

# Nurse Practice Issues Regarding Sperm Banking in Adolescent Male Cancer Patients

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*The impressive increase in the survival rate of childhood cancer patients has produced increased interest in quality of life issues. This research addresses nurse practice issues in determining whether the newly diagnosed adolescent male patient is offered the option of sperm banking before undergoing chemotherapy treatment. Questionnaires were distributed to nurses and nurse practitioners on 3 inpatient and outpatient units who care for adolescent male cancer patients at the time of diagnosis, during chemotherapy, and during follow-up care. Findings indicate that 96.3% of respondents agreed that all male patients undergoing cancer treatment with infertility as a potential side effect should be offered sperm banking. Respondents viewed oncologists and nurse practitioners as appropriate professionals to discuss the option. Lack of knowledge regarding sperm banking could be limiting nurses' willingness to introduce the topic, and education regarding cryopreservation may improve their knowledge and practice.*

**Key words:** cryopreservation, sperm banking, cancer chemotherapy, adolescents, male infertility

The impressive increase in the survival rate of childhood cancer has caused an increased awareness in quality of life issues. A person diagnosed with cancer has every aspect of his or her life influenced in some way: physical, economic, spiritual, interpersonal, psychosocial,

and sexual (Thaler-DeMers, 2001). This study focuses on fertility, as a quality of life aspect, in the male adolescent cancer patient. Although not all childhood cancer survivors are faced with infertility, approximately 15% to 30% are permanently sterile following therapy (Tournaye et al., 2004). Semen cryopreservation (sperm banking) can be offered to adolescent male cancer patients as an option to preserve their ability to father a child later in life. Although adult male cancer patients may be more willing to accept the notion of semen banking to allow them to participate in the conception of future children, adolescents may be intimidated and embarrassed by the concept. However, adolescent patients, ranging from age 14 to 17 years, have been found to be good candidates for sperm banking (Kleish, Behre, Jurgens, & Neschlag, 1996).

According to a study conducted by Schover, Brey, Lichtin, Lipshultz, and Jeha (2002b), 91% of physicians agreed that sperm banking should be offered to all eligible men; however, the majority of respondents infrequently offered the option. In a companion survey of male patients between the ages of 14 and 40 years, it was found that the most common reason patients did not

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preserve sperm was because of the lack of information they received regarding the option (Schover, Brey, Lichtin, Lipshultz, & Jeha, 2002a). The purpose of this study is to examine nurse practitioners' and nurses' attitudes and knowledge about offering sperm banking to newly diagnosed male adolescent cancer patients. This study also attempts to address what factors, if any, determine whether a newly diagnosed adolescent male patient is offered the option of sperm banking before undergoing chemotherapy treatment. A number of factors interfere with the topic being addressed: modesty of the patient, modesty of the health care provider, time limitations of the health care provider, extent of disease, knowledge of sperm banking, and/or the availability of sperm banking facilities. In addition, opinions differ regarding the appropriate age for discussing the option to offer sperm banking and who is responsible for addressing the issue.

## Literature Review

There is a growing awareness of the critical importance of addressing the long-term health care needs of cancer survivors. With survivorship successes has come the recognition of late effects of therapy. In 2003, the Institute of Medicine published a landmark report, "Childhood Cancer Survivorship: Improving Care and Quality of Life" (Hewitt, Weiner, & Simone, 2003). Recommendations from the report addressed the need for developing evidenced-based clinical practice guidelines for survivor care. They also recommended improving awareness and education and defining standards for professionals involved in care of cancer survivors. Background articles supporting the report clearly addressed the need to include infertility as a late effect affecting cancer patients' quality of life. The potential long-term psychosocial sequelae are described by Zebrack and Zeltzer (2003) as follows:

Given documented infertility in some childhood cancer survivors, we still lack an understanding of how experiencing infertility affects these young people's quality of life, including their attitudes about having children, their concerns about their children being at risk for cancer given their own cancer history, their knowledge about alternative modes of having children (i.e., adoption, artificial insemination) and their ability to financially or emotionally afford alternative modes of creating a family. (p. 11)

Following this report, the Children's Oncology Group (2004), Long-Term Follow-Up Guidelines and Health Links were developed (Eshelman et al., 2004). These resources, produced as a collaborative effort between the COG Nursing Discipline and Late Effects Committees, provide clinicians and patients access to information for monitoring and managing late effects. Because these reports address management issues for late effects once they have occurred, no mention is made of prevention and methods to preserve fertility. This is an area of need for practitioners to deliberately address through evidence-based practice studies.

In a study of oncologists, 91% of the respondents believed men undergoing chemotherapy, who are at risk for infertility, should be offered sperm banking; however, 48% either did not mention the subject or mentioned it to less than 25% of eligible men. Only 10% claimed that they offered sperm banking to all eligible men. Many male patients who do not select sperm banking state the reason being that the option was never given to them. Some 40% to 50% of men do not recall a conversation regarding infertility before undergoing treatment (Schover et al., 2002b).

Canada and Schover (2005) explored the promotion of better patient education regarding fertility after cancer treatment. Acknowledging the limited time oncologists have with each individual patient, these authors suggested that a more realistic approach to educate patients might be to train oncology nurses, social workers, and nurse practitioners in addressing infertility with new cancer patients. Recognizing that it may not be possible for many teenagers to ever be comfortable discussing such a topic, they explored various techniques that might be used to best educate newly diagnosed young men (and women) regarding infertility. One suggested approach included offering educational materials (eg, pamphlets, books, articles, computer programs) to the patient and his family for review in a private setting. "Banking on Fatherhood After Cancer" is an example of an interactive computerized tool that has been developed to educate patients, their families, and health care workers regarding reproductive issues (Canada & Schover, 2005). This program is expected to become available in fall 2006.

Locating a convenient sperm bank facility for a patient should not prevent health care providers from discussing the option of banking sperm. A list of sperm banks can be located by performing an online search. Some of the banks have mail kits available that enable the male patient to collect a sample in his own home. The

patient combines the sample with a preservative and ships it to the sperm bank for storage. This method allows the utmost privacy and should alleviate some of the pressure that might be felt in having to provide a specimen in a physician's office or hospital environment.

Many physicians and patients are under the impression that banking sperm may be too costly (Schover et al., 2002b). Although facilities vary in cost, it is estimated that the average cost of banking 3 ejaculates for a 5-year period ranges from \$25 to \$35 per month. Some insurance companies cover a portion of the cost, especially for patients who are planning to undergo cancer treatment. Many sperm banks also offer payment plans.

Recognition of these issues is beginning to be addressed in the nursing literature. In a review of resources, Cope (2002) highlighted the immense need for professional education and for open discussion between nurses and patients who are of childbearing age and facing cancer treatment. In 2004, Leonard, Hammelef, and Smith reported results from a program, the Fertility Counseling and Gamete Cryopreservation Program, led by an oncology nurse practitioner. The program describes development of extensive educational materials specific to adolescents anticipating cancer treatment and their parents. Through these interventions, cryopreservation may offer hope to young men who are at risk for infertility. This research addresses factors determining whether a newly diagnosed adolescent male patient is offered the option of sperm banking before undergoing chemotherapy treatment. We specifically sought to describe the practice issues identified by nurses and nurse practitioners working in pediatric oncology settings.

## Methods

### Participants

This study included nurse practitioners and nurses practicing in a hospital for children located in the southeastern United States. All hematology/oncology nurse practitioners and nurses were invited to participate. The population included participants from 4 of the main hospital units that typically treat hematology/oncology patients between 14 and 18 years of age. Participants were also recruited from the hematology/oncology clinic that treats ambulatory patients requiring follow-up visits or receiving outpatient chemotherapy

treatments. The survey targeted nurses and nurse practitioners who specifically provide care to adolescent males diagnosed with a form of cancer that requires radiation and/or chemotherapy.

### Protection of Human Subjects

The university institutional review board and agency approved all materials and methods. An invitation letter was attached to the front page of each questionnaire and established the elements of informed consent. The letter informed the participants that their identities would not be included in any permanent research records and that there would be no information in the questionnaire that could establish their identities. Specific precautions were directed to respondents' status as employees, stating that no information would be available to employers or supervisors on who did or did not participate or individual responses to the questionnaires. To further ensure anonymity of respondents, a waiver of written informed consent was granted by the institutional review board.

### Clinical Questions

This study attempted to answer the following clinical questions: What factors determine whether a newly diagnosed adolescent male patient is offered the option of sperm banking before undergoing chemotherapy treatment? What factors interfere with addressing the topic (modesty, time, level of cancer development, knowledge of sperm banking, availability of facility)? Under what circumstances would one address the topic? What is an appropriate age for the topic? What is the participant's knowledge level of the topic? Whose responsibility is it to address the issue?

### Instrument

The questionnaire was a modification of a tool developed by Schover and colleagues at the University of Texas M. D. Anderson Cancer Center (Schover et al., 2002b). Permission was granted for the use of the tool and its modification for nurses and nurse practitioners. The previous study tested oncologists' views regarding sperm banking, whereas the current study focused on nurse practitioners' and nurses' views. Because a slightly modified instrument was used in this study

and because this study examined nurse practice issues instead of oncologists' views, it was necessary to reestablish validity. To establish validity in this field, the instrument was reviewed for appropriateness by a nurse practitioner in the hematology/oncology clinic, the nurse director of the stem cell transplant unit, and a nurse educator with experience in research.

The instrument consists of 12 sections. The first section is divided into 2 parts: knowledge and attitudes. In the knowledge section, there are 15 true/false questions directed at the participant's knowledge regarding sperm banking before cancer treatment. The attitudes section contained 7 statements that evaluated the participants' attitudes about sperm banking. Section 2 of the instrument identifies 11 factors that may affect a health care worker's willingness to mention sperm banking to a male patient. Section 3 asks the youngest age at which the participant believes a patient needs to be in order to be eligible to bank sperm. Section 4 addresses who should be present when the topic is first mentioned. Sections 5 through 12 include demographic information: the participants' age, gender, and position held in the hospital; whether they have children of their own; who they believe is responsible for discussing the issue; and the geographic area where they were raised.

The study took place over a 3-month period. Each participant was informed of the location of a "survey response envelope," which was available in each break room for participants to insert their completed questionnaires. Questionnaires were distributed by hand to all staff available who met inclusion criteria, and each was requested to complete the survey and place in the collection envelope. The hand distribution was done, in part, to encourage participation and relay information on anonymity of responses.

## Statistical Analyses

Quantitative data were analyzed using version 10.0 of the Statistical Packages for the Social Sciences.

## Results

### Response Rate

Sixty questionnaires were distributed, and 27 returned the questionnaire, giving a return rate of 45%. The low response rate may be related to the participants'

insecurity in their knowledge level regarding sperm banking, because during the distribution process, some nurses expressed hesitancy in filling out the questionnaire. One commented, "I don't know if I know enough about the subject to have an opinion." Following completion of the questionnaire, another participant expressed that she believed an educational offering regarding the option of banking sperm would be beneficial for the staff. Many participants verbalized the desire to know the right answers to the knowledge section and requested that the correct answers and results of the survey be shared when the results were available.

### Knowledge

The knowledge section of the survey resulted in a minimum score of 40% correct, a maximum score of 100% correct (1 participant), with a mean score of 63%. Specific results are listed in Table 1. There were significant findings regarding the responding nurses' and nurse practitioners' knowledge of sperm banking. Only 22% were aware that young men with cancer have low sperm counts and motility at the time of their diagnosis. Nearly 52% were falsely under the impression that there was an increased risk of birth defects in children conceived from semen collected during the first week of chemotherapy or radiation therapy. There was a tremendous lack of knowledge regarding the cost of banking sperm; 92.6% believed that costs would be more than \$2000. Seventy percent had the mistaken impression that a patient would need to collect 3 to 6 semen samples before cancer treatments began. Only 48% were aware that infertility after treatment for pediatric cancer is more common in boys than in girls.

### Attitudes Regarding Sperm Banking

One of the most prominent findings of this study was that 96.3% of the participating nurses and nurse practitioners agreed that all male patients undergoing cancer treatment with infertility as a potential side effect should be offered sperm banking. Other findings included that 85.2% believed it was not necessary to have parental consent to discuss the option of sperm banking with boys under 19 years of age; 62.9% disagreed with the statement that they do not have time in their practice to adequately discuss the option; 81.4% either disagreed that sperm banking and storage are affordable for most patients or did not know; 92.5% disagreed with



**Table 1. Knowledge Regarding Banking Sperm Before Cancer Treatment—Answer and Percentage Correct**

Statement	% Correct
Many young men with cancer have low sperm counts and motility at the time of diagnosis [True]	22.2
Research has shown there is an increased risk of birth defects in children conceived from semen collected during the first week of chemotherapy or radiation therapy [False]	48.1
The costs of banking sperm are typically more than \$2000, including initial freezing of semen samples and fees to store samples for 5 years [False]	7.4
To have adequate semen samples for sperm banking, you need to collect 3 to 6 semen samples before cancer treatment begins [False]	29.6
With modern infertility treatments, it is worthwhile to bank sperm even if the count and motility of the samples are quite low [True]	85.2
If a teenager banked sperm, the samples would probably be useless by the time he wanted to have children [False]	96.3
The children of men who have survived cancer typically have only the same lifetime risks of cancer as the general population [True]	66.7
Sperm samples that have lowered count and motility survive being frozen and thawed just as well as better quality samples [True]	59.3
Semen samples for sperm banking can be collected daily over several days and still have adequate counts and motility for cryopreservation [True]	85.2
The preferred method of collecting semen for sperm banking is by using a condom during intercourse [False]	85.2
Infertility after treatment for pediatric cancer is more common in boys than in girls [True]	48.1
It is no longer worthwhile to use banked sperm for intrauterine insemination because in vitro fertilization is always more cost-effective [False]	96.3
Most young teenage boys have good enough sperm quality to make it worthwhile to bank sperm [True]	100
With today's cancer treatments, most male patients will retain or regain adequate fertility so that banking sperm is just added insurance [False]	70.4
A patient with a postthaw sperm count of < 1 million per milliliter and a motility of 20 would be a good candidate to use his samples for intrauterine insemination of his wife [False]	48.1

NOTE: Bolded items addressed in text.

the statement that the expense would be so high that it would not be worthwhile; 96.3% agreed that all who opt to bank sperm should be asked to sign an advanced directive regarding the use or disposal of the sperm should their death occur. Table 2 includes details of responses regarding the participants' attitudes.

### Patient Factors Influencing Nurse/Nurse Practitioners' Practices

The responding nurses and nurse practitioners recognized that there are certain factors that might influence them to be more likely or less likely to discuss the option of sperm banking. A mere 11.1% indicated they would be less likely to offer sperm banking to a patient less than 19 years of age. Nearly 78% indicated they would be less likely to offer the option with a patient who was HIV positive. Eighty-five percent stated they would be more likely to offer sperm banking to a patient who brought up the topic of infertility and stated that he wanted children in the future. Sixty-seven percent indicated they would be more likely to offer the

option if they had educational materials explaining sperm banking available for the patients and their families. Table 3 includes additional responses.

### Limitations

The most important limitation of the study is the low response rate that gave a small sample, making it difficult to generalize the results. Comments from potential respondents indicated hesitancy and possible unwillingness to participate in the study because of their lack of knowledge regarding the topic. Other details that might be considered limitations include the population's demographics: 92.6% of participants were female, 85.2% were "reared" in the southeastern United States, and 48.1% were less than 30 years of age. Including more male participants, including opinions from other geographic areas within the United States, and testing knowledge of nurses and nurse practitioners who are older (possibly with more years of experience) might have influenced the outcomes of this study.

**Table 2. Attitudes About Sperm Banking Before Cancer Treatment (percentages)**

Statement	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly	Do Not Know or No Answer
I do not have the time in a busy clinic/hospital to discuss sperm banking adequately	7.4	25.9	<b>18.5</b>	<b>44.4</b>	3.7
Sperm banking and storage are affordable for most patients	3.7	14.8	<b>29.6</b>	<b>22.2</b>	<b>29.6</b>
The success rates of infertility treatments that make use of frozen/thawed sperm are too low to justify banking sperm	0	0	40.7	33.3	25.9
All male patients undergoing cancer treatment with infertility as a potential side effect should be offered sperm banking	<b>77.8</b>	<b>18.5</b>	0	3.7	0
The expense of assisted reproductive treatments with frozen/thawed sperm is so high that it is not worthwhile to bank sperm	0	7.4	<b>44.4</b>	<b>33.3</b>	<b>14.8</b>
It is preferable for a cancer survivor who has undergone potentially mutagenic cancer treatment to use sperm banked before treatment to conceive a child instead of trying to conceive with fresh semen even $\geq 6$ -12 months after cancer treatment	22.2	29.6	22.2	3.7	22.2
It is uncomfortable to discuss sperm banking with patients because it is such an emotional and intimate topic	11.1	25.9	33.3	29.6	0
Difficult to find convenient facilities for sperm banking for my oncology patients	14.8	18.5	11.1	3.7	51.9
All men who bank sperm should be asked to sign an advance directive about options for use or disposal of this material in the event of the patient's death	<b>51.9</b>	<b>44.4</b>	3.7	0	0
Boys under age 19 should not be told about sperm banking unless their parents have given consent for this topic to be addressed	7.4	7.4	<b>33.3</b>	<b>51.9</b>	0
Boys under age 19 should not be given erotic magazines or videos to view during semen collection unless their parents have been informed and have agreed to these procedures	18.5	29.6	33.3	14.8	3.7

NOTE: Bolded items addressed in text.

**Table 3. Factors Affecting Willingness to Mention Sperm Banking to Adolescent Males (percentages)**

Statement	More Likely	Would Not Affect	Less Likely	Omitted Question
The patient is not married	0	96.3	3.7	—
Patient is engaged or recently married	37.0	63.0	0	—
Patient already has at least one child	22.2	63.0	11.1	—
The patient is open about being homosexual (gay)	0	63	33.3	3.7
The patient is under age 19	14.8	74.1	<b>11.1</b>	—
The patient does not have health insurance	3.7	85.2	11.1	—
The patient brings up the topic of fertility, and states he wants children in the future	<b>85.2</b>	14.8	0	—
Patient has poor prognosis for survival	3.7	74.1	22.2	—
The patient is HIV-positive	3.7	18.5	<b>77.8</b>	—
The patient has very aggressive disease and needs rapid initiation of cancer treatment	11.1	48.1	40.7	—
I have available detailed educational materials for patients and family about banking sperm	<b>66.7</b>	33.3	0	—

NOTE: Bolded items addressed in text.

## Discussion

Despite the low response rate, 96.3% of the respondents acknowledged that sperm banking options should be addressed with adolescent male patients undergoing cancer treatment. The participants were asked who they believed was responsible for addressing the issue. They were given the following options and instructed to check all that apply: oncologists, nurse practitioners, nurses, social workers, and child-life specialists, or a response indicating that "it should not be discussed." Not a single respondent selected "it should not be discussed." One hundred percent indicated that both oncologists and nurse practitioners should address the issue, 59.2% included nurses, and a small number included social workers and/or child-life specialist as being responsible for addressing sperm banking.

The results of this study suggest that nurses' knowledge of sperm banking is inadequate and may influence their ability and willingness to discuss the option of sperm banking with their patients. Providing education regarding sperm banking for health care providers may increase their knowledge and allow them to be more comfortable discussing the topic with patients. Nurses with a significant interest in the subject of fertility preservation may want to consider participation in the Fertility Preservation Special Interest Group within the American Society of Reproductive Medicine. Information on the group may be found at [www.asrm.org](http://www.asrm.org).

In newly published guidelines by the American Society of Clinical Oncology (2006), an expert panel states "Fertility preservation is often possible in people undergoing treatment for cancer. To preserve the full range of options, fertility preservation should be considered as early as possible during treatment planning." Additional information on fertility clinical practice guidelines is available on the ASCO website at <http://www.asco.org>.

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