tests are available such as the Androgen Deficiency in Aging Males (ADAM) self-report questionnaire, as well as evaluating testosterone serum levels.[51]

Issues Related to Cancer and Family Building

There are a variety of pathways to parenthood for individuals and couples who have experienced cancer. Though having biological children has been shown to be preferred among cancer survivors, adoption is another option, particularly when fertility preservation options are not known.[52, 53] The abundance of fertility preservation options requires discussions regarding the possibility of delaying cancer treatment, risk of congenital abnormalities, and experimental vs. established options.[54–56]

Individuals or couples will have to decide how long they wish to or are able to pay for storage of biomaterial, even if they were able to conceive naturally or decide not to have children. Surpluses of biomaterial may be sought for research purposes or donation to infertile couples, which can entail multiple ethical and emotional challenges. Embryos created with a partner may be subject to legal negotiations if the relationship dissolves, especially if a new partner refuses to use the embryos that can also cause unanticipated stress for the prospective parents.

Third-party reproduction includes utilizing biological and non-biological methods. Surrogacy allows for a female to carry a pregnancy through artificial insemination by way of donor egg, donor sperm, or donor embryo. The donor can be anonymous, known, or directed by way of a close family member or friend.[57] In this way, prospective parents have the option of creating a biologically-related child. In the case of the donor embryo cancer survivors may select from an infertile couple's donated embryos.

The adoption process may begin before a child is born until age 17. However, adopting may not be a straightforward experience for cancer survivors. International adoptions may be restricted for survivors as some countries do not consider cancer a 'curable' disease.[52]

Role of Oncology Nurses in Reproductive Health for AYA Patients

While the cancer diagnosis has the potential to impact reproductive health throughout the life-span, addressing these issues as close to the time of diagnosis as possible is likely to yield the most informed decisions and opportunities for planning for patients and their families. Clinicians attuned to the psychosocial, developmental, and life stage characteristics of this vulnerable group of patients best facilitate discussions about these sensitive and emotional topics. Oncology nurses play a key role in patients' care and, compared to other health care providers, are more likely to have multiple interactions with patients prior to the initiation of treatment.[58] They are often attuned to the medical and psychosocial needs of the patient and family and can advocate for their needs and desires.[59] Based on the well-established roles played by oncology nurses, recent data suggest physicians are highly supportive of a trained member of their health care team, such as the nurse, providing information about reproductive health issues to patients.[60, 61] Therefore, oncology nurses are in an ideal position to discuss reproductive health with patients [62].

Despite the clinical availability of options and services to protect/promote reproductive health in the oncology care setting, evidence that patients desire reproductive health information, and physician support for nurses to address this issue with patients, existing research finds few oncology nurses discuss this topic with AYA patients.[61, 63, 64].

A few studies have examined barriers to discussion of fertility preservation among pediatric and adult oncology nurses. In a study of 115 pediatric oncology nurses, Vadaparampil and colleagues reported patient factors most likely to encourage the discussion of fertility preservation were: patient being recently married or engaged, patient asking about it, and availability of patient education materials.[61] While results indicated nurses did not regularly discuss fertility preservation with their patients, the vast majority of nurses perceived such discussion as being within their scope of practice. King and colleagues found similar patterns with adult oncology nurses.[64] Only half of the nurses regularly discussed fertility preservation options with patients, even though the majority believed having discussions with patients about fertility was part of their role. Factors associated with the discussions included: (1) knowledge (procedures, fertility institutes and clinics, resources for patients, and practice guidelines), (2) attitudes (difficulty finding facilities, time constraints, role, comfort level, ethical issues, financial considerations, and patient characteristics), and (3) behaviors (patient initiation, physician behaviors, patient characteristics, and timing).

Additional studies have identified factors that contribute to the lack of communication regarding gynecologic and urologic health with AYA cancer patients and survivors. Discussing sexual concerns that arise after gynecologic procedures will likely reduce future stress among survivors.[65] Despite the need to discuss future gynecologic and urologic impacts from cancer treatment, the frequency and consistency with which these conversations remain low, possibly due to low confidence to discuss sexual issues with patients.[66, 67] In fact, almost 20% of advanced practices nurses who attended a communication training in 2001 reported that sexual matters was the hardest issue to discuss with patients [68], demonstrating need for enhanced education.

An Innovative Program to Train Oncology Nurses in Reproductive Health

Importantly, many barriers to the discussion of the topics identified in these studies (e.g., low knowledge, unfavorable attitudes, perceived lack of skills, low confidence) may be

improved through educational initiatives. As such, we have developed an innovative distance learning training program for nurses based in the oncology care setting, entitled Educating Nurses about Reproductive Issues in Cancer Healthcare (ENRICH). This program was funded by a five-year R25 Cancer Education Training Grant from the National Cancer Institute in 2011. Our target audience includes oncology nurses who regularly see AYA patients in adult cancer care settings at or near the time of diagnosis and treatment planning. The training will enable nurses to identify, educate, and refer individual patients as well as develop and implement strategies at their local work settings to make improvements in this area of care. The ultimate goal of the training program is to develop a network of 250 trained nurses to share experiences and resources, and disseminate the program with a focus on creating behavioral and institutional change. The remainder of this paper, we outline key aspects of this training program structure and curriculum that will be implemented over the next five years.

Program Structure

Participants will be selected through a competitive application process during years 2–5, with 26 participants in the first cohort, followed by 76 in each cohort for the subsequent 3 years. The training program consists of a 10-week web-based curriculum with distance learning-based follow-up, facilitated expert eLearning discussions, brief quizzes, ask-the-expert modules, and interactive group discussions. Core elements that underlie this training program include a broad-based approach to addressing reproductive health, facilitating individual-level change, supporting practice-level change, and collaborating with clinical and research experts nationwide.

Broad-Based Approach to Reproductive Health

Much of the early work in this area was focused on a singular aspect of reproductive health: fertility preservation. This pioneering work from professional, advocacy, and academic organizations such as ASCO [10], Fertile Hope (now part of LiveStrong), and the Oncofertility Consortium [69] have been tremendously important to creating awareness, interest, and clinical advances related to fertility and cancer. They have also paved the way for addressing additional needs related to reproductive health for oncology patients. As outlined in Table 1, we developed a comprehensive curriculum that addresses separate but related issues under the broad umbrella of cancer and reproductive health.

Program Structure

While improving knowledge is an important requisite to fostering individual change among providers, the opportunity to share personal experiences and see a direct application of a learned concept are central to adult learning. The adult learner, who returns to study, brings a background of life and work experience to the learning environment and has more clear cut goals, which grow from the desire for professional advancement or an organizational requirement. Central tenets of adult learning theory include: (1) learning should capitalize on the experience of the participants, (2) learning should be adapted to the limitations of the participant, (3) adults should be challenged to move to advanced stages of personal development, and (4) adults should have choice in organizing the learning program.[70] Table 2 provides some examples of how each of these principles is operationalized in our curriculum.

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expert modules, and interactive group discussions. Figure 1 provides examples of the eLearning environment. Core elements that underlie this training program include a broad-based approach to addressing reproductive health, facilitating individual-level change, supporting practice-level change, and collaborating with clinical and research experts nationwide. Eligibility requirements are to be a registered nurses working in the adult oncology care setting who provides oncology care for at least 5 patients a year who are of child-bearing age.

Creating Individual-Level Change

Due to the intense information needs expressed by health care providers, there have been several short-term, in person, and web-based training opportunities that cover important aspects of fertility and reproductive health that address the increases in provider knowledge that are critical to behavior change (e.g., discussing reproductive health topics with patients). Given the important knowledge elements related to educating providers about issues related to the risk of infertility and fertility preservation, our hope is to partner with these programs to make these resources available to our participants. However, the majority of current education programs are focused on increasing knowledge through short-term, primarily didactic opportunities, and generally focused solely on fertility preservation.

Supporting Practice-Level Change

Our training program has several distinguishing features organized within each process (application, training, and completion) and is designed to foster a practice setting that will embrace the application of knowledge and skills acquired by program participants. First, as part of the application process, we require a letter from the applicant's supervisor conveying support for both the applicant's participation in the training program as well as institutional support for the desire to address the reproductive health needs of AYA oncology patients. This support letter is to ensure initial buy-in at the management level and ensure that institutions ultimately have the same goals as the applicant because knowledge and skills should not depend on a single individual, but rather should reside in the practice itself. Additionally, all participants in our program will have a learning partner. While we prefer individuals from within a practice setting or institution apply as a team, we will pair those who are unable to identify such a partner based on geographic proximity.

The purpose of a learning partner is two-fold; first, it helps to ensure that an institution does not lose the knowledge and skills gained by the training if the trainee leaves the organization. Second, partnered learning allows for "sharing" or discussion with another learner about how to approach a task or how to consider it. Paired learning is deemed a critical component of adult learning, particularly in on-line learning situations where learners may have limited, or no interaction like which naturally occurs in a traditional classroom setting.[71] Several recent experimental studies have included the "Think, Pair, Share" technique in adult learning setting and found it to be more effective than individual learning.[72] This technique involves considering or thinking about the information or learning activity, pairing with a partner to discussing, and sharing ideas about how to approach the task or seek additional information.

Successful application of knowledge and skills acquired from the program requires a desire for and documentation of change within each nurse's practice setting. For some this may encompass their entire institution, and for others this may mean their individual clinic or program. Therefore, prior to the training, all applicants will indicate their specific practice setting's current efforts related to addressing reproductive health issues and their future goals based on program participation. Some examples of goals may be to create systems for

identification of AYA patients who may be interested in additional reproductive health information or training additional nurses within the practice setting.

During the program, participants will participate in several “real life” activities that help to create necessary components of a system to support discussions related to reproductive health and cancer. For example, in one of the week’s curriculum, each participant must identify and introduce himself/herself to a local reproductive endocrinologist. Skills will be measured by an open-ended qualitative assessment that evaluates behavior acquisition related to the week’s specified practice care competencies. In another week’s assignment, nurses will communicate with a local state adoption agency to identify the general requirements for potential parents wishing to pursue adoption as well as the unique requirement for cancer survivors (e.g., a letter from personal oncologist or physician stating the patient is cancer-free). Skills will be measured by a two-fold assessment that utilizes an open-ended behavior acquisition question and a multiple-choice quiz that analyses knowledge acquisition of the barriers and facilitators to reproductive health care. Weekly discussion board posts will be required that encourage exchanging ideas and experiences with the lesson which will reinforce learned skill set and how this fits or wouldn’t fit in their institution.

Upon completion of the program, it is expected that participants will disseminate the information to colleagues and administrators, as well as establish new institutional practices regarding the delivery of reproductive health information to cancer survivors. Participants will be required to provide institutional change documentation six months after the training and a yearly request will be sent for the remaining years of the grant.

Collaboration with National Experts

There are multiple aspects of the training program that benefit from expert input. In addition, by working with leaders in the field, we are kept well-informed about other innovations and advances that may be relevant to our training program. In our training program, this takes the form of three distinct advisory panels with unique functions. This group represents oncology nurses and physicians; basic science, clinical, and behavioral science researchers; patient advocates; and cancer survivors that are affiliated with seven organizations across six states in the U.S.

The recruitment committee assists in the development of the recruitment and nomination strategies for all cohorts, the marketing material for the training program, and the identification of marketing venues that will enhance the outreach of the training program. The curriculum committee assists in the development of the objectives, methodologies, and content of the training curriculum and will interact with the evaluation advisory to finalize evaluation methods related to content knowledge acquisition. The evaluation committee will develop and finalize all evaluation documents and database/tracking options over time for all cohorts. Each panel includes two leaders representing a local research team member and an outside institution. In addition to a two-day in person annual working meeting, committee leaders participate in regular phone calls to advise and guide the training program directors.

Future Directions

In January 2013 we will enroll our first cohort of trainees. This pilot cohort will consist of 26 individuals either self-identified or nominated by one of our national experts. During this pilot year, we will refine our recruitment approaches, curriculum, and evaluation metrics. Other goals for the training grant include the need to identify the most up-to-date science in reproductive health, new findings, and best practices and to ensure this evidence is continually infused in the curriculum. Finally, the goal of ensuring the nurse training

ultimately has direct benefits for patients will be met by conducting regular meetings with patient survivor groups and individuals for suggestions to improve the communication aspect of the training. The research goal of the training initiative is to move the communication science forward by identifying and disseminating the most appropriate messages regarding reproductive health, the timing of the message, and factors that facilitate decision-making.

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ENRICH Training Home Page

ENRICH Module One Main Page

REPRODUCTIVE HEALTH AND MEN

LEARNING OBJECTIVES

- Describe the physiological and psychosocial impact of cancer and treatments on AYA males
- Understand current technologies available and future directions for male FP

➔

CARE COMPETENCIES

- Demonstrate an understanding of the relationship between cancer treatment and male reproductive health
- Identify male clients who may benefit from specific reproductive health information and/or services
- Provide male clients with credible, accurate, appropriate and current information to patients about reproductive health risks and options

Following a review of this page, participants will be prompted to complete a survey in which they rate the relevance of each care competency to their personal work environment. The aim of this survey is to provide motivation through the connection of the care competencies addressed with the personal experiences of each participant.

ENRICH Module One Example Screen Shot

Participants will have the ability to choose how they will complete module by selecting the order in which they complete the three module sections below. This page serves as a content "menu" and allows for the adult learning participants to take command of their learning experience.

**PHYSIOLOGICAL
IMPACT**

**PSYCHOLOGICAL
IMPACT**

**CURRENT
TECHNOLOGIES
AND FUTURE
DIRECTIONS**

ADOLESCENT AND YOUNG ADULT MEN | REPRODUCTIVE HEALTH

ENRICH Module One Example Screen Shot of Menu

ENRICH Module One Discussion Board

ENRICH Module One: Evaluation Tools

Figure 1.
ENRICH Training: Module One Screen Shots

Table 1

ENRICH Curriculum Objectives

Week	Learning Objectives ^a
Orientation: Reproductive Health and Cancer Overview	<ul style="list-style-type: none"> Discuss the significance of reproductive health for cancer survivors and clinical scenarios in which reproductive health may be relevant to an oncology patient.
Phase One: Establishing the Facts	
One: Reproductive Health – Males	<ul style="list-style-type: none"> Describe the physiological and psychosocial impact of cancer and treatments on the AYA male patient Understand current technologies available and future directions for male fertility preservation
Two: Reproductive Health – Females	<ul style="list-style-type: none"> Describe the physiological and psychosocial impact of cancer and treatments on the AYA female patient Understand current technologies available and future directions for female fertility preservation
Three: Family Building Options	<ul style="list-style-type: none"> Describe the options for male and female AYA patients to build a family after cancer treatment. These include, but are not limited to: use of reproductive biospecimens that were cryopreserved prior to treatment, donor sperm, donor embryos, third-party reproduction, and adoption
Four: Pediatrics and Reproductive Health	<ul style="list-style-type: none"> Discuss current knowledge, attitudes, and practices among pediatric oncology clinicians with regard to reproductive health for prepubertal patients Generate ideas for an oncology nurse to bridge the gap between current practice and the ASCO and American Academy of Pediatrics guidelines
Phase Two: More than Fertility Preservation	
Five: Sexuality	<ul style="list-style-type: none"> Discuss the impact of cancer and treatments on sexuality and intimacy Discuss options for managing menopausal symptoms resulting from cancer treatment
Six: Cancer and Parenting	<ul style="list-style-type: none"> Identify the guidance needed by parents for their children, at each stage of a parent's illness List ways children can be involved in hospital visits and dealing with a parent's illness
Phase Three: From Theory to Practice – Agents for Change	
Seven: Barriers and Facilitators to Reproductive Health Care	<ul style="list-style-type: none"> Identify the three aspects of the Competing Demands Model within his/her institution that act as barriers to reproductive health care Identify resources for reducing cancer patient barriers to reproductive health care
Eight: Ethical, Legal, Social Issues	<ul style="list-style-type: none"> Identify the legal and insurance issues related to cancer and fertility Recognize the ethical issues faced by patients/families with cancer related to fertility
Nine: Practical Applications	<ul style="list-style-type: none"> Discuss strategies to incorporate education of patients about fertility preservation into patient care Practice communication skills and become comfortable challenging areas of needed revision
Ten: Self Study	<ul style="list-style-type: none"> To utilize the skills of induction, deduction, and problem-solving to effectively communicate reproductive health topics with patients and to refine a plan to introduce change in his/her institution

^aTentative outline of the 10-week distance-learning curriculum

Table 2

Principles of adult learning theory conceptualized in ENRICH

Principle of Adult Learning	ENRICH Training Examples	
Learning should capitalize on the experience of the participants	Case studies developed based on experiences of curriculum consultants active in the AYA oncology field Content designed to take into account the reproductive health basic science knowledge required for RN certification	<i>Relevant Content</i>
	<i>Participant will:</i> Actively synthesize ^a previous reproductive health discussion experiences with ENRICH training content to develop a more practical and proficient means of ensuring his/her patient's receive quality information and to disseminate that information at his/her institution	<i>Instructional Design</i>
Learning should be adapted to the limitations of the participant	Content designed to enhance confidence in participant's ability to discuss and refer patients on this sensitive issue <i>Participant will:</i> Identify barriers and facilitators to reproductive health care ^b at his/her institution and identify local resources for reproductive health and fertility preservation	<i>Relevant Content</i>
	Online learning environment allows each participant to complete coursework on his/her available time each week	<i>Instructional Design</i>
Adults should be challenged to move to advanced stages of personal development	Content designed to develop communication and professional development skills necessary to confidently address reproductive concerns with patients and to disseminate institutional change on the topic of reproductive health communication with patients <i>Participant will:</i> utilize learned skills of induction, deduction, and problem-solving as a means of developing a practical plan for his/her institution ^c	<i>Relevant Content</i>
	Reflective writing assignments allow for the constant evaluation and development of communication skills and reproductive health knowledge	<i>Instructional Design</i>
Adults should have choice in organizing the learning program	Content outline designed through the consultation of active oncology nurses in the fields of oncology and reproductive health	<i>Relevant Content</i>
	Learning methodologies and design structure were implemented with reference to analysis of needs described by consultants at R25 strategic planning meeting and through a needs assessment survey conducted in 2008	<i>Instructional Design</i>

^aBased on Bloom's Taxonomy: Synthesis is "the putting together of elements and parts so as to form a whole. This involves the process of working with pieces, parts, elements, etc., and arranging and combining them in such a way as to constitute a pattern or structure not clearly there before"

^bSee: Table 1. Week Four

^cSee: Table 1. Week Ten