Facilitating Teamwork in Adolescent and Young Adult Oncology

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Abstract

A case of a young adult patient in the days immediately after a cancer diagnosis illustrates the critical importance of three interrelated core coordinating mechanisms—closed-loop communication, shared mental models, and mutual trust—of teamwork in an adolescent and young adult multidisciplinary oncology team. The case illustrates both the opportunities to increase team member coordination and the problems that can occur when coordination breaks down. A model for teamwork is presented, which highlights the relationships among these coordinating mechanisms and demonstrates how balance among them works to optimize team function and patient care. Implications for clinical practice and research suggested by the case are presented.

INTRODUCTION

Adolescent and young adult (AYA) oncology is an emerging discipline that targets the > 70,000 patients age 15 to 39 years who are diagnosed with invasive cancer annually in the United States.^{1,2} During the past three decades, cancer survival rates have improved more for children and older adults than for AYA patients.³ AYA patients with cancer face a distinctive set of challenges, including disruption of the normative developmental tasks of adolescence and emerging adulthood, suboptimal treatment, threat of treatment-related infertility, financial burden, and disproportionate rates of negative sequelae, including post-traumatic stress disorder and suicide, after treatment.⁴⁻⁸

Age-specific needs of AYA patients can complicate cancer care delivery. Fertility preservation and enhanced psychosocial services, such as developmentally appropriate support for decision making, are necessary adjuncts of therapy. Clinical

management may be further complicated by the fact that many AYA patients lack health insurance and may juggle work, school, and childcare obligations during therapy.⁴

MULTIDISCIPLINARY TEAMS IN AYA ONCOLOGY

In the United States, cancer care for AYA patients is coordinated by multidisciplinary teams, hereafter referred to as teams for simplicity, sometimes within dedicated AYA programs at a few institutions,⁹ but more often by ad hoc teams at the many institutions with no formal focus on AYA oncology. In ad hoc teams, information must be shared between medical oncology and pediatric oncology practices as well as fertility clinics, and some team members may be new to one another, as in the case below.

For high-quality patient care, team interactions must be both efficient and effective. National Comprehensive Cancer

ASSOCIATED CONTENT

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Network,¹⁰ Institute of Medicine,¹¹ and ASCO¹² guidelines suggest that AYA teams can improve service delivery by increasing clinical trial accrual and translational research, encouraging fertility preservation, and facilitating the provision of psychosocial support services.⁹

AYA oncology teams have unique complexities that are inherent in their structure and function. Optimal AYA cancer care involves coordinated and time-sensitive effort between disparate groups of clinicians that would otherwise rarely interact. For example, AYA patients with cancer require more assistance with fertility preservation than do older or younger patients, which necessitates time-sensitive communication between oncology providers and fertility specialists at the time of diagnosis.⁹ Because AYA patients may qualify for clinical trials that are sponsored by either pediatric or medical oncology cooperative groups, pediatric and medical oncologists often need to communicate as the treatment regimen is being considered.⁹ AYA patients are at risk for adverse psychosocial outcomes and they benefit from enhanced support services.^{13,14} Expert personnel who are trained in various aspects of patient support, including social work, psychology, child life, and nursing, should be considered as members of the care team.⁷ By using a model of patient- and family-centered care, patients and their designated support people are also made part of the team and may collaborate with health care providers on decision making.¹⁵

CORE COORDINATING MECHANISMS OF TEAMWORK

To provide optimal clinical care, team members must communicate effectively. In this article, we explore how three well-defined core coordinating mechanisms of teamwork—closed-loop communication (CLC), shared mental models (SMMs), and mutual trust (MT)¹⁶ can operate within an AYA team (Table 1). These mechanisms were chosen because they can be easily used by any member of a team. Well-coordinated teamwork has the potential to improve both professionals' satisfaction with the process of providing AYA cancer care, which enhances provider engagement and effectiveness, and the delivery of clinical services relevant to AYA patients, as measured by factors such as clinical trial enrollment, fertility preservation, and use of and satisfaction with psychosocial supportive care services.

PROPOSING A MODEL FOR COMMUNICATION WITHIN THE TEAM

The three coordinating mechanisms, CLC, SMM and MT, respectively, represent the behavioral, cognitive, and affective

dimensions of teams (Fig 1). Together, these three strategies form a basis for both the task work and relational communication that are required for teams to function effectively. Teams need to use optimal levels of each strategy; just as too little MT can be deleterious for a team, excessive MT can lead to erroneous, harmful assumptions that tasks will be completed by other team members. Both CLC and SMM can enhance MT by facilitating discussion and problem solving. Conversely, if team members rely too heavily on CLC, SMMs and MT may suffer. Finally, if SMMs become entrenched, use of CLC and MT will suffer. The interrelations among the three coordinating mechanisms require ongoing balance by the team members.

Across the three coordinating mechanisms, effective teams use a mix of task-related and relationally related communication. Task talk has been shown to be more prominent than relational talk—approximately 60% v 40%, respectively—in team conversations, but both are necessary for optimal team functioning.^{32,33} Task talk, for example, “What’s next on the treatment plan?” facilitates the completion of work, whereas relational dialogue, for example, “Are we all in agreement?” helps group members feel supported and enhances team solidarity. Relational messages, although less frequent, are influential. Thus, MT, or relational talk, works with CLC, or task talk, to create SMMs.

Patients and their support people—parents, siblings, spouse or partner, and friends—are integral members of the team, although service providers may vary depending on the patient’s individual needs. If trust between team professionals and the patient and his or her support person(s) is not established, SMM will suffer. In contrast, CLC is the responsibility of professional members of the team and extends outward to include the patient and support person(s); however, the patient and support person(s) do not have a responsibility to communicate in any sort of a scripted fashion with professionals.

EXAMINING COORDINATING MECHANISMS OF TEAMWORK THROUGH A CASE STUDY

This case study explores the opportunities and challenges of enacting CLC, SMMs, and MT as elements of effective teamwork within an AYA care team (Box 1; detailed case study is available in the Appendix, online only).

UNDERSTANDING THE COORDINATING MECHANISMS THROUGH THE CASE

Previous work in AYA oncology has defined roles and goals for service delivery on AYA teams,^{9,34} creating a framework for an

Table 1. Core Coordinating Mechanisms of Teamwork

Mechanism	Considerations for Use: Barriers and Facilitators	Effect
<p>Closed-loop communication</p> <p>Simple three-step formal, yet streamlined, verbal procedure to ensure team members communicate effectively during a collaborative task</p> <p>Step 1: Team member calls out observation about patient or patient-centered task, making all team members aware of situation</p> <p>Step 2: Second team member verifies message has been received</p> <p>Step 3: First team member acknowledges communication and verifies was interpreted as he or she intended</p>	<p>Occurs in front of all team members present, giving any team member the opportunity to speak up to correct an error</p> <p>Most effective when the initial call is in the form of a directive¹⁵ and addresses a specific team member by name¹⁶</p> <p>May be initiated by any member, although most often by team leader¹⁸</p>	<p>Because the interchange is verbal and public, all team members benefit, although only two of them actively send or receive messages</p> <p>Assumed effective for medical teams¹⁷ but no empirical tests have yet been reported</p>
<p>Shared mental models (SMM)</p> <p>Provide a basic, common framework for communication, which helps team members to “describe, explain, and predict events”^{19(p274)} that are likely to occur in the team environment</p> <p>Are based on declarative knowledge (factual information) and/or procedural knowledge (how to complete a task)²⁵</p> <p>Accrue as team members share information over time</p> <p>May change quickly in the setting of dynamic, ambiguous, or emergency situations²⁷</p> <p>Are about tasks, but may develop and/or improve relational communication by facilitating implicit coordination without explicit discussion, thereby minimizing task stress</p>	<p>Barriers:</p> <p>Rigid hierarchical role structure can impair communication and development of SMM²⁰; differing views of team roles and responsibilities between team members²¹; role duplication, especially among team leaders²²</p> <p>Facilitators:</p> <p>Regular interactions of team; modeling of effective processing and communication by team leader^{22(p282)}; empowering all team members to question information, comment on ideas, and help team members move to a new SMM²⁶; formal training or practice to help teams surmount individual variations in skills or knowledge²⁰</p>	<p>Help team members understand events, draw inferences, make predictions in highly similar ways²³—thus anticipate needs of colleagues—adjust clinical strategies, and identify circumstances that require team input²⁴</p>
<p>Mutual trust (MT)</p> <p>“The shared belief that team members will perform their roles and protect the interest of their teammates”^{28(p1582)}</p> <p>Present in effective teams, but not automatically triggered by role-oriented behavior or through routine professional interaction</p> <p>MT is based on specific, positive interpersonal relationships</p>	<p>Barriers: MT is an inherent challenge for teams, because health care professionals place more trust in colleagues who share similar roles²¹; divergent understanding between team members of interplay between different professional roles (who is getting work done)^{30,31}</p> <p>Facilitators: Common understanding between team members of interplay between different professional roles⁴⁷; common belief within the team that all members perform their roles for the highest good of a group and patient^{30,31}; presence of strong SMM in the team</p>	<p>Team members feel valued and acknowledged when each individual is empowered to contribute to the group’s decision making²⁹</p>

SMM for AYA multidisciplinary care. Steve’s diagnosis of pre-B ALL provides an opportunity to explore the ways in which CLC works effectively or ineffectively, how SMMs are created or not, and how MT, when established, supports team functioning.

Although the patient noticed symptoms for 3 weeks, he initially attributed these to stress, late nights, or the flu. Steve goes to the emergency room and is admitted to the hospital after blood tests show probable leukemia. Throughout the day, a great deal of information is shared with Steve. Most importantly, he is informed that the hospital does not treat adults with ALL and that without insurance he cannot go to the nearest university medical center that provides this treatment.

Steve’s mother arrives from out of state and meets his boyfriend for the first time at the patient’s bedside. Because Steve and his mother did not regularly exchange information about his personal life, the mother, Steve, and boyfriend have not developed an SMM about his lifestyle or relationship. As a result, trust also becomes an intrafamilial issue as tension develops among the three.

Later that day, Steve meets with his medical oncologist, who does not often treat patients with ALL. He offers Steve a traditional adult treatment regimen instead of a pediatric-based regimen that has been shown to have superior outcomes in multiple previous studies.^{35,36} Sensing that this physician may not have up-to-date information and still lacking a foundation of trust with this new doctor, Steve proactively uses

his cell phone to search for information on treatment options for ALL in young adults. Steve’s request to be treated with a pediatric-based protocol on the adult oncology unit of the county hospital further demonstrates divergent mental models between Steve and his oncologist. Because MT and SMM develop and evolve quickly after diagnosis, both explicit updating and transparent communication about assumptions and mental models are especially important during this time period. Over time, explicit discussions between team members facilitate collective sense-making and help bring the SMMs of individuals into closer alignment.

In the midst of treatment planning, Steve’s support persons focus on somewhat divergent topics of relevance to themselves. Steve’s boyfriend questions whether Steve will continue to be able to participate in recreational activities. Steve’s mother reveals that cancer runs in the family and worries that she might have passed along a cancer predisposition gene. Coping with their own stresses, this discussion illustrates how each participant has slightly differing mental models about the patient’s diagnosis and his future.

Steve’s medical oncologist speaks to a pediatric oncologist who, using effective CLC, offers to provide an appropriate treatment protocol and serve as a resource for its delivery; however, the patient’s oncologist fails to use CLC regarding fertility preservation. He does not initially offer sperm banking to Steve, perhaps because Steve is gay or lacks health insurance, which demonstrates another absence of SMM. An

FIG 1. Climbing the hill: Core coordinating mechanisms at work within a multidisciplinary team. AYA, adolescent and young adult.

Box 1. Case Study

Day 1, evening: Steve, age 27 years, presents to the emergency room at a community hospital and is admitted to medical oncology for pancytopenia and lymphoblasts in peripheral blood.

Day 2, morning: Bone marrow aspiration is performed and is positive for pre-B acute lymphoblastic leukemia (ALL).

Day 2, afternoon: Steve is informed that the community hospital does not treat adults with ALL. Uninsured, he is denied transfer to a university medical center.

Day 3, morning: Steve is transferred to a local county hospital to receive care from oncologists who are affiliated with a university medical center. Steve's mother and boyfriend meet, to his mother's surprise, which creates a need to establish who will be Steve's primary caregiver.

Day 3, midday: Steve meets his medical oncologist.

- His oncologist offers hyperfractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone induction. Steve is the first young adult with ALL that his medical oncologist has treated in 5 years.
- Steve requests transfer to the local children's hospital after reading online about superior outcomes using high-intensity pediatric protocols.
- Steve's boyfriend expresses concern regarding his ability to cope with the changes that the patient's illness will bring to their lives.
- Steve's mother expresses guilt about the patient's illness and discloses a strong family history of cancer.

Day 3, early afternoon: Steve's oncologist calls adult medical oncology colleagues who treat patients with leukemia to find a pediatric oncologist who treats patients with leukemia. Steve's oncologist locates a pediatric oncologist at the children's hospital who is willing to provide a pediatric treatment protocol that can be used to direct Steve's treatment at the county hospital.

Day 3, midafternoon: Steve consents for chemotherapy to start that evening after a peripherally inserted central catheter line is placed.

- Infertility mentioned as a potential adverse effect of therapy. Sperm banking initially is not offered, possibly because the patient is gay. Steve expresses his wish to father children someday.
- Chemotherapy is put on hold until sperm banking can be arranged.
- His nurse questions the safety of a delay in starting therapy.

Day 3, late afternoon: Steve's oncologist does not know anyone who has arranged sperm banking for a patient. He calls the pediatric oncologist again.

- The pediatric oncologist recommends a pediatric oncology social worker at the children's hospital who arranges sperm banking for adolescent patients.
- The social worker provides sperm bank contact information.
- Steve's oncologist relates how challenging he finds it to care for young adult patients, but social worker does not offer advice.
- The sperm bank client services coordinator informs patient's oncologist that the first available appointment at the sperm bank is 2 days hence.
- The oncologist convinces the fertility clinic representative of the necessity for patient to complete sperm banking the next morning as an inpatient.
- Steve's oncologist remembers that the pediatric oncologist mentioned a clinical trial of a pediatric-inspired regimen for young adults with ALL would be ideal for patient, although he never provided any enrollment information.
- The oncologist searches the Cancer Trials Support Unit protocol list, finds the trial, contacts the principal investigator for the county hospital, and proceeds to have Steve enrolled.

Day 4, morning: Within 24 hours of his transfer to the county hospital, Steve successfully completes sperm banking and starts chemotherapy.

explicit discussion with the patient would have cleared up the oncologist's misconception that Steve would not be interested in banking sperm. Steve's nurse later questions the oncologist's decision to delay treatment to allow for sperm banking, which demonstrates a lack of trust in that decision, although the fact that a team member can voice a disagreement shows some degree of psychological safety in the functioning of the team. The question clearly demonstrates a lack of a SMM; however, the oncologist does not respond to the nurse's CLC attempt, and this ideological discrepancy is therefore not resolved. The oncologist could have used this situation as a teachable moment to explore the reason for the nurse's question and to provide education on the importance of fertility preservation before cancer therapy, applying CLC to bolster MT and SMMs among team members.

The medical oncologist's conversation about sperm banking with the pediatric oncology social worker is both direct and effective as a result of the use of CLC; the oncologist is given contact information for a local sperm bank. However, the social worker's failure to respond to the oncologist's broader request for support may indicate a lack of MT and SMM that would situate both professionals as collaborators in an emerging, although not yet unified, ad hoc team serving this young man. The medical oncologist's conversation with the sperm bank reveals that the client services coordinator lacks an SMM with team members for timely fertility preservation in newly diagnosed patients with cancer. The coordinator is following standard fertility clinic procedures but fails to see the situation from the patient's point of view. On behalf of his patient, the oncologist stresses the urgency of the case and arranges for Steve to complete sperm banking the next morning as an inpatient. With these actions, the oncologist is drawing upon his newly formed SMM with Steve. The doctor's advocacy enhances the trust between patient and physician.

MT and SMMs are enhanced as the medical oncologist works to find the best treatment protocol for Steve. The oncologist searches online, finds the trial that was mentioned by the pediatric oncologist, contacts the principal investigator at the county hospital, and proceeds to have Steve enrolled in a pediatric-inspired treatment protocol that is open to adults through the Cancer Trials Support Unit.

By day 4, the treatment protocol is selected, sperm banking is completed, and Steve starts chemotherapy. Reciprocal and closed-loop interactions between Steve, his care team, and his support persons build an SMM for the distinctive needs, preferences, and concerns of these individuals during the

upcoming treatment. The group is developing MT, which will form the basis for a solid therapeutic relationship in the coming months and years.

IMPLICATIONS FOR PRACTICE

Although use of these core coordinating mechanisms has the potential to improve team functioning, there is no guarantee that AYA care teams will use the concepts of CLC, SMM, and MT spontaneously or deliberately. One barrier to implementation is that teams are required to manage interdependent tasks within and across groups, often in contexts with significant time constraints and multiple competing commitments. Because CLC is not a natural type of conversation, team members must learn the skill; incorporating CLC takes practice within the team. In contrast, many opportunities may exist to develop and affirm SMMs among team members, including the patient and his or her support person(s). However, team members may share mental models about some issues, but not others. Calling out SMMs verbally and publicly helps team members identify instances where there is agreement, which allows the team to gain MT in their knowledge sets, and also instances where there is disagreement, which brings contrasting points into the open for discussion. Although SMMs are focused on tasks, the presence of SMMs may positively influence the relational quality in a team. For this reason, face-to-face interactions are recommended to enhance efficiency and communicate nuances of meaning.^{37,38} In phone conversations, team members should explicitly state assumptions regarding patient care and read back instructions, which promotes SMM and CLC. Because MT is based on the belief that team members will perform their roles and protect the interest of their teammates, it makes sense that SMM and MT would be positively related.²⁷ We propose that MT represents one critically important type of SMM in the working relationships among team members.

Because the care of AYA patients with cancer is complex—often spanning pediatric and medical oncology services and occurring over many months or years—a large, shifting, and possibly newly emerging, ad hoc group of team members may share a patient's care. Both simulation-based practice and retrospective review of real cases could help uncover where, when, and how individuals are called into teams, and how communication between team members can be supported and enhanced.

Ultimately, the three coordinating mechanisms facilitate the delivery of safe care, which has the potential to improve patient outcomes.^{39,40}

IMPLICATIONS FOR RESEARCH

To facilitate the widespread recognition and use of CLC, SMM, and MT, research on medical teamwork should begin by testing theoretical models in clinical practice, followed by investigation of how to train groups to systematically use core coordinating mechanisms of care.

Field experiments and ethnographic observations could capture process and outcome variables across personnel at different institutions and locations. These studies could investigate such questions as how the use of core coordinating mechanisms differs on the basis of role within the team, or how improvements in MT and use of SMM affect other mechanisms within a team.

Health care providers would benefit from practicing CLC, SMM, and MT to optimize communication within teams. Previous studies suggest that team members should regularly use simulation-based training in a nonclinical setting, rehearsing typical skills and clinical situations.⁴¹⁻⁴³ Ethnographic methods⁴⁴ or diary studies⁴⁵ could be used to document how frequently and effectively individual team members use coordinating mechanisms in clinical practice. Qualitative and quantitative field studies⁴⁶ could determine to what extent specific training of individuals or practice of teams increases efficiency of cancer care delivery, reduces medical errors, and increases patient or provider satisfaction.

Within AYA oncology, a long-term goal is to determine whether specific training to improve communication within AYA care teams can improve job satisfaction for team members and influence relevant clinical outcomes, such as clinical trial accrual, rates of fertility preservation, and patient satisfaction. Data generated by such analyses can be used to create evidence-based standards to script and streamline the teamwork of AYA teams while adapting to local conditions. The result will be a clearly defined system for the delivery of AYA cancer care throughout the United States. **JOP**

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**Facilitating Teamwork in Adolescent and Young Adult Oncology**

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Appendix

Case Study

Steve is a 27-year-old male who is newly diagnosed with pre-B acute lymphoblastic leukemia (ALL). He presents to the emergency room (ER) at his local community hospital with a complaint of acute shortness of breath and a syncopal episode while working out at the gym one evening after work. He recalls a 3-week history of increasing fatigue, unintentional weight loss, and tactile fevers. He states that he did not seek care previously because of an impending work deadline. He attributed his symptoms to work stress, late nights out with friends, or the flu going around his workplace. He has no significant past medical history and his last doctor's visit was for a sports physical at age 18 years. He works full-time as a contractor for a large software company in a city in the Pacific Northwest and shares an apartment with a friend from work.

In the ER, Steve's CBC reveals pancytopenia with 25% lymphoblasts, so the ER doctor communicates the probable diagnosis of leukemia and he is admitted to the community hospital's medical oncology team overnight, pending further workup. In the morning, a bone marrow aspiration is completed, which is positive for pre-B ALL. The medical oncologist informs Steve of the diagnosis. That afternoon, Steve is informed that as the hospital does not treat adults with ALL, he must be transferred to another facility. Steve is told that the university medical center treats adults with ALL, but he is not eligible for transfer there as he does not have insurance. He reports, "My mom has been nagging me about that for the past year, but I never bothered to get my own because I figured I'm a healthy guy and didn't need it."

The following morning, Steve is transferred to the local county hospital where he will receive care from oncologists who are affiliated with the university medical center. His mother arrives from her home in the rural Midwest and announces that she has applied for coverage under the Family and Medical Leave Act and plans to "stay with my baby and take care of him." She is surprised to see that Steve's boyfriend, whom she has never heard about or met, has been staying with him in the hospital.

At mid-day, his new medical oncologist meets briefly with Steve. Steve is the first young adult with ALL that he has treated in the past 5 years, but he does not reveal this information to Steve. He offers Steve hyperfractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone induction. While his oncologist is presenting the details of his treatment plan, Steve pulls out his phone and goes online to search for information on ALL in young adults and treatment options. He reads about the superior outcomes by using high-intensity pediatric protocols. He then finds that such a protocol is being offered at the local children's hospital. When his oncologist finishes presenting the details of his treatment plan, Steve asks if transfer to the children's hospital would be possible. His oncologist says that the children's hospital only accepts children age ≤ 18 years. Steve then asks why he cannot receive the same treatment as an adult at the county hospital that he would get as a child at the children's hospital.

Steve's boyfriend asks how sick Steve is going to get and whether the patient will still be able to hike, rock climb, and ski, and admits he's afraid he's not up for Steve being so sick that it totally changes both their lives. Steve's mother starts crying and asks, "Did this happen because cancer runs in our family? You know, my father, his grandpa that he never met, died before he was even 40 of a brain tumor, and my brother had some sort of bone cancer when he was just a little younger than Steve. They had to amputate his leg."

After calling around to colleagues in adult medical oncology who see patients with leukemia to find someone who knows someone in pediatric oncology who treats patients with leukemia, Steve's oncologist returns to tell him that he has found a pediatric oncologist at the children's hospital who is willing to provide a pediatric treatment protocol that can be used to direct Steve's treatment at the county hospital.

Steve's oncologist then proceeds to obtain consent to start chemotherapy that evening, as soon as he has a peripherally inserted central catheter line placed. During the consent conference, when his oncologist mentions infertility as one of a list of potential adverse effects of therapy, Steve says, "But I've always wanted to be a father." His oncologist tells him that they would need to delay starting his therapy until noon the next day so that he could bank sperm. He tells Steve's nurse that the chemotherapy orders are on hold because the patient wants to bank sperm. The nurse reports that she is used to seeing patients with leukemia start therapy as soon as possible and questions the safety of the delay.

Steve's oncologist does not know anyone who has arranged sperm banking for a patient, so he calls the pediatric oncologist again. She directs him to call a pediatric oncology social worker at the children's hospital who helps to arrange sperm banking for their adolescent patients. The social worker gives the oncologist contact information for a local sperm bank; however, he is rushed and not responsive to the oncologist's attempts to broaden the conversation to how challenging he finds it to care for young adult patients. The oncologist calls the sperm bank where the client services coordinator informs him that Steve is required to attend a new client intake appointment at their facility and that the first available appointment is not for 48 hours. He convinces her of the necessity for Steve to complete sperm banking the next morning as an inpatient.

Because Steve's chemotherapy will not start that evening—to permit him time to sperm bank the following morning—the oncologist has time to reconsider Steve's treatment regimen. He recalls that the pediatric oncologist mentioned that a clinical trial of a pediatric-type regimen in young adults with ALL would be ideal for Steve, although she never provided any specific information on how to enroll Steve in such a trial, decides to go online and search the Cancer Trials Support Unit protocol list. He finds the trial that she mentioned, contacts the principal investigator at the county hospital, and proceeds to have the patient enrolled in a pediatric-inspired treatment protocol that is open to adults through the Cancer Trials Support Unit.

Within 24 hours of transfer to the county hospital, Steve has successfully completed sperm banking and started chemotherapy.