

Oncologists' Attitudes and Practices Regarding Banking Sperm Before Cancer Treatment

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Purpose: The goal of this study was to survey oncologists in three different practice settings to determine their knowledge, attitudes, and practices regarding referring patients to bank sperm before cancer treatment.

Methods: A postal survey about knowledge, attitudes, and practices regarding banking sperm before cancer treatment was sent to 718 oncology staff physicians and fellows at two cancer centers and at sites in a Community Clinical Oncology Program.

Results: The return rate was 24% and did not differ by institution, oncologic specialty, or sex. Fellows were significantly more likely to participate (37%) than staff physicians (20%). Ninety-one percent of respondents agreed that sperm banking should be offered to all men at risk of infertility as a result of cancer treatment, but 48% either never bring up the topic or mention it to less than a quarter of eligible men. Neither greater knowledge about sperm banking nor seeing large numbers of

eligible men yearly increased the likelihood of discussing the option. Barriers cited included lack of time for the discussion, perceived high cost, and lack of convenient facilities. Oncologists reported they would be less likely to offer sperm banking to men who were homosexual, HIV-positive, had a poor prognosis, or had aggressive tumors. Oncologists overestimated the costs of sperm banking and the number of samples needed to make cryopreservation worthwhile.

Conclusion: Sperm banking should be offered as an option to all men at risk of infertility because of their cancer treatment. Clearer practice standards could help oncologists increase their knowledge about sperm banking and avoid dependence on biased patient selection criteria.

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IN THE PAST decade, a number of practical barriers to banking sperm before cancer treatment have disappeared. Overall 5-year relative survival rates for cancer have gradually improved to a level of 60%, with greater than a 95% rate for testicular cancer and 82% for Hodgkin's disease, two of the most common tumors in men of reproductive age.¹ Surveys of cancer survivors show that the majority are interested in having children, especially if they were childless at the time of cancer diagnosis.^{2,3}

Another advance is the success of in vitro fertilization with intracytoplasmic sperm injection (IVF-ICSI), a technique that only requires one live sperm cell for fertilization of an oocyte.⁴ IVF-ICSI routinely results in live birth rates per cycle of about one in three when the female partner has normal fertility and is under age 35,^{5,6} making it worthwhile for men to bank sperm even if only one ejaculate can be

collected before starting cancer treatment. Although many men diagnosed with cancer have low sperm counts and motility at the time when banking sperm would be possible,⁷⁻⁹ samples of diminished quality do not suffer any incremental damage from the freezing and thawing process so that some sperm cells are likely to survive in most cases.^{10,11}

It is still often optimal to store more than one ejaculate, particularly if the semen quality is good enough so that samples could be used for intrauterine insemination with or without superovulation (a course of injectable hormones to stimulate multiple oocytes to develop), which is less expensive than IVF-ICSI and entails less medical risk for the female partner.^{8,9,12} The protocol formerly advised for semen collection was to bank three to six samples, with 48 to 96 hours of abstinence between each collection, a process that could delay beginning cancer treatment for up to 2 weeks. More recent research suggests that adequate samples can be collected with only 24 to 48 hours between ejaculations, so that storage of one or two samples before treatment could be accomplished in all but the most emergent cases.¹³

Studies of the health of the offspring of cancer survivors have not detected any excess rates of birth defects or of childhood malignancies (except in the case of families with defined hereditary cancer syndromes, such as retinoblastoma).¹⁴⁻¹⁶ Some concern has been raised by findings of unusual rates of DNA damage measured by the sperm chromatin structure assay, even in the sperm cells of some untreated cancer patients.¹⁷ Abnormal assay results may be associated with poor fertilization rates, even with IVF-ICSI.

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Both cytotoxic chemotherapy and radiotherapy are also known to produce mutations in sperm cells, but DNA repair seems to remedy much of this damage within the 2 years after cancer treatment.¹⁸⁻²⁰ This observation could provide a rationale for suggesting that men wait to try to conceive a child with fresh semen until at least 2 years after finishing treatment. The rarity of any defects even in live births of infants conceived with sperm exposed to chemotherapy or radiation,¹⁸ however, suggests that sperm with significant genetic damage either fail to fertilize an oocyte, or that the resulting embryo fails to implant and thrive. The numbers of births studied are sufficient to rule out a doubling of the background 3% rate of birth defects but not enough to detect a lesser increase.¹⁸

Recently, oncologists have not only suggested that all adult men at risk of infertility should be advised of the option of sperm banking,^{12,21-25} but have begun to consider how best to introduce the topic to teenaged patients.^{26,27} Cryopreserved semen may be stored for as long as 50 years without undergoing additional deterioration beyond that caused by the original freezing process.^{11,25} A new technique to identify and isolate spermatogonial sperm cells from a testicular biopsy and cryopreserve them for future autotransplantation may offer a way in the future to preserve fertility before cancer treatment in prepubertal boys.^{28,29}

Although the criteria for offering sperm banking have broadened, recent surveys suggest that sperm banking is still not mentioned routinely by most oncologists. A postal questionnaire about sperm banking sent to 165 Minnesota members of the American Society of Clinical Oncology elicited a 28% response rate.³⁰ Only 26% of respondents knew about IVF-ICSI, and they rated the importance of sperm cryopreservation as 5.8 on a scale of 1 (mention it) to 10 (insist on it). They estimated that 27% of their male patients chose to bank sperm. Twenty-eight percent cited cost as a barrier to sperm banking, but less than half of the oncologists had an accurate idea of the fees for collection and storage.

As part of the preliminary research for a project to create a computerized educational and decision aid about banking sperm before cancer treatment for both physicians and patients, we conducted a survey of three groups of oncology physicians to ascertain their knowledge and attitudes regarding sperm banking.

METHODS

Subjects

The two cancer centers for this survey were chosen because of their participation in the project to create an educational tool on sperm banking. Physicians and fellows at the University of Texas M.D. Anderson Cancer Center (UTMDACC) ($n = 307$) and the Cleveland

Clinic Taussig Cancer Center (CCF) ($n = 111$) were identified from their respective directories, excluding specialties that focus exclusively on female patients or in which the physicians would not be in charge of primary cancer diagnosis and treatment (ie, cardiology, imaging specialties, etc). In addition, to sample oncologists in a wider variety of community settings, we received permission to mail questionnaires to a randomly chosen sample of 300 physicians from 26 clinical sites (smaller hospitals or private practice groups) participating in the UTMDACC Community Clinical Oncology Program (CCOP). We did not have the information needed to exclude inappropriate specialties in the CCOP sample, however.

Survey

All materials and methods were approved by the Institutional Review Boards of the UTMDACC and the CCF, as well as the Taussig Cancer Center research committee. Physicians were mailed a questionnaire with a cover letter that set forth the elements of informed consent. The letter stated that physicians' identities would not be part of the research record and that no information in the questionnaire would be used to ascertain identity. A code number on the last page of the questionnaire would be used to determine whether or not to send the physician one reminder letter to return the survey. Survey recipients from UTMDACC and CCF, but not those from the CCOP sample (because of lack of external funding for surveying this third sample) were offered an incentive to complete the questionnaire. If physicians sent back their completed questionnaires, the research team would tear off the code number and enter it in a lottery for a \$100 gift certificate for a local restaurant delivery service. Physicians were informed that if everyone chose to participate, their chance of winning would be approximately 1 out of 75, with the probability increasing if some physicians did not return the questionnaire.

The questionnaire began with a 15-item true/false test of knowledge about banking sperm before cancer treatment. We had piloted the test with a sample of urology physicians, fellows, and nurses at UTMDACC to make sure that the level of difficulty was appropriate. Physicians were then asked to respond to 11 questions about their attitudes regarding sperm banking using a four-point scale from agree strongly to disagree strongly (Table 1). In the next section, they were asked to rate 11 patient factors on whether they would influence their likelihood of offering sperm banking (Table 2). They were asked how often each of nine factors influenced patients in their own practice to refuse sperm banking (Table 3). Physicians also responded to the following questions: What should be the youngest age group of patients offered sperm banking? Who should be present when sperm banking is first mentioned to a male patient under age 18? How many new male cancer patients age 14 and over do you see annually who undergo treatments with the potential to damage fertility? What percent of the time do you mention sperm banking to these patients during treatment planning? What percent of these patients want more information about sperm banking? Physicians indicated whether they were a staff member or fellow, and their age, sex, and medical specialty.

Statistical Analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences version 10.0 (SPSS Inc, Chicago, IL). Analyses included descriptive statistics, such as mean, median, and SD. Categorical variables were compared among the groups of interest using the Pearson χ^2 test. Continuous variables were compared among groups using the Student's t test to compare two groups or analysis of variance

Table 1. Attitudes of 162 Oncology Physicians Regarding Sperm Banking

Attitude	Agree Strongly (%)	Agree Somewhat (%)	Disagree Somewhat (%)	Disagree Strongly (%)
All male patients undergoing cancer treatment with infertility as a potential side effect should be offered sperm banking	65	26	6	3
I do not have the time in a busy clinic to discuss sperm banking adequately	13	37	30	20
It is uncomfortable to discuss sperm banking with patients because it is such an emotional and intimate topic	0	12	26	62
The success rates of infertility treatments making use of frozen/thawed sperm are too low to justify banking sperm	0	3	51	46
Sperm banking and storage is affordable for most patients	12	39	38	11
The expense of assisted reproductive treatments with frozen/thawed sperm is so high that it is not worthwhile to bank sperm	1	9	47	43
It is preferable for a cancer survivor who has undergone potentially mutagenic cancer treatment to use banked sperm instead of trying to conceive with fresh semen even \geq 6-12 months after cancer treatment	20	31	35	14
It is difficult to find convenient facilities for sperm banking for my patients	16	35	29	20
All men who bank sperm should be asked to sign an advance directive about options for use or disposal in the event of death	74	22	4	0
Boys under age 18 should not be told about sperm banking unless their parents have given consent for this topic to be addressed	15	22	33	30
Boys under 18 should not be given erotic magazines or videos during semen collection unless their parents have been informed and have agreed to these procedures	30	31	25	14

to compare multiple groups. All statistical tests were two-sided, and $P < .05$ was used to indicate statistical significance.

RESULTS

Response Rates

A total of 718 questionnaires were mailed. Physicians were excluded from the response rate calculations if the questionnaire was undeliverable (one at CCF and three in the CCOP sample) or if a physician declined to participate because the survey was not applicable to his or her practice (five at UTM-DACC, one at CCF, and 18 in the CCOP sample). Of the remaining 690 questionnaires, 162 were returned for an overall return rate of 24% (30% at UTM-DACC, 21% at CCF, and 17% from the CCOP sample).

The lower response from the CCOP may have been related to the lack of incentive. We also had more limited knowledge about the physicians in the CCOP sample, resulting in a higher rate of physicians included inappropriately, some of whom may simply have discarded the questionnaire. Differential rates of response between institutions were affected by the proportion of fellows sampled. Fellows were significantly more likely than staff members to participate (37% response rate *v* 20%, respectively; Fisher's exact test = 17.01, $P < .001$), perhaps because they found the incentive more attractive and/or had more time to complete the survey. The return rates for staff physicians did not differ significantly by site, 25% at UTM-DACC, 20% at CCF, and 17% for the CCOP sites. We only have specialty information for the UTM-DACC and CCF physicians. Response rates were not significantly

different by specialty for these 418 physicians (27% of medical oncologists, 26% of surgical oncologists, and 33% of radiation oncologists). We also only have sex information for these 418 physicians. Within this subgroup, 26% of men and 34% of women returned their questionnaires (Fisher's exact test, not significant).

Of our overall sample, 70% ($n = 113$) were staff physicians and 30% ($n = 49$) were fellows. Only 21% ($n = 34$) were women. The median age range of respondents was 40 to 49 years. Sixty-three percent of respondents were medical oncologists ($n = 97$), 21% were surgical oncologists ($n = 33$), and 16% were radiation oncologists ($n = 25$).

Knowledge About Sperm Banking

Table 4 lists the items and physician responses for the 15-item true/false knowledge test. The mean score for 162 respondents with valid questionnaires was 10.00 (SD = 1.97). Differences in knowledge between physicians from the three different sites, and between staff and fellows did not achieve significance, but male physicians did have significantly higher knowledge scores (mean = 10.19, SD = 1.92) than females (mean = 9.32, SD = 2.01; $t(159) = -2.353$, $P = .02$). Scores also did not differ significantly by medical specialty. Knowledge scores were not significantly correlated with physicians' reports of how often they mentioned sperm banking to eligible patients or with their estimates of how often patients were interested in finding out more about sperm banking. Items that were answered incorrectly by more than half of physicians suggested that respondents overestimated the costs of sperm

Table 2. Influence of Patient Factors on Whether 162 Physicians Offer Sperm Banking

Patient Factor	Would More Likely Offer (%)	Would Not Affect Practice (%)	Would Less Likely Offer (%)
Patient is not married	8	86	6
Patient is engaged or recently married	41	59	0
Patient already has at least one child	1	86	13
Patient is open about being homosexual (gay)	0	46	54
Patient is under 18 years old	16	66	18
Patient does not have health insurance	0	84	16
Patient brings up the topic of fertility and states he wants future children	75	25	0
Patient has a poor prognosis for survival	1	44	55
Patient is HIV-positive	0	16	84
Patient has very aggressive disease and needs rapid initiation of cancer treatment	3	40	57
I have available detailed educational materials for patients and family about banking sperm	65	34	1

banking, overestimated the number of samples needed to make sperm banking worthwhile, and did not know that infertility is more common in male than female survivors of pediatric cancer.

Practice of Offering Sperm Banking

As seen in Table 5, all but four out of 162 respondents treated some new male patients each year aged 14 or older whose cancer treatment had the potential to damage fertility

(our definition of eligibility for sperm banking). Thus we surveyed an appropriate group of physicians. Medical oncologists reported seeing the most eligible patients, followed by surgical oncologists, and then radiation oncologists ($\chi^2(6) = 14.66, P = .023$). Table 5 lists data on how many eligible patients (males aged 14 or older whose cancer treatment could potentially damage their fertility) physicians saw yearly, how often they offered sperm banking as an option, and their perception of how often patients were interested in exploring it further. Thirty-eight percent of respondents estimated seeing more than 20 eligible men. It is notable how infrequently the physicians mentioned sperm banking to eligible men, however, with 48% offering it as an option less than a quarter of the time to never. Only 10% reported offering it to all eligible men. Although there was a trend for fellows to offer sperm banking less often than staff physicians, it did not reach statistical significance ($P = .65$). Neither sex nor age was significantly related to offering sperm banking. Once sperm banking had been discussed, physicians had widely variable impressions of the percentage of patients who were interested in having more information about it.

Respondents from the three institutional samples did not differ significantly in terms of the number of eligible men they saw yearly, but physicians from CCF offered sperm banking more frequently to eligible men than physicians in either of the other groups ($\chi^2(10) = 18.557, P = .046$). There was a significant association between how many eligible patients physicians saw yearly and their likelihood of mentioning sperm banking ($\chi^2(15) = 33.66, P = .004$), but the relationship between the two variables was complex. Physicians were least likely to refer men to sperm banking if they saw either five or less eligible men a year or if they saw more than 20 eligible men a year. They were most likely to mention sperm banking consistently if they saw six to 20 eligible men a year.

Table 3. Physicians' Reports of Reasons Why Patients Refuse to Bank Sperm Before Cancer Treatment

Reason	Common Reason for Refusal (%)	Occasional Reason for Refusal (%)	Uncommon Reason for Refusal (%)	Not Applicable to My Practice (%)
Patient already has children and does not want more	55	13	3	29
Patient is focused on cancer treatment and does not want to think about possible infertility	15	40	21	24
Patient does not believe he will become infertile after cancer treatment	3	11	61	25
Patient is young and believes future fatherhood not important	5	28	31	36
Patient is too embarrassed to go to the sperm bank	8	33	34	25
Patient believes banking sperm will be too expensive	23	34	18	25
Patient is worried that banking sperm will delay cancer treatment	15	35	24	26
Parents of a teen do not want sperm banking mentioned to their son	1	12	39	48
Patient finds banking sperm unacceptable from religious or ethical standpoint	1	15	54	30

Table 4. True/False Questionnaire and Responses

Statement	True (%)	False (%)
Many young men with cancer have low sperm counts and motility at the time of their diagnosis	57*	43
Research has shown that there is an increased risk of birth defects in children conceived from semen collected during the first week of chemotherapy or radiation therapy	30	70*
The costs of banking sperm are typically more than \$2,000, including initial freezing of semen samples and fees to store samples for 5 years	70	30*
To have adequate semen samples for sperm banking, you need to collect 3 to 6 semen samples before cancer treatment begins	66	34*
With modern infertility treatments, it is worthwhile to bank sperm even if the count and motility of the samples is quite low	92*	8
If a teenager banked sperm, the samples would probably be useless by the time he wanted to have children	1	99*
The children of men who have survived cancer typically have only the same lifetime risks of cancer as the general population	74*	26
Sperm samples that have lowered count and motility survive being frozen and thawed just as well as better quality samples	51*	49
Semen samples for sperm banking can be collected daily over several days and still have adequate counts and motility for cryopreservation	61*	39
The preferred method of collecting semen for sperm banking is by using a condom during intercourse	9	91*
Infertility after treatment for pediatric cancer is more common in boys than in girls	40*	60
It is no longer worthwhile to use banked sperm for intrauterine insemination, since in vitro fertilization is always more cost-effective	4	96*
Most young teenage boys have good enough sperm quality to make it worthwhile to bank sperm	90*	10
With today's cancer treatments, most male patients will retain or regain adequate fertility so that banking sperm is just added insurance	42	58*
A patient with a postthaw sperm count of < 1 million per mL and a motility of 20% would be a good candidate to use his samples for intrauterine insemination of his wife	17	83*

*Denotes correct answer.

Attitudes Regarding Sperm Banking

Perhaps the most striking finding from Table 1 is that 91% of physicians agree that sperm banking should be offered to all eligible men, despite the fact that most infrequently do so. The most frequent perceived barriers to referring men for sperm banking include having a hard time finding convenient banking facilities (51%); not having adequate time to discuss sperm banking in a busy oncology

Table 5. The Practice of Offering Sperm Banking to Patients

	%
How many men per year do you see age 14+ at risk for infertility?	
0	2
1-5	28
6-10	24
11-20	8
More than 20	38
What % of time do you offer sperm banking to these men?	
Never	18
< 25% of time	30
25%-50% of time	15
51%-75% of time	9
> 75% of time	18
Always	10
How many men are interested in finding out about sperm banking?	
< 10%	18
10%-25%	18
26%-50%	18
51%-75%	18
> 75%	14
Do not offer it	14

clinic (50%); and concerns that the out-of-pocket cost would not be affordable to patients (49%).

The great majority of physicians (96%) also agree that men who bank sperm should complete an advance directive about posthumous disposition of the samples. Although 52% of physicians thought any teenager producing sperm should be eligible to bank and 86% believed males under age 18 should be able to bank, they were more divided on the issue of whether parental consent is required before offering sperm banking to a teenaged patient (37% agree) or to allow a teenager to view erotic materials in the collection room (61% agree). Seventy-eight percent believed that both parents and teenaged patient should be in the room when sperm banking is discussed, 11% would start with the parents only, and 9% preferred to talk to the teen alone. Physicians also are divided in their opinions on whether to encourage a man to use sperm cryopreserved before mutagenic cancer treatment to conceive (51% agree), rather than allowing for natural conception if fertility recovers after cancer treatment.

Influence of Patient Factors on Physicians' Practices

Oncology physicians in our sample do admit to some influence of patient factors on whether or not to mention sperm banking. As Table 2 illustrates, physicians would be much less likely to offer sperm banking to a man who was positive for the human immunodeficiency virus (HIV)

(84%), openly homosexual (54%), had aggressive disease and needed rapid initiation of cancer treatment (57%), or who had a poor prognosis for survival (55%). On the other hand, physicians would be more likely to refer a man for banking if he was recently engaged or married (41%), if he brought up the topic and expressed an interest in future children (75%), or if detailed educational materials on banking were available for patients and family members (65%).

Physicians' Perceptions of Men's Reasons for Refusing Sperm Banking

Table 3 illustrates our respondents' perceptions of about why men who are offered sperm banking decline the opportunity. The last column shows the percentage of respondents unable to answer these questions because they were not relevant to the physician's practice. This percentage was typically quite similar to the 28% of the sample who see five or fewer men a year eligible for sperm banking. Even more respondents did not treat teenagers, however. Thus some barriers, such as embarrassment about semen collection or parental opposition, may be underreported.

By far, the most common physician-reported reason that patients refuse to bank sperm is that they already have completed their families and do not want more children (68% cite as common/occasional reason for refusal). Less common motivations for refusal include the expense of banking sperm (cited by 57%), the patient's difficulty focusing on infertility rather than on his cancer (cited by 55%), and the patient's fears of delaying his cancer treatment by banking sperm (cited by 50%).

DISCUSSION

We believe this survey exposes a significant gap in the practice of oncology. Physicians' knowledge about sperm banking is not up to date, and many are failing to routinely provide adequate information on potential infertility and preservation of options for having biologic children to men at risk because of their planned cancer treatment.

Although 91% of oncology physicians responding agree that sperm banking should be offered as an option to all men at risk of infertility because of cancer treatment, only 10% attain this standard in their own practices. Almost half of oncologists either never mention sperm banking or offer it to less than a quarter of their patients who are 14 or older and receive cancer treatment potentially damaging to fertility. Neither greater physician knowledge about sperm banking, nor seeing many eligible patients increase the likelihood of bringing up the topic.

Given the low response rate for our survey, are the results generalizable to most oncology physicians in the United States? We believe that the response rate reflects oncolo-

gists' failure to give cancer-related infertility adequate consideration. The earlier survey of Minnesota oncologists also had a poor response rate and suggested similar gaps in knowledge and practice about sperm banking.³⁰ Our current survey is much more detailed, with a far larger and more geographically varied sample. We used techniques designed to enhance response rates, including a reminder letter and offering an incentive for returning the questionnaire. If a response bias exists, it seems logical that physicians interested in providing sperm banking as an option would be more likely to participate in our survey. Most of our physicians were also working in specialized cancer centers at the cutting edge of research and treatment. Thus, our data, disturbing as they are, may present an overly favorable picture of how often physicians discuss sperm banking with patients.

Our companion survey of 201 younger male cancer survivors recently treated at the same two cancer centers confirmed these physicians' reports² and replicated findings of our earlier patient survey.³ Less than a quarter of men bank sperm, and for those who do not, the most common reason is that the option was never offered. Forty to fifty percent of men do not recall any discussion of infertility before cancer treatment.

Physicians perceive the most common barriers to sperm banking to be lack of time in their busy practices to discuss this complex issue, difficulty in finding convenient sperm banking facilities for patients, and concern that banking sperm would be too costly for patients. None of these barriers seems insurmountable to us. Patient education materials can be presented by support staff, reducing the amount of physician time invested in explaining sperm banking. Almost two thirds of physicians said they would be more likely to bring up the topic if detailed patient education materials were available. In fact, for patients with reasonable literacy levels, two self-help books that discuss cancer, male infertility, and sperm banking have already been published.^{31,32}

It is rather easy to locate sperm banks using resources on the internet. For example, a list of sperm banks in the United States is available at www.sperm-banks.com. Several large banks now offer express mail kits that allow a man to collect semen at home, mix it with a preservative, and ship it to the sperm bank. Given that many men diagnosed with cancer already have impaired semen quality, however, it may maximize the number of viable sperm to have samples processed and cryopreserved locally, then shipped to the sperm bank for long-term storage.

Scores from our knowledge test suggest that physicians overestimate the cost of banking sperm. Although costs vary widely between laboratories, we would estimate that the average out-of-pocket cost of processing and cryopreserv-

ing three ejaculates for 5 years is around \$1,500 to \$2,000. Insurance will usually cover testing for sexually-transmitted diseases and the initial semen analysis but rarely will reimburse patients for the costs of processing and cryopreserving sperm. Many sperm banks offer payment plans for cancer patients. Our surveys of patients also suggest that cost is not commonly a reason that men decide not to bank sperm.^{2,3}

Oncologists seem to pick and choose among patients in deciding whether to offer sperm banking. Physicians may not refer men who are openly homosexual or are HIV-positive, yet some of these men may desire children. With advances in treating HIV, bioethicists are encouraging the use of assisted reproductive technology for couples who desire children, when one or both partners are HIV-positive.³³ Some sperm banks will not accept samples from men who have HIV or hepatitis, but others have special facilities for storing contaminated material.

Men who have very aggressive disease requiring rapid initiation of cancer treatment and those with a poor prognosis are also apt to be excluded from discussions of sperm banking. Symptoms such as high fever, hemorrhage, or CNS dysfunction may make it impossible for some men to collect semen. However, our knowledge test suggests that many oncologists are unaware that sperm banking no longer has to delay cancer treatment for more than a few hours. Patient surveys also reveal that cancer survivors are often interested in having children despite their anxiety about having a normal lifespan.^{2,3}

A majority of respondents believed that sperm banking should be offered to teens. Only 37% felt it was necessary to have parental consent before bringing up the topic with a patient under the age of 18. As with most medical procedures, both parental informed consent and the assent of the teenager should be elicited before initiating sperm banking.²⁷ If there is family conflict, adolescents age 14 and over are considered mature enough to give or refuse informed consent for medical procedures or research that does not involve major risk, especially when reproductive health services are at issue.³⁴⁻³⁶ It is crucial for physicians to make the teen aware of the pros and cons of a procedure, to ensure that he knows what to expect, to intervene if inappropriate parental pressure is being brought to bear on him, and to solicit and respect his opinion.³⁷

Like 78% of the respondents, we formerly advocated that parents and teenager both be present when the topic of sperm banking was introduced. After conducting preliminary qualitative research with several young cancer survivors, however, we now suggest raising the topic first with

the adolescent in private and then discussing it separately with the parents. Our young male patients were adamant that the decision on whether to bank sperm belonged to them, not to their parents, and reported that it was acutely uncomfortable to be informed about sperm banking in front of mother and father.

We agree with our respondents that all men cryopreserving sperm should have a chance to discuss and consider what they would want done with their samples in the event of their death. The most common disposition is to destroy samples posthumously,²⁴ but some surviving wives, partners, or even parents have wanted to use a cancer patient's cryopreserved semen to create a child. Without some form of legal document indicating the man's own wishes, most United States courts have not been willing to give semen samples to any family member.³⁸ Sperm banks or individual men should consult an attorney for guidance because laws differ from state to state.

Although there is no empirical evidence of unusual health risks to the offspring of cancer survivors, men are often very concerned about the health of potential children^{2,3} and should be offered the chance to discuss the issue with a geneticist or genetics counselor. Those few men known to carry a gene mutation increasing cancer risk may wish to consider using preimplantation genetic diagnosis,³⁹ particularly if they will have to use IVF-ICSI to conceive a child.

In conclusion, we would like to see a more uniform standard of practice for oncology physicians. We would like to see sperm banking offered as an option to all teens and adult male patients about to undergo a cancer treatment with some known potential to damage fertility. Although some treatment regimens are more toxic than others, and risk estimates for infertility may be available for guidance, it is not possible to guarantee that an individual patient will recover his fertility after a particular cancer therapy. Rather than having the physician take responsibility for excluding patients based on guesses about whether they would be appropriate parents or could afford to bank sperm, we believe that the patient and family have the right to decide. It would also be timely for professional groups from oncology and infertility to join together in lobbying for insurance coverage for gamete cryopreservation and assisted reproductive technologies for patients who lose fertility as a consequence of cancer treatment.

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