

**NASCIO Award Nomination  
2003**

*myMDAnderson:*  
Making the cancer experience easier for patients and their families

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*myMDAnderson.org:*  
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The University of Texas  
M. D. Anderson Cancer Center  
Houston, Texas  
2003

## Executive Summary

The primary objective of the *myMDAnderson* project is to support and enhance patient care by expanding M. D. Anderson Cancer Center's online interactive services. Secure personalized web sites are created for each interested, individual registered patient, providing 24-hour access to services and information about each patient's particular disease and care center.

*myMDAnderson* aids in patient communication by providing a secure communication channel that is available twenty-four hours a day, seven days a week. The *myMDAnderson* web site has been designed to allow the patient to communicate directly with appropriate care teams or support staff, without requiring the patient to have a detailed understanding of the complex organizational structure of the institution. Patients can also find answers to common questions on their own.

*myMDAnderson* has been designed and developed as a practical tool to make the sometimes overwhelming cancer experience easier for patients and their families. Successful implementation of *myMDAnderson* is contributing to improved patient relations and patient satisfaction.

Two secondary objectives of the project are:

- To reduce operating expenses and increase organizational efficiency through patient self-service
- To support compliance with federal HIPAA requirements

Key features of the website include:

- Secure web-based messaging between patients and their care team/support staff
  - Workflow support through automated message routing
  - Categorization of messages (e.g., clinical care, schedule changes, billing/insurance, etc.)
- Personalized sets of patient education materials
- Online prescription refills
- Up to 400 days of appointment schedules
- Personal calendar
- Personal journal
- Online patient billing statements
- Online demographic data updates
- Support for pre-registration communication
- Frequently Asked Questions

The project completed an initial pilot in three outpatient clinics during 2002: Brain & Spine, Breast, and GU-Urology. Over 2,000 patients were enrolled during the pilot phase. Patient use was extensive, including significant usage during evenings and on weekends (times when most of our offices are closed). Patients downloaded more than 5,500 patient education documents and sent over 2,100 secure messages.

Patient and staff satisfaction is high. International use was noted from eleven countries. Additional Clinical Administrative Directors have requested that the project be expanded into their care centers. Patients and families in non-participating centers have requested access.

Since January 2003, five additional clinics have been brought online: GU-Medical Oncology, Gynecologic Oncology, Head & Neck, Melanoma & Skin, and Lymphoma/Myeloma. 1595 patients have used the site.

The system software has been enhanced to support multi-center integration and can now support non-primary care centers. Multi-center integration models more completely the experience of patients as they transition between various centers and locations during the course of treatment.

Planned future enhancements include automated appointment reminders, online bill payment, support for patients involved in research and clinical trials, and additional integration with other key internal systems.

### A. Description of project

M. D. Anderson Cancer Center has been rated the number one cancer care center in the United States by *U.S. News & World Report*. An important reason for this designation is the institution's focus on patient service. Studies of customer complaints and requests indicate the majority of patient issues at M. D. Anderson arise from the patient's inability to easily access the appropriate resources. This problem is only compounded by the continued growth in the number of patient encounters.

Acting on a strategic insight that Web-based solutions have the potential to ease the cancer experience for many patients and their families, M. D. Anderson conducted internal and external research in 2000 and 2001 to document specific issues and ascertain patient and staff priorities.

We found that the Dept. of Quality Improvement, the Patient Advocacy program, The M. D. Anderson Information Line, and the Anderson Network all receive and document patient requests. During FY2000 over 13,343 patient e-mails were received with 7,475 answered by the Information Line department alone.

Research indicated that the top six reasons patients contacted the institution during FY2000 were to obtain:

- Assistance in scheduling a new appointment
- Assistance in changing an appointment
- Aid in contacting the appropriate clinical caregiver
- Information on how to navigate the Texas Medical Center and M. D. Anderson clinics and resources
- Cancer information and answers to specific questions regarding individual cancer care
- Information regarding their bills and insurance

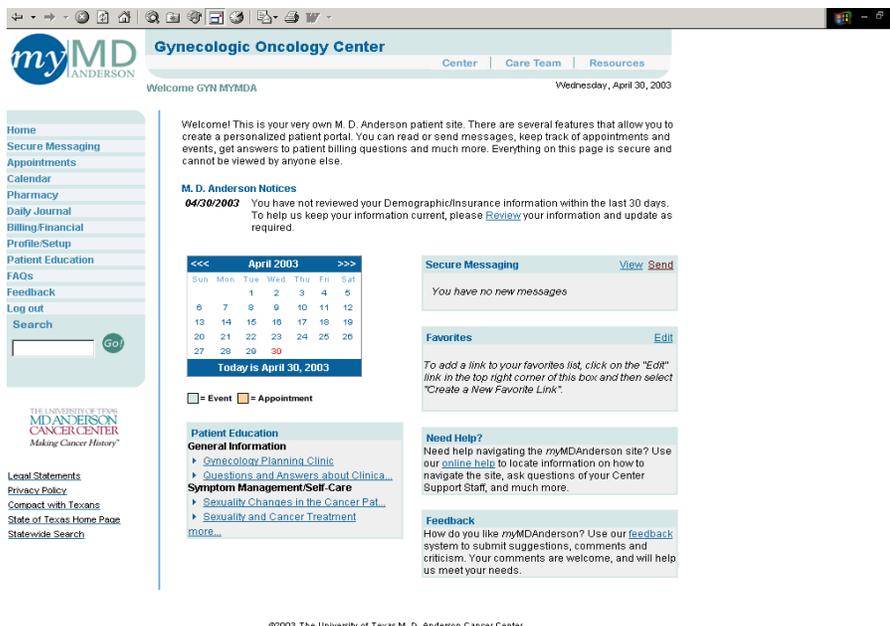
Supporting patient requests requires significant human resources and expense. On average, 18,000 paper statements are distributed to patients per week via patient accounting. During the month of December 2000, 2,368 patient demographic updates and 4,323 patient insurance updates were conducted, primarily through phone conversations with patients. 300-500 calls are received in the call centers per week.

We concluded that some or all of these patient care processes could be enhanced through Web-based technology. In mid-2001, M. D. Anderson retained Gelb Consulting to conduct focus groups and interviews with cancer patients and their families. The goal was to understand their needs for communication and information support and to determine whether they thought online interactive services should be a priority. Some of the important insights were:

- The cancer experience includes serious "information anxiety" – not knowing enough, not knowing what or who to ask, not knowing about available resources.
- Ironically, patients also suffer from information overload and are unable to process all the information provided verbally and in print while they go through an emotionally and physically difficult experience.
- Although they perceived the institution as caring and highly-customer focused, the communications aspects of the patient experience were perceived as challenging
- A large majority of patients and family members indicated an interest in Internet support. Even non-computer users said they could and would gain Internet access to use such a system.

Development started in late 2001 and a pilot was launched in March 2002. The project completed the initial pilot in three outpatient clinics by the end of 2002: Brain & Spine, Breast, and GU-Urology. Over 2,000 patients were enrolled during the pilot phase. Patient use was extensive, including significant usage during evenings and on weekends (times when most of our offices are closed). Patients downloaded more than 5,500 patient education documents and sent over 2,100 secure messages. Patient and staff satisfaction was good. International use was noted from fifteen countries.

Additional Clinical Administrative Directors have requested that the project be expanded into their care centers. Patients and families in non-participating centers have requested access. Therefore, since January 2003 five additional clinics have been brought online: GU-Medical Oncology, Gynecologic Oncology, Head & Neck, Melanoma & Skin, and Lymphoma/Myeloma.



Secure web-based messaging between patients and the care team and support staff is a key service and includes several important features

- Workflow support through automated message routing
- Categorization of messages (e.g., clinical care, schedule changes, billing/insurance, etc.)

Other key features of the website currently include:

- Personalized patient education materials sets
- Up to 400 days of appointment schedules
- Personal journal
- Online demographic data updates
- Frequently Asked Questions
- Online prescription refills
- Personal calendar
- Online patient billing statements
- Support for pre-registration communication

The system software has been enhanced recently to support multi-center integration and can now support non-primary care centers. Multi-center integration models the experience of patients more completely as they transition between various centers during the course of treatment (which may take weeks or months).

Planned future enhancements include an improved user interface, online bill payment, automated appointment reminders, e-learning, support for patients involved in research and clinical trials, additional integration with other key internal systems, and support for multiple languages.

Usage has continued to increase over the life of the system and averages 40% of all enrolled patients.

Center	Total patients enrolled	Total users	Messages sent
Brain & Spine	1044	387	1325
Breast	525	244	1119
GU	1828	677	1709
Gynecology	631	127	286
Head & Neck	171	44	92
Lymphoma/Myeloma	140	83	217
Melanoma & Skin	93	33	61
Total	4432	1595	4809

## Technical Approach

### Accessibility

Due to the diverse audience for the *myMDAnderson* application, the development team spent considerable effort to make it available to a wide range of browsers and connection speeds. The application is designed to work in all standard web browsers, but specifically Internet Explorer and Netscape Navigator version 4 and above. The requirement for browser plug-ins was also kept to a minimum. The only current plug-in required is Adobe Page Reader (this is necessary to view patient education documents and online billing statements).

To address connection speed issues (many patients use low-end dialup connections), the application makes minimal use of graphical elements. For example, navigational menus are textual and implemented using cascading style sheets (CSS).

The *myMDAnderson* application also degrades gracefully for older browser versions. For example, if an older version of Netscape Navigator is being used, the navigational system defaults to a non-CSS version.

The effort required to make the system available to legacy browsers is necessary based on our patient's usage patterns. The development team monitors site usage by browser, browser version, and platform. The pattern has remained relatively stable during the past year with 90.3% using Internet Explorer, 1.7% using Netscape, and 8% using miscellaneous other browsers. While the IBM-compatible platform is prevalent (85% of users), Apple (2%) and miscellaneous other platforms (13%) continue to be used.

### Application Environment

The *myMDAnderson* architecture is based on the Unix platform. The application and database are hosted on Sun 280R servers running Solaris 8. This environment is extensible by incorporating additional servers and running appropriate load balancing software, if necessary.

The application is developed using Macromedia ColdFusion MX. ColdFusion is an extensible server-side scripting language that supports reusable components, custom tags, and Web service development. While the language is script based, it is compiled into Java byte code on its instantiation. This allows the development team to make code changes easily, while keeping the performance capabilities of compiled code.

The *myMDAnderson* primary database is Oracle 8i. It is comprised of approximately 45 tables. The Oracle database is primarily used to store application data specific to *myMDAnderson*. It is not used to redundantly store information from other systems. The *myMDAnderson* application has dynamic interfaces to external systems.

## Application Interfaces

The *myMDAnderson* application interfaces with many disparate systems. A variety of techniques are used to make this possible, including native Oracle database JDBC drivers, vendor supplied proprietary interfaces, and custom coded interfaces. Native JDBC drivers (as opposed to standard ODBC drivers) are used for performance reasons, and interface with several application databases:

- *myMDAnderson* internal tables,
- Patient Education Online, and
- MicroMedex Drug Database (vendor-supplied)

A vendor-supplied proprietary interface is used for implementing an online prescription refill system and consists of a Microsoft compatible dynamic link library (DLL). This interface is hosted on a secondary Microsoft platform (Windows 2000 Advanced Server) web server.

Custom interfaces are used to interface with M. D. Anderson's installation of the Siemens Invision application hosted on an IBM 9672 mainframe. Patient demographic information, appointment scheduling and involved provider information is accessed through this interface. The interface is developed using

GNU C++ to implement a ColdFusion custom tag (an example of ColdFusion's extensibility) which connects directly to the mainframe through the TCP/IP protocol.

A custom interface is also used to make patient billing statements available. The *myMDAnderson* application integrates with a file-based transfer of billing statements (in Adobe Acrobat PDF) provided by Lason, an external vendor.

The *myMDAnderson* project will continue to use "best fit" methods to interface with more external systems. Not mandating an interface method is flexible and allows for quicker integration.

### **Application Design Methodology**

The *myMDAnderson* application development team has used the component-based objects supported by the ColdFusion MX environment. The use of components allows all core application business rule processes to be delivered to the application from one internal interface. This methodology allows the development team to make functionality changes available throughout the application easily. Currently, this component approach is being used for handling patient logins and permissions, HIPAA logging, secure messaging, and session timeout handling.

The *myMDAnderson* application is very dynamic. By implementing a phased rollout approach, we can support both small maintenance upgrades on a short standard schedule and major point releases on a more infrequent basis.

The development team makes ongoing usability changes based on feedback from both patients and M. D. Anderson staff. Additionally, the development team is addressing system performance issues and introducing new code constructs that have been made available in upgrades to the development environment.

## **C. Benefits realized**

### **Improved patient service**

Patients now have the ability to access information and interact with the institution on a 24x7 basis. Patient feedback has been substantial and highly positive.

Here are three representative patient verbatim comments:

- *"I absolutely love the personalized website and being able to check on my appointments and even reschedule. I know your clinic and staff are extremely busy and this cuts down on the phone time for all. Keep up the great work!"*
- *"I enjoy being able to check my appointments and messages without using the telephone as I am just 3 weeks post-laryngectomy and talking is difficult."*
- *"The site will help me since I live out of town and have to call long distance every time I need something."*

### **Improved service delivery**

Service managers now have insight and metrics into how service is being delivered in their units. This transparency into the efficiency and effectiveness of their customer service process is unique. Customer interactions can be audited for quality and cycle time. This has improved accountability and performance.

Managers and staff in the centers using the system report improvements in efficiency. For example, nurses report consistently that one secure message has now taken the place of multiple phone calls, voice mails, and "telephone tag." Physicians report that they are receiving less e-mail from patients requesting routine services such as appointment changes. Such efficiencies are very important to busy clinical care providers.

Documentation and consistency of information provided to patients has improved. In a complex organizational with many units and individuals providing service to patients, training is never sufficient. The development of content and procedures for *myMDAnderson* has yielded significant improvements in patient education documentation and in consistency of answers provided by customer service personnel.

## **HIPAA Compliance**

The federal Health Insurance Portability and Accountability Act (HIPAA) is designed to protect the confidentiality of each patient's medical record. HIPAA requires role-based access controls, user authentication, and audit trails of user access to medical records. Patients have the right to request a listing of all personnel who have viewed their medical record. Penalties for non-compliance are substantial.

*myMDAnderson* supports all HIPAA requirements. Access to patient information is limited to appropriate individuals and administered by patient care managers. Access is controlled through name/password authentication. All access to patient information is logged by the *myMDAnderson* system. This audit information is available to provide a listing of those who have accessed a specific item.

HIPAA does not specifically prohibit the use of e-mail, but since e-mail cannot be secured for patients using common Internet tools, Internet e-mail presents an identifiable risk. Therefore, the secure messaging features of *myMDAnderson* provide a secure alternative to unsecure Internet e-mail. E-mail is only used to "push" notices to users; e-mail content is formatted to include only generic information.

Additionally, *myMDAnderson* now requires each patient user to electronically acknowledge that he has read and understood the official *Notice of Privacy Practices*.

## **D. Return on investment, financial benefits**

### **Resources**

The two-year project cost for *myMDAnderson* development is estimated at \$1.3-million, including development team salaries and benefits; hardware and software; and external professional services.

The *myMDAnderson* project was created with a development team of 3.5 staff FTEs through the flexible assignment of team members. Roles included project manager, project coordinator, technical lead, web developers, content developers, web designers, DBA/systems administrator, external project facilitators, and vendors for selected technical and content services. A multi-disciplinary team of managers and staff from the involved patient-care departments and support groups has supported the project on a part-time basis. Represented departments have included care centers, Pharmacy, Nursing, Patient Business Services, Patient Education, Public Affairs, Social Work, Patient Advocacy, and MIS.

### **Financial benefits**

Internal managers and staff already attribute early cost-savings to the system, citing cost avoidance in printing, mailing, and long-distance telephone calls and faxes.

Additionally, although *myMDAnderson* was not originally chartered to seek financial results, two particular areas seem to offer strong potential for quantifiable financial benefits:

#### **1. Increasing collections by:**

- Presenting the patient with their statements electronically, faster than postal mail – reducing days in A/R
- Offering online bill payment – reducing days in A/R
- Allowing patients to update billing address changes online – making collections more accurate and reducing returned mail

#### **2. Increasing revenues by:**

- Increasing the number of patient self-referrals by enhancing the reputation of M. D. Anderson as a high-touch, leading-edge, customer service-oriented institution
- Making it easier to move prospective patients through the lengthy pre-registration process, thereby preventing patient drop-off and increasing actual registrations
- Avoiding no-shows for billable appointments
- Extending the platform to provide referring physicians with a new channel for patient referrals and subsequent follow-up