Ensuring Continuity of Care for Patients with Cancer Through Electronic Health Records:

Recommendations from ASCO's 2007 EHR Roundtable

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A National Call for Care Coordination

With a one in three chance of getting cancer in our lifetime, all Americans will either experience or know someone who has survived cancer. According to the Institute of Medicine (IOM) report, *From Cancer Patient to Cancer Survivor: Lost in Transition*, more than 10 million Americans live with a personal history of cancer, all of whom are considered cancer survivors.

Some survivors experience few adverse effects from their cancer treatment. Many survivors, however, manage psychological distress, sexual dysfunction, infertility, impaired organ function, cosmetic changes, and limitations in mobility, communication, and cognition. Others face risks for secondary cancers as well as several comorbidities, such as diabetes, cardiovascular disease, osteoporosis, or reproductive disorders. The good news is that with intervention, much can be done to avoid, ameliorate, or arrest these late effects of cancer, especially so if the team of caregivers has access to key information regarding the patient's cancer, care, and treatment.

The transition from active treatment to post-treatment care is critical to long-term health. If care is not planned and coordinated, cancer survivors are left without knowledge of their heightened risks and follow-up plan of action. Fragmented and poorly coordinated cancer care systems and poor mechanisms for communication contribute to the barriers cancer survivors often face.[1] Remarkably absent from the survivor's care plan is a treatment summary that contains critical information developed by the treating oncologist about the patient's cancer type and treatment.[2] If a treatment summary could be made available and exchanged in a secure electronic environment, it would enable the survivor and caregivers to effectively facilitate provider-to-provider and provider-to-patient communication.

Care coordination is not an oncology-specific issue. Today stakeholders from every health care sector are collaborating to facilitate the electronic exchange of health information and improve the quality of care for all patients.[3] Cardiovascular disease and diabetes are examples of chronic conditions that can benefit from care coordination. Many specialties are developing disease-specific summaries and electronic health records (EHRs) are becoming an important tool in promoting care coordination.

This paper identifies the unique communication issues for cancer patients and survivors; discusses the role of the treatment plan and treatment summary in continuity of care for patients with cancer; and describes ASCO's position on the benefits of electronic medical record software for oncology practitioners and patients.

ASCO is the national organization representing physicians and other health care professionals who specialize in the treatment of cancer. ASCO has nearly 25,000 members, primarily physicians, who work in academic medical centers, community-based office practices, and other settings throughout the United States (and in other countries). ASCO consulted a number of other organizations in preparing this paper, but the material herein represents the position of ASCO except to the extent that other organizations separately endorse it.

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[1] Institute of Medicine Committee on Cancer Survivorship: *From Cancer Patient to Cancer Survivor: Lost in Transition.* Washington, DC, National Academies Press, 2004, pp. 1-7.
[2] National Initiative on Cancer Care Quality, American Society of Clinical Oncology, 2005.
[3] www.asco.org/ASCO/ArticleASCO/TabEHRStandardsAdoptionReport.pdf

Background

Unique needs of oncology

Patients referred to an oncologist have just been dealt a sudden blow, redirecting all normal life events to a single focus on health. By the time they present to an oncologist, patients typically have had visits with their primary care physician and other specialists, may have had surgery, and have undergone laboratory tests, x-rays, and other sophisticated radiological studies. When establishing a care plan, the oncologist analyzes reports from these encounters and together with the patient, determines methods for treatment that may include chemotherapy, surgery, radiation therapy, or a combination of the three.

Chemotherapy drugs are toxic agents. Administration of these drugs is often preceded or followed by the separate administration of antiemetics, steroids, and other supportive care drugs, and by prolonged infusion of intravenous solutions for hydration purposes. Oncology nurses typically administer the drugs by infusion into a vein or a previously implanted venous access port, a process that may take from 20 minutes to more than six hours. The drugs also can be administered by a continuous infusion over an extended period of time through an external infusion pump attached to the patient.

Since chemotherapy often results in significant adverse effects, oncologists spend considerable time managing the effects of the treatment as well as the disease itself. Side effects may include nausea and vomiting, fluid overload leading to shortness of breath, fever, or life-threatening events such as anaphylaxis. In addition to clinical care, oncologists provide or refer patients for support services such as psychosocial services, nutrition counseling, and family counseling.

A chemotherapy treatment plan is a synoptic document prepared at the initiation of a course of chemotherapy treatment. Key elements of the treatment plan include diagnosis, goals and anticipated benefits of therapy, the name of the regimen, duration and number of planned cycles of treatment, a strategy for assessing response, and an assessment of major risks and benefits.[4] Ideally the treatment plan should be reviewed with the patient and his or her family members when treatment is started. Because patients are often overwhelmed at the time of diagnosis, having a document that can be referred to later is valuable. Preparation of a treatment plan at the start of treatment simplifies preparation of a treatment summary at the conclusion of treatment. A sample treatment plan is included as Appendix A.

The transition from active treatment to post-treatment care is daunting, a process that led the IOM to identify four essential components of survivorship care.

1. Prevention of recurrent and new cancers and other late effects;
2. Surveillance for cancer spread, recurrence, or second cancers; assessment of medical and psychosocial late effects;
3. Intervention for consequences of cancer and its treatment, for example: medical problems such as lymphedema and sexual dysfunction; symptoms, including pain and fatigue; psychological distress experienced by cancer survivors and their caregivers; and concerns related to employment, insurance and disability; and

[4] www.asco.org/treatmentsummary

4. Coordination of care between specialists and primary care providers to ensure all of the survivor's health needs are met.[5]

While the long-term effects of cancer treatment vary by cancer type, survivors share commonalities. For example, while many can name the location or type of cancer, few survivors recall clinical details. A breast cancer survivor knows which side was treated, but is unlikely to recall the size of the tumor, whether there were lymph node metastases, the names of chemotherapy drugs, starting or ending dosages, pathology findings, toxicities or adverse effects, or why treatment was interrupted.

Recognizing cancer survivorship as a distinct phase of cancer care, the IOM's *Lost in Transition* report also set forth 10 recommendations that can improve the health and well-being of survivors. Recommendations 1 and 2 from that report relate directly to the subject of this paper.

> **Recommendation 1**: Health care providers, patient advocates, and other stakeholders should work to raise awareness of the needs of cancer survivors, establish cancer survivorship as a distinct phase of cancer care, and act to ensure the delivery of appropriate survivorship care.
>
> **Recommendation 2:** Patients completing primary treatment should be provided with a comprehensive care summary and follow-up plan that is clearly and effectively explained. This "Survivorship Care Plan" should be written by the principal provider(s) who coordinated oncology treatment. This service should be reimbursed by third-party payers of health care.[6]

An ASCO-commissioned study conducted by Harvard University and RAND Health confirmed the IOM's findings. Researchers working on the National Initiatives on Cancer Care Quality (NICCQ) learned that patients with breast cancer received 86% of recommended care, and colorectal patients received 78% of care overall.[7] But there also were areas for improvement.

The most surprising finding of the NICCQ study was that it was difficult for chart reviewers to locate the patient's chemotherapy doses and administrative notes in the medical oncology records because there was no standard place to find them. Furthermore, the oncologist's record typically did not document all of the patient's oncology treatments, pointing to the need for oncologists to compile an easily accessible treatment summary.[8]

The chemotherapy treatment summary is a succinct document prepared at the end of a course of chemotherapy treatment. Essential elements of a treatment summary include identifying the treatment that was planned and delivered, how treatment was tolerated, the patient's response to treatment, and next steps for the patient's care. The treatment summary is not intended to take the place of more detailed communication between the oncologist and the patient or the

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[5] Institute of Medicine Committee on Cancer Survivorship: *From Cancer Patient to Cancer Survivor: Lost in Transition.* Washington, DC, National Academies Press, 2004, p. 3

[6] Institute of Medicine Committee on Cancer Survivorship: *From Cancer Patient to Cancer Survivor: Lost in Transition.* Washington, DC, National Academies Press, 2004, pp. 3-4

[7] Malin JL, Schneider EC, Epstein AM, et al: Results of the National Initiative for Cancer Care Quality: How can we improve the quality of cancer care in the United States? J Clin Oncol 24:626-634, 2006.

[8] Bailes JS: ASCO's Groundbreaking Study on Cancer Care Quality: NICCQ. J Oncol Pract,2:48, 2006.

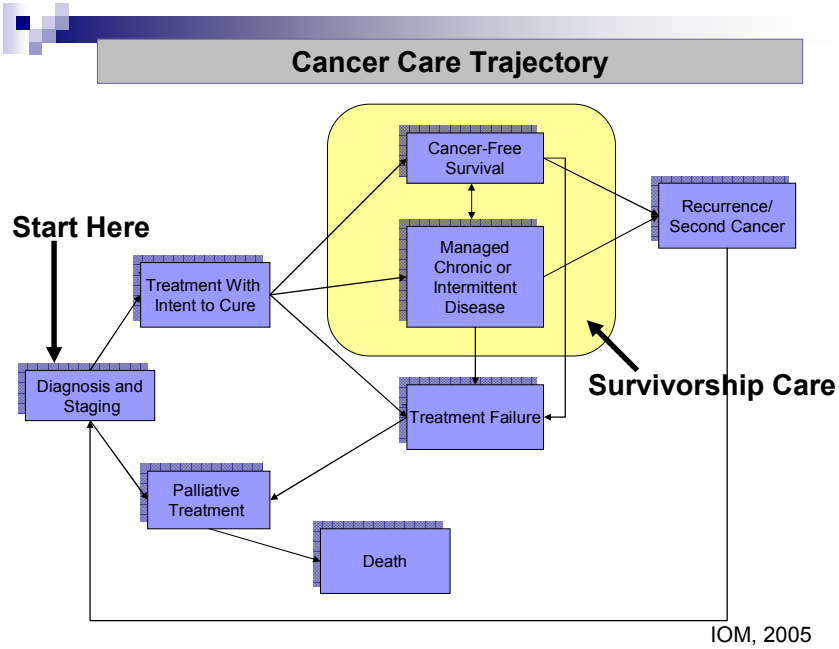
oncologist and other treating physicians, but is intended to be a communication tool and a resource for the patient.[9] Appendix B shows an example of a treatment summary.

Patient Benefits From the Treatment Plan and Treatment Summary

ASCO advocates for the treatment plan and treatment summary as important tools in care coordination and high quality cancer care. The treatment summary is a synopsis of the actual treatment and is not intended to be a comprehensive report. It must include information such as serious complications and adverse effects of treatment. The treatment summary's most important function is to provide an outline of care that can be transmitted between providers or from provider to patient.

Patricia Ganz, MD, Chair of ASCO's Electronic Health Record (EHR) Workgroup, and medical oncologist at UCLA's Jonsson Comprehensive Cancer Center has been instrumental in the development of ASCO's treatment plan and treatment summary. She recalls her own experience in opening a survivorship program and notes that the process of going through records of patients who have gone through treatment is very labor intensive, especially if those patients received multiple rounds of treatment. As illustrated in the following figure, the treatment summary becomes most critical when a patient:

- completes curative treatment,
- faces treatment failure or a reoccurrence of cancer, and/or
- coordinates cancer treatment or survivorship care with multiple providers.



The treatment summary is also an essential tool when oncologists and other health care providers attempt to reconstruct medical records following a natural disaster as demonstrated during the 2005 hurricane season. At that time, patients who had been dislocated from providers presented at new sites of care with little or no information about stage of illness or treatment. Oncologists

[9] www.asco.org/treatmentsummary

assuming care had tremendous difficulty taking on patients without such information, and were forced to repeat testing, staging, and other services in order to ascertain appropriate next steps. The oncology treatment summary and its integration into an EHR provides an important opportunity to ensure continuity of care following natural or other disasters.

As the American health care system becomes more patient centered, the personal EHR (PHR) will become an important tool for patients to manage their personal and family medical histories. Many large national health plans, corporations, patient advocacy groups, hospitals and healthcare systems are advocating for or beginning to provide PHRs. The chemotherapy treatment plan and treatment summary are important tools for care coordination and could become essential components of PHRs.

Focus groups with patients and providers were conducted in preparation for a workshop on implementing the treatment summary and care plan sponsored by the National Coalition for Cancer Survivorship (NCCS) and the Lance Armstrong Foundation.[10] Four focus groups, each of which included patients, primary care physicians, and oncologists, reviewed a cancer treatment summary. Patients characterized it as "wonderful," often calling it a tether that linked their oncology medical record with those from primary care providers and other specialists. Most notable were comments that they could now take greater ownership of their health care. Primary care providers treating survivors found the treatment summary helpful as they were not getting any treatment synthesis or summary on their patients. In fact, primary care physicians said they would *preferentially refer* to a medical oncologist who created this type of note. Oncologists expressed concern that they were already overburdened and would need tools and incentives to make preparation of a treatment summary feasible.

ASCO Facilitates Industry-wide Adoption of an Oncology Treatment Summary

As oncologists continue to assess ways to improve the quality of cancer care, they also seek answers about selection and implementation of electronic clinical information systems. ASCO has identified EHRs as an important vehicle for advancing quality and established a series of initiatives that would advise and hasten adoption of EHRs among its members and also facilitate the adoption of treatment summaries. Working closely with members of its EHR Workgroup, ASCO hosted an EHR Roundtable in Washington, DC, on January 23-24, 2007.

The EHR Roundtable brought together senior thought leaders from government, academic centers, community-based oncology practices, and patient advocacy organizations. These 40 national thought leaders and practitioners invested two days exchanging first hand knowledge of their experiences with EHR selection and implementation and developing recommendations to enable the effective exchange of health information between patients with cancer and their caregivers.

Roundtable participants were asked to focus on the following objectives:

1. Achieve consensus and prioritize recommendations from key stakeholders about the functional elements needed to capture chemotherapy administration data in an EHR;

[10] 2007 Implementing Cancer Survivorship Care Planning workshop, http://www.canceradvocacy.org/policy/#templates

2. Identify interoperability challenges affecting development and implementation of EHRs for oncology;
3. Challenge EHR vendors to incorporate functional elements of the ASCO-developed chemotherapy treatment plan and summary into EHR products.

ASCO President Gabriel Hortobagyi, MD, convened the session by welcoming each of the participants.

"ASCO wants to help all of its members keep informed about a variety of public policies, national initiatives, legislation, and the technologies that will allow our members to keep abreast of progress in these areas. As oncologists, our members want to maximize the use of EHRs, reduce medical errors, provide access for multiple users, increase operational efficiencies, enhance revenue, and many other potential benefits.

But the complexity of medicine makes this more challenging. Many existing EHRs have not been satisfactory to the oncology community. Elements needed to build a treatment summary are incomplete and inconsistent. The National Initiative on Cancer Care Quality also found deficiencies in medical oncology documentation for patients with cancer. One of the purposes of this roundtable is to focus on the needs for oncology."

Following Dr. Hortobagyi's welcome, Roundtable attendees introduced themselves. Attendees included community oncologists, academic oncologists, payers, representatives from government agencies and other organizations involved in EHR policy issues. Vendors were invited to participate in a second day of the Roundtable to hear recommendations that emerged from day one. A complete list of attendees is included as Appendix C.

Oncology Workflow Challenges

Robert Miller, MD, Roundtable Chair, presented workflow in a medical oncology setting as a framework to engage participants to discuss their experiences with EHR planning, development, implementation and process re-engineering. Typical workflow is portrayed in the following table.

<table>
<tr><td colspan="2">Typical treatment day workflow for infusion visit</td></tr>
<tr><td colspan="2">Patient has blood draw prior to or day of visit
(generally a CBC, may include other laboratory tests as well)</td></tr>
<tr><td colspan="2">Physician visit
(generally includes history & physical as well as assessment of toxicity from prior therapy)</td></tr>
<tr><td colspan="2">Physician orders chemotherapy treatment
(may be single or multi-day therapy)</td></tr>
<tr><td colspan="2">Patient proceeds to outpatient treatment room or center</td></tr>
<tr><td colspan="2">Drugs are mixed by RN, pharmacist or admixture technician</td></tr>
<tr><td>Patient receives drug therapy
(typically 15 minutes to 6+ hours)</td><td>RN documentation on flowsheet
(includes drugs, doses, patient response)</td></tr>
<tr><td colspan="2">Patient discharged home</td></tr>
</table>

This complex workflow process comes with several challenges.

Treatment selection should be based on established guidelines and/or best practices.	1. The oncologist's database for receiving information from pathology, labs and other diagnostic studies may be incomplete. 2. There is no single authoritative source for verification of the drug regimen. 3. Patient assessment for eligibility for clinical trials may be incomplete.
Modification of treatment regimens should be based on accepted toxicity guidelines (National Cancer Institute's Common Terminology Criteria for Adverse Events)	1. Access to guidelines may be limited. 2. Documentation of toxicity may be incomplete, inconsistent, and may not utilize standard terminology.
Physician drug ordering is usually done on an individual basis.	1. This opens the risk of computational errors and drug interactions.
Patient handoff from physician to nurse or pharmacist increases the risk for errors.	1. Handwriting can be misinterpreted. 2. Admixture errors occur (wrong drug, wrong dose, wrong route). 3. Maximum drug dose, lifetime cumulative dose may be exceeded. 4. There can be infusion incompatibilities.
Drug administration errors may occur.	1. Patients may be misidentified. 2. Documentation may be incomplete or inaccurate. 3. Charges may be missed.

Lessons Learned in EHR Implementation

Academic Centers

Given the workflow challenges described above, the Roundtable attendees turned their attention to lessons learned in their selection, development, and implementation of EHRs that could be used as building blocks for moving forward. The academic centers represented at the Roundtable began with "homegrown" systems, but as the health care systems grew and more users logged onto the system, variations in clinical vocabularies and data entries created unmanageable databases, leading the institutions in several cases to purchase a system-wide commercial solution that integrated with the homegrown. Most of the lessons learned grew out of that experience.

Assessment and Planning Lessons

- A close working relationship between clinical staff and information technology staff is essential.
- Identify needs before purchasing systems. For example, look for flow sheets and data query functions to avoid having to build them.

Process Re-engineering Lessons

- Focus on workflow and technology usability.

- Identify products that will enhance, not hinder, the interactions between practitioner and patient.
- Include early adopters (nurses, pharmacy) in discussions of how data will be used so that they know how and what to capture. For example, the doctor documents the written order for chemotherapy, but the nurse may document the actual dose changed and dose given. Without accurate input, an oncologist may not recall when and why these orders changed.

Data Configuration and Management Lessons

- Understand key elements in the environment that must be in the record. Include care delivered by all functions within the system, such as nursing documentation, chemotherapy administration and physician documentation.
- Codified data is critical to the functionality of the record (for example, CPT, ICD-9, clinical vocabularies).
- Understand the clinical documentation process. Start with a data dictionary such as SNOMED[11] (included in some systems) to avoid cleaning and scrubbing data for consistent terminology. For example, one participant noted "Out of 35,000 admissions, we have 15 ways of saying bronchitis and a dozen ways of saying adenocarcinoma of the lung."

Implementation and Adoption Lessons

- Nurses and pharmacists can be leaders in getting systems adopted as they understand the value of codified data for drug recalls, patient searches, billing efficiency, and reimbursement tracking.
- Roll out the system incrementally, either one module at a time for all users, or one user group at a time.
- Identify "super users" and train them first. In one setting, the nurses were first to be trained and physicians last. By the time oncologists came on board, systems were established and their training focused more on how to use the electronics.

Return on Investment (ROI) Lessons

- Be realistic in ROI calculations. Don't undervalue the exercise of calculating costs against revenue.
- Finances in hospital systems are very complicated. Don't look at just the start up costs, but also at the ongoing implementation costs.
- Focus on appropriate use of diagnostic codes for appropriate reimbursement of chemotherapy drugs.
- Train users to capture all activity so that it can be billed.

[11] **SNOMED Clinical Terms®** (Systematized Nomenclature of Medicine*)* or SNOMED CT®, is the universal health care terminology that makes health care knowledge usable and accessible wherever and whenever it is needed. This strong foundation is leading the health care industry in building a seamless infrastructure of worldwide care while integrating an overwhelming amount of clinical data.

Community-based Practices

The community-based practitioners at the Roundtable were direct in their comments about problems they had experienced with various EMR products and concerned about the financial impact of these expensive systems.

Assessment and Planning Lessons

- Consider all stakeholders, including pharmacists. For example, in one large health plan,, the pharmacists' enthusiasm was essential to the adoption of a system-wide EHR. They didn't have to type labels for drugs, and a functional system alerted them when dosages didn't match the patient.
- Ask vendors about ongoing costs such as upgrades and software support. Most vendors will disclose the average ongoing cost if they are asked.
- When changing to a new practice management system, allow three to six months to back out of or overlap the old system with a new one. Do not implement practice management and EHR systems simultaneously.
- Take notes during conversations with vendors and refer back to them as the purchase is completed implementation is scheduled. Ask questions if notes do not correspond with the vendor's plan.

Process Re-engineering Lessons

- Hire or contract with a skilled professional in health information technology.
- Recognize there still will be errors.
- Keep track of new processes and write them down as users develop new habits.

Data Configuration and Management Lessons

- For staging and clinical trial use, databases must be searchable. Systems cannot read the free text messages typically captured in the paper record such as, "Mrs. Smith was depressed because of a daughter's illness."
- About 80% of the system can deal with clinical standards, but 20% needed some modification. The new system may force all of the doctors to agree on standardized protocols.

Implementation and Adoption Lessons

- Schedule implementation by groups. Nurses and order entry tend to make the easiest transition.
- Find ways to reinforce and reward the staff for making the transition.
- Expect EHRs to slow the practice down at first. Reduce the schedule as needed for the first month.
- Require the vendor to provide a trainer to shadow each doctor for the first few days.
- Attach patient photos to records or patient cards to avoid giving the wrong drug to a patient.
- Re-evaluate and update the practice's HIPAA[12] privacy policies. Simply tracking who's logged on to a particular patient doesn't solve the problem because physicians and staff log

[12] Health Insurance Portability and Accountability Act

on and walk away. To circumvent this issue, one practice uses pseudonyms to protect the patient's identity.

Return on Investment Lessons

- ROI comes from better coding, better reporting and savings in transcription costs.
- Establish consistent patterns in how physicians use the system to measure costs and improved quality of care.
- Evaluate workflow processes from the top down and bottom up.
- Do time-motion studies before the implementation of the EHR and again about 2 months after implementation to quantify ROI.

Functional and Clinical Elements in an Oncology EHR

A primary goal of the EHR Roundtable was to achieve consensus and prioritize recommendations from key stakeholders about the functional elements needed to capture chemotherapy administration data in an EHR. To maintain a focus on oncology, participants agreed that two defining facets of care provided by medical oncologists are (1) the process of developing treatment plans and summaries for patients receiving chemotherapy and (2) the process by which patients undergo chemotherapy and their course of treatment in the chemotherapy chair. Presented with the following core elements for the ASCO Treatment Plan and Treatment Summary, the group endorsed these as the essential elements for an oncology EHR:

Core elements of a chemotherapy treatment plan:

- Diagnosis, including the cancer site, histology and stage
- Goals of therapy (may be specified by the type of template; e.g., adjuvant chemotherapy plan)
- Patient health status and co-morbidities
- Surgical history and notable pathology findings
- Chemotherapy regimen and starting dosages
- Duration of treatment and number of planned cycles
- Major adverse effects of chemotherapy

Core elements of a chemotherapy treatment summary:

- Chemotherapy treatment delivered, including number of cycles administered, duration, and extent of dose reduction
- Reason treatment was stopped
- Major toxicities and/or hospitalizations
- Treatment response
- Follow-up care and relevant providers

Additional oncology specific EHR core elements and functionality such as the ability to generate a chemotherapy flow sheet and provide drug interaction alerts and dosing safety limits were also recommended. Appendix D includes a complete list of these core elements and functionality. Each element is rated as critical, desirable, or enhancement to indicate the priority that each should be given by EHR vendors in product development.

It was deemed highly desirable that treatment plans and treatment summaries be generated dynamically by the EHR. The expectation is, therefore, that the EHR can extract data from relevant fields throughout the EHR to pull together a chemotherapy treatment plan and/or summary and EHR products without this functionality should be viewed in a considerably less favorable light. The format and presentation of treatment plans and summaries need not be identical across different EHRs; however, the inclusion of elements categorized as "critical" is important and is what practitioners should come to recognize and expect as a standard in oncology EHRs.

On day two of the event, Roundtable attendees presented participating EHR vendor representatives the prioritized list of core elements and functionality as well as the treatment plan and treatment summary. The vendors uniformly welcomed this direction from ASCO as the authoritative voice for oncology and recognized the importance of this direction from ASCO. The vendors agreed to take the chemotherapy treatment plan and summary back to their respective companies and determine whether they could incorporate ASCO's identified core elements into their software. Vendors meeting ASCO's selection criteria will be invited to participate in an EHR Lab and demonstrate their application of the chemotherapy treatment plan and summary at ASCO's Annual Meeting in June 2007.

ASCO President Dr. Gabriel Hortobagyi identified mutual goals and told the vendors, "This conversation, which is just the beginning of a longer road, is very important to ASCO. We want a functional, useful, user-friendly, and interactive/interoperable health record for oncology. Our members earn a living by treating patients and providing quality of care. Vendors earn their living by developing software and products in this field. We want vendors to succeed so that we can succeed. If we can develop appropriate, clear, and unmistakable definitions for each of the components, we will do that. We hope that vendors will continue to work with us on these initiatives. ASCO is very committed to this."

Challenges Remain

Adoption of health information technology is not a new frontier for oncologists. For nearly four decades, oncologists have recognized the benefits of accessing electronic information in clinical and administrative decisions. In general, they are fluent with hand held devices, computerized billing services, computerized scheduling and patient demographic files. They have collated and analyzed images and laboratory results to determine either a curative or palliative treatment plan for the patient. They recognize that the assembly of patient health information into an electronic medical record would simplify the organization and management of large sums of data.

However, adoption still includes significant challenges for oncology.

1. *Funding and Cost Transparency*. The cost of initial purchase is only the first step in funding the move to the digital environment. Ongoing and recurring costs are often unknown and can be a discouraging obstacle to closing the sale, leaving oncologists unsure of the actual cost commitment. While costs for an EHR system have gone down in primary care specialties, the forces driving those cost reductions such as competition, cost transparency, and content consistency have not yet been realized. Oncology-specific EHR companies do not post their prices as do the larger multispecialty EHR companies. And because the practice of oncology is subcategorized, competition from multi-specialty vendors is just now starting to penetrate the

oncology market, giving hope that competition and cost transparency will help drive stability into funding an EHR as it has with other medical specialties.

2. *Vendor instability*. As late as 2003-2004, the failure rate of EHR systems was significant enough to postpone selection and implementation, waiting for EHR vendors to achieve better success at stability and integration of billing systems with the new clinical systems.

3. *Re-engineering workflow*. The move to an EHR also requires a complete re-engineering of the practice in the clinical, billing, and back office. Calculating the exact return on investment requires an oncologist to understand what an EHR system can and cannot do to help deliver high quality patient care while keeping costs low. Without knowing what it costs to operate a paper-based environment, it is difficult to measure the return on investment for an EHR.

4. *Reduced reimbursements*. As payment levels from both public and private payers decrease, physicians face staff reductions or schedule more patients in less time, making the transition to EHRs an additional burden to time and revenue. This crunch threatens to compromise quality of care and adds to the medical staff's frustrations. At the same time, payers are increasingly focused on quality of care as a payment mechanism and EHRs are an essential tool in this growing pay for performance environment.

5. *Health information exchange*. Improving quality and continuity of care also requires functional interoperability, the ability to exchange health information electronically between providers and between provider and patient. Messaging standards, content standards, and controlled vocabulary are all important to the discussion of health information exchange.

Conclusions and Next Steps

There is an urgent need for better tools to manage the highly complex clinical activities involved in treating cancer patients. The delivery of cancer care is unique in that treatment typically involves multiple physicians and other health professionals, as well as multiple sites of care. The NICCQ study highlighted the need for improved documentation to facilitate communication between caregivers and patients, and ultimately to promote a higher quality of patient care. Patients on a course that includes surgery and radiation therapy benefit when the oncologist, surgeon, and radiation oncologist are in communication. "Snowbird" seniors who may see physicians in different parts of the country at different times of the year are at an advantage when this increased documentation occurs. For those patients who experience unanticipated separations from their health care team due to natural or other disasters, such a treatment record is critical. As the primary provider of chemotherapy, the medical oncologist plays a pivotal role in improving the communication between physicians, as well as between oncologists and patients, through the use of the treatment plan and treatment summary.

While the overall delivery of cancer care is distinctive, so are the data requirements for oncology EHRs. For example, stage of cancer is a core data element that is not always readily found in the cancer treatment record. An EHR for a patient with cancer must be able to integrate and keep up with multiple and evolving systems for cancer staging. In general, the body of knowledge around the science, technology and treatment of cancer continues to increase at a rapid pace; accordingly, there should be an expectation for continued innovation and refinement in oncology EHRs to adapt to these changes.

The Roundtable served to identify areas for future work by ASCO:

1. ASCO should continue the dialogue with members and EHR vendors to ensure that EHR products meet the requirements of this complex patient population.
2. ASCO should provide practical guidance and resources to address implementation and workflow issues for those practices who have already selected and purchased EHRs as well as those considering a purchase in the near future.
3. The core functional elements for an oncology EHR (Appendix D) should be further refined so that each of these elements are associated with a clear and standard definition, thereby facilitating adoption and integration into electronic health records. ASCO should collaborate with other members of the cancer community as well as medical informatics and standards-developing organizations to pursue this effort.
4. ASCO should explore partnerships with the National Cancer Institute (NCI) and other groups who are working to enhance researchers' ability to access and use aggregated data collected through electronic health records. The NCI, through the Cancer Biomedical Informatics Grid (caBIG) program, has made great strides in establishing an infrastructure for discussion around cancer-related data.

ASCO looks forward to continuing discussions with other stakeholders in the cancer community about the role of electronic health records in advancing quality cancer care.

APPENDIX A

Colon Cancer Treatment Plan – Adjuvant Chemotherapy 01/2007

Insert Practice Name/Info Here	*This Treatment Plan is a brief record of major aspects of colon cancer adjuvant chemotherapy. This is not a complete patient history or comprehensive record of intended therapies.*

Provider name:		
Patient name:		**Patient ID**:
Patient DOB: ___/___/___	**Age at diagnosis**:	**Patient phone**:
Support contact name:		
Support contact relationship:	**Support contact phone**:	

BACKGROUND INFORMATION

Cancer detection: Screening Symptoms Incidental		
Site in colon: Right Transverse Left Sigmoid		
Predisposing conditions: None Inflammatory bowel disease FAP HNPCC		
Family history: None 2nd degree relative 1st degree relative Multiple relatives		
Pre-op colonoscopy to cecum: Yes No		
Other lesions: None Low risk polyps High risk polyps		
Primary colon operation:		**Date of surgery**: ___/___/___
Surgery type: Elective Emergent	**CEA pre-op**:	**CEA post-op**:
Stage: IIA IIB IIIA IIIB IIIC	**T stage**: T1 T2 T3 T4	**N stage**: N0 N1 N2
Number of nodes removed:	**Number of positive nodes**:	
Notable pathology findings:		
Notable surgical findings/complications:		**Ostomy**: Yes No
Comorbidities:		

PLAN FOR ADJUVANT TREATMENT

Name of regimen:		**Start date**: ___/___/___
Treatment on clinical trial: Yes No		

Chemotherapy drugs	Administration	Major side effects

Number of planned treatments:	**How often**:	**For how many weeks**:
Central venous catheter placement needed: Yes No		
ECOG performance status at start of treatment: 0 1 2 3 4 5		
Patient-reported health status at start of treatment: Excellent Very good Good Fair Poor		
Nutritional status at start of treatment: Excellent Very good Good Fair Poor		
Special circumstances:		

Oncology Team Members	Name	Contact Information/Location
Medical oncologist		
Oncology nurse		
Surgeon		
Pharmacy		

Comments:

Important caution: this is a summary document whose purpose is to review the highlights of the colon cancer chemotherapy treatment plan for this patient. This does not replace information available in the medical record, a complete medical history provided by the patient, examination and diagnostic information, or educational materials that describe strategies for coping with colon cancer and adjuvant chemotherapy in detail. Both medical science and an individual's health care needs change, and therefore this document is current only as of the date of preparation. This summary document does not prescribe or recommend any particular medical treatment or care for colon cancer or any other disease and does not substitute for the independent medical judgment of the treating professional.

APPENDIX B

Colon Cancer Treatment Summary – Adjuvant Chemotherapy 01/2007

Insert Practice Name/Info Here	*This Treatment Summary is a brief record of colon cancer adjuvant chemotherapy. This is not a complete patient history or comprehensive record of therapies administered.*

Provider name:	**Today's date**: ___/___/___
Patient name:	**Patient ID**:

ADJUVANT CHEMOTHERAPY TREATMENT RECEIVED

		Notes
Name of chemotherapy regimen:		
Date of first dose:	___/___/___	
Date of last dose:	___/___/___	
Number of cycles planned:		
Number of cycles administered:		
Number of cycles containing oxaliplatin:		
Reason for stopping adjuvant treatment:		
Extent of dose reduction:		
Hospitalization for toxicity during treatment:	Yes No	
Grade 3/4 toxicities during treatment (list all):		
Neuropathy at end of treatment (Grade):	0 1 2 3 4	
ECOG performance status at end of treatment:	0 1 2 3 4 5	
Disease status at end of treatment:	No evidence of disease Possible recurrence Recurrence	
Pt-reported health status at end of treatment:	Excellent Very good Good Fair Poor	

SURVIVORSHIP CARE COORDINATION AND PLAN

Symptoms that should be evaluated by a physician:

Special precautions:

Follow up care	When/How often?	Provider to contact
Medical oncology visits		
Lab tests		
Radiology scans		
Colonoscopy		
Routine health care		

PROVIDER CONTACTS

Provider	Name	Contact information
Surgeon		
Gastroenterologist		
Primary care physician		

Comments/Notes:

Important caution: this is a summary document whose purpose is to review the highlights of the colon cancer chemotherapy treatment plan for this patient. This does not replace information available in the medical record, a complete medical history provided by the patient, examination and diagnostic information, or educational materials that describe strategies for coping with colon cancer and adjuvant chemotherapy in detail. Both medical science and an individual's health care needs change, and therefore this document is current only as of the date of preparation. This summary document does not prescribe or recommend any particular medical treatment or care for colon cancer or any other disease and does not substitute for the independent medical judgment of the treating professional.

APPENDIX C

ROUNDTABLE PARTICIPANTS

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APPENDIX D

Oncology EHR Core Functional Elements

Element/Functionality
Treatment plan core elements
Demographics, including referring provider and primary care physician
Diagnosis (ICD-9 or 10; possibly more clinically relevant system)
Stage • AJCC for relevant diagnoses, tumor registry staging system for other diagnoses • Disease status at each course of therapy
Site/histology/pathology findings (menu-driven by disease)
Intent/goals of therapy – adjuvant/curative vs. palliative
Performance status
List of co-morbid conditions expected to complicate chemotherapy (e.g. hepatic insufficiency)
Cancer surgical history
Chemotherapy/biotherapy regimen planned
Body surface area (BSA) and starting doses
Duration of treatment and number of planned cycles
Major toxicities associated with planned treatment
Radiation therapy planned (or previously delivered)
Pain assessment and supportive care needs (advanced cancer)
Treatment on clinical trial
Sites of disease monitored (advanced cancer)
Treatment summary core elements
Patient demographics
Chemotherapy/biotherapy delivered – intravenous and oral • Number of cycles planned and administered • Duration (date of first and last dose) • Extent of dose reduction
Reason treatment stopped
Major toxicities experienced
Hospitalization required for toxicity
Disease status at completion of treatment
Performance status at completion of treatment
Coordination of follow up care
Provider contacts
Other oncology-specific documentation
Flow sheet - inclusive of all chemotherapy, non-chemotherapy medications, transfusions, tumor measurements, lab values
Flow sheet - physical findings including tumor measurements, imaging, relevant procedures, nursing assessment *
Oncology-specific review of systems
Patient provided with copy of treatment plan and summary

Element/Functionality
Documentation of investigational drugs
Capture date of death *
Oncology Specific EHR Functions
EHR generated treatment plan
EHR generated treatment summary
Ability to update treatment summary
EHR application to generate specific reports (e.g., specific types of flow sheets)
Mechanism to capture verbal orders *
Drug interaction alerts
Basic safety limits for dosing
Body surface area (BSA) safety monitoring
Lifetime cumulative chemotherapy dose
Clinical decision support (e.g., guidelines or trial eligibility) *
Treatment preauthorization support *
Drug inventory control *
Internal and external communications *
Import key external reports (e.g., pathology, operative note, radiation)
Radiofrequency identification (RFID) technology for patient/drugs given (e.g., barcodes) *
Open database with query capabilities *
Interoperability – Health information exchange (HIE) with labs, imaging centers, etc. *
Compliance Safeguards
Privacy and Security safeguards in place
Disaster Recovery plan in place

* elements characterized by Roundtable participants as desirable, not critical