Request for Proposal

Medication Process – Supply Chain Technology

The University of Texas
MD Anderson Cancer Center
Division of Pharmacy

RFP: PHARMTECH/MA

March 11, 2008
Introduction

The purpose of this Request for Proposal (RFP) is to solicit innovative and competitive proposals that will serve to establish a contractual relationship between a Pharmacy Medication Process Automation Technology company and The University of Texas M. D. Anderson Cancer Center (MDACC), its affiliated retail pharmacies, outpatient pharmacies, investigational pharmacies, inpatient pharmacies, and any other pharmacies as may be added. The Division of Pharmacy intends to upgrade its existing suite of such technologies and systems enabling the operation of a seamless end-to-end pharmacy supply chain extending from the pharmaceutical manufacturer to the patient.

This collaboration effort will serve the unique pharmaceutical service requirements of the MDACC patient population and staff. This partnership is expected to be viewed as a model in the Healthcare industry in achieving the highest standards in all aspects of patient care, safety, perpetual inventory, financial monitoring, reporting, and inventory management.

MDACC is a component institution of The University of Texas System. Formed under legislative action, MDACC was created to provide care for Texans with cancer, with the ultimate goal being the elimination of cancer as a significant health threat. MDACC provides programs in quality patient care, clinical and fundamental research training, education, and prevention as a means to meet this goal. The Division of Pharmacy provides both clinical support and drug distribution functions to patients of the institution.

MDACC continues to expand the magnitude of its clinical programs as well as its facilities. MDACC is undergoing a major construction project adding four floors for patient care with plans to expand to another four floors. The Division of Pharmacy itself is in the midst of plans to significantly remodel and expand its core space. The upgraded facility will accommodate a more effective work flow and relieve the congestion that limits storage space and efficient operations.

The Division of Pharmacy, one of the largest hospital-based pharmacies in the United States provides a broad scope of clinical and distributive patient care services. The Division generates over $1 billion of gross revenue with pharmaceutical expenditures in excess of $250 million annually. Based on the most recent physical count, the inventory value is approximately $15.6 million dollars dispersed among multiple locations. An early adopter of Medication Process Technologies, the Division is embarking on a full scale upgrade to those technologies and systems creating a seamless end-to-end integration that assures the safety and integrity of the pharmaceutical supply chain from the manufacturer through the wholesaler to the patient while tracking and monitoring inventory on a perpetual basis. MDACC expects to maintain and extend its reputation at the leading edge of practice evolution.

There are two major, highly interdependent initiatives that are defined by the respective RFP’s:

- The search for a Medication Process Technology – Supply Chain Partner
- The search for a Strategic Technology Partner and;

The success of the Division’s efforts will be a function of the success of the collaboration with the respective Distribution and Medication Process Technology partners. Separate RFP’s for these functions are being submitted to qualified respondents. However, those organizations capable of providing the requested services and enabling the strategic relationship described in both of these documents will merit intense interest and detailed scrutiny. Additionally, only those organizations that
are actively and collaboratively willing to work in partnership with other vendors to accomplish MDACC’s broad, leading-edge goals will be considered. If MDACC determines that a vendor that does not have a comprehensive array of solutions, the vendor will agree to provide those solutions within a contractually agreed upon period of time.

Instructions

General Instructions

Please respond to the RFP using the following guidelines. Deviation from the guidelines may result in being disqualified.

Please respond to the RFP using MDACC’s RFP software Procuri, via the website: http://www.procuri.com. You will be receiving an email with explicit instructions, which are also on the website. Adherence to this process is required in order to be considered. Using this website allows MDACC to evaluate responses in a more equal and timely fashion.

The Technology Partners are requested to provide a point person available to answer any questions that MDACC may have while reviewing the responses. Please ensure that this person is knowledgeable about all aspects of the organization and the RFP response.

Respondents may elect to present alternative options to one or more sections of this RFP. Please provide such alternatives as an addendum to the primary response to the RFP. When such alternatives are proposed, please summarize the expected differences in approach, results and impact of the financial aspects of the proposal.

If respondents have any questions, please contact Aileen Maze-Kennon, Contract Manager amazeke@mdanderson.org or Maurice Alvarado, Sourcing Analyst, maalvara@mdanderson.org who is the only person from MDACC authorized to answer any questions regarding this RFP. Any other correspondence with MDACC staff members, except when so delegated, will be deemed reason for disqualification from the process.

Acceptance or Rejection of Proposals

The RFP is not an offer to contract. Acceptance of a proposal neither commits M. D. Anderson to award a contract to any Supplier nor limits M. D. Anderson’s rights to 1) accept or reject any or all proposals in part or whole; 2) request clarification on any specific response, omission, or claim made in a response to the RFP; 3) to further evaluate one or more proposals via additional interviews/presentations, site visits, reference checks, and other additional criteria; and 4) to further negotiate the terms submitted in a proposal, including price, prior to final award of an agreement in order to provide an optimum solution.

Supplier Response Guidelines

In replying to this RFP, Supplier shall make best effort to comply with the guidelines as follows:

☐ All statements made regarding the Supplier’s proposed product and capabilities shall be considered as contractual commitments in the event that the Supplier’s system is selected.
☐ Follow sections and numbering schema in responding to the items.
☐ Supplier acknowledges that responses received after the proposal closing time and date listed on the RFP cover page will not be considered. NO EXCEPTIONS WILL BE MADE FOR LATE OR MISDIRECTED SUBMITTALS. Suppliers are encouraged to ask any questions that they
may have with regard to the correct submittal of their proposal. Contact numbers are listed on the cover page of this RFP.

☐ All general public announcements regarding this RFP document will be made through the M. D. Anderson’s Internet website located at http://www2.mdanderson.org/app/procurement/bids/.

Supplier acknowledges and accepts that any costs incurred from the Supplier’s participation in this RFP shall be at the sole risk and responsibility of the Supplier.

**Contract Terms and Conditions**

The expected length of this agreement is (5) years with the option to renew for two (2) additional periods of (1) year each at MDACC’s discretion. The anticipated effective date of the Contract is January 1, 2009.

**Schedule of Events**

Below is the Schedule of Events concerning this RFP. Any missed deadlines will mean disqualification from the RFP process. Please make sure that you adhere as no extensions will be given.

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<td>Bidders Conference</td>
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**Pre-Proposal Conference**

The information provided herein is intended to assist respondents in the preparation of proposals necessary to properly respond to this RFP. The RFP is designed to provide interested respondents with sufficient basic information to submit proposals meeting minimum requirements, but is not intended to limit a proposal’s content or to exclude any relevant or essential data from there. It is recognized that the respondents may need additional information to complete its response which will be accommodated as MDACC considers such requests both reasonable and applicable. Respondents are at liberty and are encouraged to expand upon the specifications to give additional evidence of their ability to provide the services requested in this RFP.

There will be a Bidders Conference March 18, 2008 at 1:00 PM – 5:00 PM CST. The location of the meeting is Basic Science Research Building Room BSRB S5.8005 (5th floor). Bidders will be allowed to ask questions about the RFP to gain clarification on any points that they do not understand. **Only two (2) people may attend from each company.** A tour of the pharmacy and distribution areas will be held immediately following. Please respond to Aileen Maze-Kennon amazeke@mdanderson.org with the names of the employees representing your company that will be attending.

MDACC will not provide tours on any other date than March 18, 2008. Please make certain that you attend, as the physical layout of the pharmacy is important to the response of this RFP.
**Linkage between RFP Response and Final Agreements**

At the option of MDACC, all the provisions of this RFP shall be incorporated into any subsequent agreement between the parties. MDACC reserves the right to negotiate on all issues that it deems relevant. However, to the extent the parties do not agree in writing to change any provisions of this RFP, all the terms and conditions set forth herein shall be binding upon the Distribution at all times regardless of whether MDACC has executed this RFP unless and until MDACC has rejected or revoked this RFP as described above. All decisions by MDACC will be based upon a combination of factors and issues it deems relevant.

**Administration**

The selected Technology Partner will be responsible for providing MDACC with a detailed administration and procedures manual pertaining to:

- Monthly billing for services and products;
- Transition implementation schedule
- Ownership and maintenance of information system hardware, software, equipment and improvements
- Documentation of specific performance

In the event of any change in practices or procedures affecting the administration of the pharmacy operations management programs provided by the Technology Partner, MDACC will receive at least three (3) months advance notice in writing. Technology Partner service representatives shall be available for on-site consultations with MDACC administration as necessary.
Ownership of Records

All pharmacy management, financial and clinical data shall be the property of MDACC. The selected Technology Partner(s) will be asked to transfer all records to MDACC every 30 days during the contract term and within 30 days after notice of termination. No MDACC information of any kind is authorized for any use without specific expressed written consent.

I am legally authorized to represent ____________________________ (company name) and understand and agree that all data used in the procurement, management, and distribution of pharmaceuticals through ____________________________ (company) is/shall be owned solely by M. D. Anderson.,

Organization                      Signature
________________________________  ________________________

Date
Compliance with the RFP

All responses are to be prepared according to the RFP. Any item(s) that your company cannot accommodate are to be disclosed in writing prior to binding acceptance by MDACC. You must specify any and all deviations in your response to the RFP in the Statement of Compliance. Areas of your proposal that deviate in terms of personnel, services, equipment and performance should be specifically mentioned. It will be assumed that your proposal is in compliance if deviations are not noted in the Statement of Compliance.

Any such deviations from this RFP are to be discussed with MDACC in advance of the due date. After MDACC has made a commitment, the selected Pharmaceutical Technology Partner will be held strictly responsible for all items as contained in the RFP.

STATEMENT OF COMPLIANCE

Please submit as a part of your proposal the following information:

We hereby acknowledge receipt of the RFP for MDACC Division of Pharmacy, and verify that our proposal conforms to the RFP except as detailed below:

________________________________________________________________________
Organization ___________________________ Signature ___________________________

________________________________________________________________________
Date ___________________________ Title _______________________________________

________________________________________________________________________
Scope of Work

Future State Vision for Medication Process – Supply Chain Technology

In order to appropriately respond to this RFP, it is critically important to understand and embrace the direction and intention of the MDACC Division of Pharmacy (Pharmacy) with regard to Pharmacy Patient Care. A primary objective of Pharmacy is to assure the safe and cost effective realization of the planned outcomes of medication use. The Pharmacy “Five Rights” are the most universal description of this primary objective. Pharmacy Patient Care is a unique and complex mix of traditional hospital-based pharmacy services including ambulatory treatment, retail, clinical and investigational elements. Additionally, IT and financial services require leading-edge inventory management, reporting, and valuation of the pharmaceutical supply chain. There are significant interdependencies among all of these elements. Enabling the pharmaceutical supply chain is the first goal of this RFP. However, this is only one first step in the continuing evolution of pharmacy practice at MDACC.

Background

The Division of Pharmacy is recognized as an early adopter of Medication Process Technology. It acquired one of the first pharmacy dispensing robot. Many other such Medication Process Technologies were added as they became available to fill a functional niche along the pharmacy supply chain. Efforts to create integration among these technologies have been significantly limited by their respective fundamental designs which did not envision such integration.

The deficiencies of the current array of Medication Process Technologies have become increasingly apparent in recent years. MDACC’s Pharmacy and current pharmacy systems lack the ability to comprehensively monitor and appropriately manage medications on a perpetual basis with GAAP compliant valuation and accountability, an issue raised by MDACC internal and external auditors. As a result, the Division of Pharmacy maintains this inventory with many labor-intensive processes.
The Division of Pharmacy identified changes in no less than two key areas:

- Financial — to an ability to manage purchasing and inventory management consistent with leading operational and financial practices. This is particularly significant given the extraordinary cost of the agents that are at the core of cancer treatment.

- Strategic - to further support the institution’s key initiatives outlined in its strategic vision, including but not limited to:
  - Enhance the excellence, value, safety and efficiency of patient care
  - Safeguard and enhance resources
  - Advance The University of Texas M. D. Anderson Cancer Center as an employer of choice

**Medication Process Technology – Supply Chain Excellence Objectives**

The MD Anderson Division of Pharmacy has created a plan to implement leading edge technology for the oversight of the pharmacy supply chain as it relates to patient care, medication safety, process efficiency, fiscal responsibility and risk management including the following components:

- Inpatient Solution
- Ambulatory Treatment Center Solution
- Operating Room Pharmacy Solution
- Retail Solution
- Inventory Control and Management Solution

**Global Solution Objectives**

The selected Technology Partner and solutions will:

- Enter into a strategic and tactical partnership with MDACC
- Enable a seamless medication process that ties all steps from the pharmaceutical distribution center to the patient using at least state of the art technology
- Enable patient safety, minimize medication errors and assure the integrity of the medication supply using at least state of the art technology
- Reduce redundancy in inventory storage and movement
- Provide comprehensive perpetual inventory valuation and accounting capabilities
- Determine comprehensive cost of goods sold
- Provide leading-edge inventory management tools and reporting for data-driven decision making
- Provide advanced inventory safeguarding and medication security (diversion and shrinkage)
- Improve inventory tracking capabilities in and between all pharmacy inventory locations
- Support the desired future state medication process operational model
- Manage and value inventory at and between all pharmacy inventory locations as broadly defined
- Minimize manual data manipulation

**Inpatient Solution**

The Division of Pharmacy requires a decentralized medication distribution system that is interfaced to the pharmaceutical distribution center. Implementation of this integrated supply chain solution will provide automated processes with fully auditable transactions. It will utilize unit-based cabinets (UBC) with full integration to inventory carousels and unit dose packaging equipment. This will provide perpetual inventory capabilities as well as ultimately enhancing medication safety and increasing patient and nursing satisfaction. All drugs within the inpatient pharmacies must be controlled by technology including IV products, refrigerated medications and bulk storage items. Additional key
factors in making this selection are systems integration opportunities, scalability options for future institutional growth, enhanced patient and nursing satisfaction, and readiness to enhance the institution's strategic vision. Additionally, documentation of all drugs and quantities created, wasted or recycled, the preparer's name, and preparation time and date of all IV sterile products manufactured in any MDACC satellite or by any authorized vendor is required for medication safety and to fully implement perpetual inventory. It is expected that tracking of all medications will available during the preparation and dispensing processes and will be recorded in a permanent record.

**Ambulatory Treatment Center Solution**

The Ambulatory Treatment Centers (ATCs) are the primary sites for on-going patient care and delivery of chemotherapy and adjunctive medications. As such, ATCs prepare extremely high volumes of costly and potentially toxic medications. The plan envisions the use of Intravenous Admixture robotics to reduce the labor required to support patient care in the ATC areas. In addition to the full complement of bar code enabled inventory management systems, many of the necessary agents will be housed and sourced from refrigerated carousels. However, all drugs within the ATC pharmacies must be controlled by technology including IV products, refrigerated medications and bulk storage items. The importance of these technologies in combination with other systems cannot be understated, given that a significant plurality of medications used in this clinical setting is administered parenterally. These technologies enable the pharmacists to devote time and attention to those key steps for which their training is fundamentally important to assuring an optimal outcome. The technologies themselves are able to support the mechanics of the medication preparation processes that are labor intensive and error prone thus providing the time needed by the pharmacists for higher value functions. Additionally, documentation of all drugs and quantities created, wasted or recycled, the preparer's name, and preparation time and date of all IV sterile products manufactured in any MDACC satellite or by any authorized vendor is required for medication safety and to fully implement perpetual inventory. It is expected that tracking of all medications will available during the preparation and dispensing processes and will be recorded in a permanent record.

**Inventory Control and Management Solution**

Inventory Control is the part of pharmacy operations that warehouses limited medications and provides inventory management services for all pharmacy locations.

Inventory Control requires a carousel system that integrates with the pharmaceutical wholesaler as well as comprehensive, state of the art, inventory management tools and reporting applications. All drugs within Inventory Control must be controlled by technology including IV products, refrigerated medications and bulk storage items. It is expected that tracking of all medications will available during distribution processes and will be recorded in a permanent record.

There is an ultimate requirement to achieve perpetual inventory in a manner consistent with Generally Accepted Accounting Principles (GAAP) throughout all inventories in the Pharmacy. This requires tracking and reporting of purchase, issuances, wastage and shortages of all inventories including the ability to calculate cost of goods sold (COGS) on a daily basis. The ideal perpetual inventory solution would preserve the pricing at which the product was purchased throughout it's lifecycle within MDACC.

Achieving the ideal state for perpetual inventory management all but requires the ability to debit inventory based on real-time medication administration documentation. This functionality is dependent on the same machine-readable code labeling (e.g., bar codes, RFID) required by other technologies in the pharmacy supply chain. More importantly, electronic medication administration documentation applications are becoming viewed as fundamental resources in reducing the substantial risks associated with medication administration. While bedside Medication Administration and an
electronic Medication Administration Record (eMAR) are not explicitly included in the requested solutions, we can anticipate adoption as a “when” rather than an “if” at MDACC.

Maintaining inventory in this comprehensive pharmacy system requires comprehensive, leading edge inventory management dashboards and reporting including the ability to generate ad-hoc reports.

Retail Solution

The three retail pharmacies provide prescription services to the MDACC’s patients. The retail pharmacies utilize integrated ScriptPro technology for medication dispensing. This technology will remain in place and is independent of any system used by the inpatient or ATC pharmacies. However, unit-based cabinet software especially designed for narcotic inventories are needed to enhance medication security by providing a closed loop medication system throughout the Division of Pharmacy. In addition, the retail pharmacy will require a solution that will provide:

- Integration with divisional inventory management
- Automated inventory ordering
- Comprehensive inventory valuation

All drugs within the retail pharmacies must be controlled by technology including IV products, refrigerated medications and bulk storage items.

Operating Room Pharmacy Solution

The operating room pharmacy services the institution’s peri-operative and post anesthesia care unit (PACU) patients. Currently, all medications are prepared manually and dispensed in medication trays, which are retrieved by peri-operative personnel. To provide a technologic solution for inventory control in the peri-operative areas, specialty anesthesia cabinets have been identified as a proximate solution. This technology will integrate into the Pharmacy’s supply chain solution and will advance patient care safety and efficiency.

Solution Implications

Patient Safety

Patient safety is an issue of fundamental concern in today’s healthcare environment. MDACC’s technology solutions must enhance patient safety by minimizing the risk of medication errors and assuring the integrity of the medication supply. Any proposed technology solutions must be compatible with BCMA and eMAR systems and devices under consideration at MDACC to achieve this primary objective.

Inventory Control

The desired solutions are, most immediately, the enabling backbone to an effectively controlled and managed pharmacy supply chain operation. An MDACC internal audit report cited issues with determining Cost of Goods Sold (COGS). The traditional physical inventory process that occurs annually means that variances and the causes of variance can only be determined retrospectively. Given the high unit costs for chemotherapeutic agents and other adjuvant agents (e.g., erythropoietics, immune response modifiers, etc), the numbers of line items that comprise the majority of inventory would be relatively small. There is a clear expectation that the technologies will provide a vehicle to improve inventory control, valuation, management and reporting.

Pharmacy Practice
The last, but very significant, implications must center on the role of pharmacists as direct providers of patient care services. The Division of Pharmacy has a very significant cohort of Clinical Pharmacists. These specialists focus on the clinical needs of some, but not all, of the patients at MDACC. The goal is to have a pharmacist participate in the care of each patient in a manner that greatly exceeds the current involvement that is largely tied to order entry and fulfillment processes.

The Health-System Pharmacy and medical literature is replete with documentation of the impact of the patient care pharmacist on appropriateness of therapy design, clinical outcomes, cost management, impact on length of stay and reduction of medication errors. To accomplish the objectives of having pharmacists practice in a fundamentally clinical manner while also increasing the effectiveness of the pharmacy supply chain processes would require major changes in staffing and/or changes in operations. Even if increasing the staffing was seen as a means to this end, the realities of the pharmacist shortages impose a barrier, not easily overcome. The more appropriate view indicates that manual processes that are capable of being automated should (must) be automated.

There are tasks that technologies can perform more effectively than could be accomplished with people resources. There is a need for a close examination of the functionality and effectiveness of the core processes before adding technology to the mix. The objectives of the process and the optimal roles of people and technology must be evaluated to establish the optimal balance among all three factors.

This last implication speaks to the continuing evolution of pharmacy practice at MDACC. Within organized Health System Pharmacy, the vision that defines the HPP has become increasingly clear and positions Pharmacy as a complex and broad reaching patient-centered function within the hospital and health system. MDACC and its Division of Pharmacies largely share this vision. The Medication Process Technology – Supply Chain plan are focused on merging the MDACC objectives and values with the HPP vision to create a unique blend that meets the needs of the patients and the institution.

The Medication Process Automation technologies that will be selected through the RFP process will serve as the enabling architecture to actualize the strategic direction for pharmacy practice at MDACC.

The Technology Enabled Medication Process

The Medication Process is composed of several mega-processes that ultimately link the pharmaceutical manufacturer to the patient. The Division of Pharmacy is the most proximate intermediary with responsibilities and accountabilities that are a blend of clinical and medication supply chain management services.
Objectives of the Medication Process: “The Pharmacy Five Rights”

It is fundamentally important to recognize the primary objective of pharmacy as a contributor to patient care. Everything that we do is in support of these goals.

☐ The Right Patient
  • The medication is ordered, prepared, dispensed and administered to the patient for whom it is intended with the least possible risk of preventable error

☐ The Right Medication
  • The medication is the actual entity which is the most clinically appropriate and cost effective choice to fulfill the therapeutic objectives of the patient’s physician

☐ The Right Dosage
  • The amount of medication is the most clinically appropriate dosage for the patient’s age, gender, height, weight, overall and specific conditions to fulfill the therapeutic objectives the patient’s physician

☐ The Right Route of Administration
  • The medication is ordered, dispensed and administered via the most clinically appropriate means (e.g., orally, intravenously, topically, etc.) to yield the safest, most effective and convenient outcome

☐ The Right Time
  • The medication is ordered and dispensed in such a fashion that it is available to be administered according to a schedule that is based on the clinical requirements of the patient and the pharmacological characteristics of the medications

☐ The “Sixth” Right
  ▪ The patient achieves the intended outcome of medication use with an optimal balance of therapeutic benefit, avoidance of preventable risk and prudent use of resources

Specific Medication Processes in the RFP Scope

Among the totality of all pharmacy process, the technologies and systems implemented through this RFP are those that focus on the pharmaceutical supply chain:
Future State Schematic for Inventory Management

The Division of Pharmacy intends to actively manage the pharmaceutical inventories as the aggregation of each inventory location. This expectation includes the ability to determine the on-hand inventory value, based on a GAAP-compliant methodology, at any time. The Inventory Management System must support the ability to establish inventory performance metrics (minimum and maximum stock levels, optimal re-order points) at the line-item level that are system-driven based on transaction/utilization volumes.

Visibility and tracking of item movement of into, among and from any inventory location is accomplished electronically based on bar code scanning transactions and/or electronic data interchange.
All Patient Level Doses Imprinted with Machine-readable Code

A fundamental requirement of the Medication Process – Supply Chain Technology solution is the use of machine-readable codes representing critical information to assure the identity of each unit of medication including lot numbers and expiration dates. Other data elements must also be represented and/or accessed via a unique reference number.

Symbology must be compatible with the physical size of medication dosages as well as must be universally readable across all applications and devices in the selected solution. For example:

![Scannable machine-readable code example](image)

**Medication Process Cycle and Position of Specific Technologies**

The Medication Process is not linear, but an ever recurring cycle. There are specific technologies that enable each cycle component. Tight and effective integration is an absolute essential for the smooth delivery of expected results.
Inventory Management System
- The foundational application providing a mechanism for electronic control of ordering, receiving, transfers, inventory valuation.
- All pharmacy inventories can be actively managed with visibility to all authorized users.

Medication Carousels
- Automated storage and retrieval systems for medications stored in the pharmacy; provide security and storage density, accuracy in picking medications with bar codes including medications requiring refrigerated storage.

Bar Code Scanners
- Hand-held or hands-free devices to “read” the bar codes and transfer the label information to a software application e.g., patient identification database, inventory or dispensing records, medication administration application.

Unit-based Cabinets (UBCs)
- Medication dispensing cabinet to automate storage, dispensing and tracking of medications in patient care areas as the primary distribution mechanism (“cart-less system”).

Pharmacy Robot
- Automates the medication dispensing process with bar code technology in the central pharmacy to serve as the dispensing mechanism for medications not stocked in the UBCs.

Shelf Stock Management
- Functionally mimics carousels with bar code based transactions and recognition as an inventory area in the Inventory Management System for medications that cannot be housed on the carousels.
Controlled Substances Management
- Essentially similar to the concept of the carousel to provide automated storage and retrieval systems for medications stored in the pharmacy; provide security and storage density, accuracy in picking medications with bar codes; interfaces with UBCs to define “closed loop control.”

Electronic Physician/Pharmacy Order Management Systems (ePOMS)
- Scanning based imaging systems to transmit electronic copies of handwritten orders from the patient care areas to an electronic “in box” in the pharmacy information system for visualization and processing.

Anesthesiology Medication Control and Access
- UBCs specifically designed to support the needs of the anesthesiologist and/or CRNA.
- Alternatively, redesigned medication trays housed and accessed from UBCs may be considered.

Remote Location Management Systems
- Functionally mimics UBCs with bar code based transactions and recognition as an inventory area in the Inventory Management System for medications that cannot be housed on the UBCs in the patient care areas including those dispensed by the Robot and/or refrigerated medications.

Work Flow Management
- Applications designed to manage, track and document the medication order fulfillment processes and steps

IV Robotics
- Relatively new technologies using automation to mass produce small volume infusions

Specific Medication Process Technologies and Devices Out of the Current Scope of the RFP

There are several technologies needed to optimize important aspects of Patient Care and the Medication Processes that are not included in the current plan, but for which the selected technologies must be able to integrate and/or support in the future:

Computerized Physician Order Entry (CPOE) – (under development)
Applications that sit at the front of the Medication Process that enable the direct interaction of physician orders with the Electronic Medical Record (eMR) and all of patient support applications, such as the Pharmacy Information System and the Electronic Medication administration Record (eMAR). The eMAR and the eMR are propriety MDACC systems. Technology components will need to integrate with these applications.

Bar Code Medication administration (BCMA) or Barcode Point-of-Care (BPOC) – (under consideration)
Medication use process use bar codes and scanning to improve medication use accuracy and safety, right patient, right dose, right route, right time, right medication as well as transfer medication administration documentation to the eMAR. Technology components will need to integrate with this application.

Electronic Medication administration Record (eMAR) – (under consideration)
• Both the listing of medications as well as the vehicle for documenting medication administered to the patient
• Generally is a component of the Electronic Medical Record (eMR)
• Technology components will need to integrate with this application.

Until these technologies are implemented, a fully technology enabled medication process will not exist.

**Note:** The MDACC Division of Pharmacy is using the GE Centricity pharmacy application. Integration and interfacing to this application are absolute requirements of the end-to-end solution to be implemented. There are no plans to consider an alternative pharmacy information system.

### Functional Requirements

The following section provides an overview of the expected role of the specific technologies and systems as part of the overall Medication Process – Supply Chain Technology solution. The detailed functional requirements are found in the Functional Requirements Questionnaire. These specific requirements may not include some basic fundamentals that are generally understood to be present in the respective technology device or systems. It is critically important that RFP responses document how the proposed solution enables the Division Medication Process – Supply Chain vision.

#### Perpetual Inventory Management

- MDACC is moving toward perpetual inventory accounting.
- Under this principle, the current balance of inventory is adjusted daily by the addition of inventory to the account when medication supplies are received and the deduction from the account when they are administered and charged to the patient.
- This method, as opposed to a yearly or monthly calculation, allows for an organization to have more timely and accurate data on inventories.
- For Pharmacy, perpetual inventory would also provide a means to recognize, track, trace and reconcile all purchase transactions with the corresponding medication administration and charge transactions at the item level at all steps of the total Medication Process.
- True perpetual inventory accounting requires BCMA. Until this function is implemented, perpetual inventory accounting will be limited to reconciling what is purchased with what is transferred out of the inventory (e.g., dispensed to a patient, to a patient care inventory account, clinic, waste, etc).

#### Inventory Management System (IMS)

- A comprehensive inventory management system provides control and visibility to all pharmacy inventory areas.
- The IMS must be capable of establishing and maintaining comprehensive line item inventory valuation using a GAAP compliant methodology including the determination of cost of goods sold.
- Inventory in each area will be actively managed using on-hand valuation and annual turns (at least) as performance measures.
- All transactions in and out of inventory are recorded using a scanning procedure or a system-generated transaction. Inventory will be relieved via:
  - Vend transaction from UBCs, and robots
  - Dispense transactions for IV infusions and non-UBC medications from other inventory storage equipment
  - Waste (not recycled)
  - Expired
  - Returned (over-stock, etc)
Eventually, most inventory relief will occur based on bar code medication administration scans (for those doses administered on-site) or on dispensing to ambulatory/retail patients. The application will automatically schedule random cycle counts (mini physical counts) that will eventually replace the physical inventory counts.

**Inventory Replenishment**

- Inventory replenishment will be system-driven based on min/max/re-order point triggers.
- Trigger thresholds will account for replenishment cycle time.
- Orders will be reviewed centrally before submission to shift inventory among the various pharmacy locations to minimize ordering excess quantities.
- Order quantities will default to the system recommendation unless over-ridden based on user knowledge of short-term changes in usage patterns.
- While many pharmacy areas will continue to submit and receive orders directly with the wholesaler, the system must be able to support a centralized review of all orders to reconcile quantities. Ideally, this step may not be necessary if the wholesaler distributes in exact order quantity rather than manufacturer packaged quantities.
- Orders will be received and checked in using scanning of the package bar code against receiving document with bar codes or using a totally electronic receiving document.
- The Inventory Management System (IMS) will use an MDACC-built conversion table to reconcile between manufacturers’ package quantities (e.g., case, box, tray-pack) and Low-Unit of Measure (LUM) or patient doses.
- There will be system integration between the purchasing/inventory control applications and the Centricity product catalog that will provide guidance on product selection for order fulfillment.

**Unique Functions to be Supported by the Inventory Management System**

**Investigational Drug Program**

As one of the world’s leading cancer research and treatment centers, the Division provides support to over 800 investigational protocols. The Investigational Drug Pharmacy will be considered as a specific inventory with the IMS and all requirements for inventory management are applicable to investigational drugs. However, there are a number of specific requirements that must be supported to be compliant with Federal regulations, protocol and sponsor specifications and the dictates of science rigor. The respondents should describe the extent to which their Inventory Management System can support these specific requirements or provide an alternative solution.

**Replacement Drug Program**

As an initiative to assist patients with medication expenses, the Division has established a program of medication replacement offered by many pharmaceutical companies. These programs are offered in recognition of the economic burdens that might be imposed on cancer patients with limited financial resources. Replacement drugs are to be managed as a specific inventory location and, again, all requirements for inventory management are applicable to replacement drugs. In addition, there are several specific requirements for the identification of such products, at the NDC level, throughout their lifecycle at MDACC.

**Business Intelligence Reports**

The Division of Pharmacy is charged with the stewardship of the institution’s pharmaceutical inventory and serving as the proximate provider of medications needed for patient care. A first objective is to maintain these inventories that are dispersed in multiple locations to meet the clinical requirements of MDACC’s patients.
Routine and readily available performance dashboards and more comprehensive reports describing all aspects of purchasing, inventory management preparation, dispensing, work flow and billing are foundational to assuring the expected and desired levels of performance within the Division.

Such information is almost as equally important to manage the effectiveness of the collaborative relationship between MDACC and its Technology Partner.

MDACC Division of Pharmacy requires the Technology Partner to provide and support data warehousing applications supported by robust analytical and reporting tools to accomplish these purposes.

Ad Hoc Reporting - This report writer function allows the merging of information from different sources for reports or will create a custom report.

Multi-Account Reporting shall have the abilities to compile information from multiple locations and departments.

Custom Reporting - These reports will be produced by Distribution Partner to meet the unique needs of MDACC Division of Pharmacy with custom reports built to MDACC Division of Pharmacy specifications.

Packaging and Labeling Systems

Until such time as all medications can be purchased (either as produced by a pharmaceutical company or from the Distribution Partner) with the required labeling (i.e., at least the Triad of Safety), it will be necessary to perform these functions in-house. Even if the Division has the option to purchase medications from the Distribution Partner with the required packaging and labeling formats, it will still be necessary to have the ability to do some packaging and labeling for the pharmacy robot, for medications sourced directly from the pharmaceutical company as well as for the many circumstances in which individualized dosing is required. Doses may include oral solids, oral liquids, topical ointments and creams, ophthalmic drops, vials, ampoules, unit dose syringes, suppositories, and all other unit dose forms dispensed to patients.

Bar Coding Considerations

Bar code enabled medication administration (BCMA) is a function essential to the achievement of MDACC’s Medication Process objectives. FDA has required manufacturers to supply NDC bar codes (not necessarily linear) on all pharmaceuticals by January 2007 (not yet fulfilled). MDACC’s expectation is to take the FDA mandate a step further and require the “Triad of Safety”:

- NDC
- Lot Number
- Expiration Date

Given the potential lack of an assured pharmaceutical company-based solution, MDACC must determine whether it will conduct its own large scale repackaging / bar code labeling operations or purchase services from a third-party vendor. The bar code labeling solution must demonstrate a very high degree of reliability to not introduce repackaging / bar code labeling operations as a new source of potential error. MDACC Division of Pharmacy, the Medication Process – Supply Chain Technology Partner and the Distribution Partner will work in close collaboration to assure consistency and integration of all concurrent projects using bar coding within MDACC can be appropriately managed.

Repackaging and Relabeling

All medications must be purchased and/or repackaged with a functional machine-readable code label. At the present time, manufacturer’s bar codes represent only the NDC with occasional secondary bar codes for lot or expiration date. It is likely that a more complex symbology (e.g., stacked two
dimensional codes) than a linear format will be required to represent the desired data elements. Available medication process technologies have yet to adopt and/or support RFID.

Other packaging and labeling requirements and expectations include:

- Medication packaging must be compatible with the physical requirements for storage and retrieval from the UBCs.
- Robot-ready packaging is inherently incompatible with UBC packaging.
- It is currently planned that most robot ready medications will be produced within the pharmacy using high speed packing technology.
- A small percentage of robot-ready medications may be purchased.

**Repackaging and Bar Coding Assumptions**

MDACC Division of Pharmacy is ready to consider the most reliable, safe, and economical business model for prepackaging pharmaceuticals based on the following assumptions:

- A solution is in place for repackaging and labeling of all forms of pharmaceuticals.
- There is standardization for all bar code symbologies for all applications used at MDACC and/or scanning technology capable of translating all symbologies employed for all applications (single scanner for all functions).
- The repackaging and bar code labeling operations appropriately account for the facilities, physical environments, staffing and skill mix, work load volumes, inter-facility distribution, costs, regulatory, accreditation and licensing issues.
- The most desirable solution is to purchase medications at LUM in ready to use packaging with appropriate bar code labeling.
- Even if most medications can be purchased in the desired packaging and labeling formats, the Division will continue to require the capacity to produce and bar code labeled doses for those patient specific medications and I.V.s, when needed for unique or seldom used medications.

**Medication Carousels**

Medication carousels are powered rotating shelving units that are used to store large quantities of medications in a relatively small space. Carousels have been used in hospital pharmacies for many years, but have not, of themselves, played a significant role in enabling the future state of inventory management. The coupling of this older technology with inventory tracking software is a newer concept.

- This technology must link the electronic information provided by the pharmaceutical distributor with an inventory record.
- Newly purchased medications are received into the inventory database using bar-code basis information transfer.
- Withdrawals from stock to the dispensing areas, satellite pharmacies, distribution to UBCs and floor stocks will be tracked at either the package or patient level dosage levels using the bar code labels, hand-held or flat plate scanners and the inventory management software.
- It should be possible to actively manage these sub-inventories with defined par levels and re-order points.
- While medication carousels will not be cost effective and/or physically compatible with smaller inventory areas, the organizational objectives for maintaining a perpetual inventory as well as point-to-point track and trace functionality must be able to be satisfied.
- This is to be accomplished using the same hand-held scanners and inventory management software that would be used with the medication carousels.
The desired solution will be to mimic the functionality of the medication carousel and software with the substitution of shelf storage units with bar-code or RFID tagging to define product locations.

As an alternative, a smaller inventory area supported a major inventory area could be established as a “patient care unit” within the inventory management database of the Inventory Control area carousels. The inventory is transferred from the carousel to this smaller inventory area as the “patient care unit”. If the incoming inventory were to be immediately transferred to a UBC that would complete a “track and trace” linkage.

Unit-based Cabinets (UBCs): “Cart-less Medication Dispensing”

For patient care areas currently served by robotic and manual cart fill, dispensing will transition to a largely “cart-less” process with most medications retrieved by nursing personnel from UBCs.

- In order to optimally control the “vend” transactions and assuring the accuracy of the “pick” as well as verify the impact on the UBC inventory, unit-based cabinets will be utilized.
- UBCs will serve as the control point for inventory relief, reconciliation, replenishment and charge capture.
- With the eventual implementation of BCMA, inventory relief, reconciliation, replenishment and charge capture may be replaced with the bedside scan transaction.
- UBC inventory replenishment will also require scanning at lowest unit of measure (LUM) to assure the control of the identity, expiration date and lot numbers of the medications stocked in the device.
- The high volume of scanning transactions suggests the need for flat plate scanners rather than hand held devices.
- There has been discussion that the “scan at administration” may be possible in the OR assuming that an interface between the UBC and the OR system (currently PICIS) can be implemented. Given the wide range of the MDACC formulary, not all medications can reasonably be stored in a given UBC.
- The dispensing robot will be used to “pick” doses that are not routinely stocked in the UBC.

Pharmacy Dispensing Robot

Over the past decade, many institutions have shifted from a centralized cart-fill (or envelope-fill) unit dose distribution system to housing a majority of medications in a unit-based cart system. Regardless of intent, numerous pragmatic issues preclude routinely stocking all possibly needed medications in a given UBC.

In considering the several options to make all ordered medications available on the patient care units, the Division of Pharmacy has elected the continued use of a pharmacy dispensing robot as the mechanism to dispense those medications needed for patient care that are not routinely stocked in the UBC.

The robot will satisfy the requirements for inventory control as will as assurance of a safe and secure pharmacy supply chain.

The Division believes that the most operationally and cost effective approach to repackaging and labeling robot-ready medications is to bring this process in-house, although will be open to entertaining alternative proposals.

Shelf Stock Management Systems
The current Medication Process Technology plans calls for housing a significant volume of medications on carousels in the central pharmacy areas coupled with the comprehensive inventory management application

- Where the use of carousels is not feasible and/or practicable, the solution must support the full complement of objectives for inventory control and management
- Medications, managed as shelf stock, must be able to be identified as a specific inventory location
- All functionality linking purchasing, receiving, additions, transfers and relief from inventory using scanning mechanisms are required for all locations not using carousels.

Remote Location Management Systems

This functionality is tightly coupled to shelf stock and any other medication inventory that can not be housed in a carousel or UBC.

- Such medications include those requiring refrigerated storage in the pharmacy or on the patient care units as well as individual patient supplies (i.e., those picked by the dispensing robot).
- It must be possible to identify such supplies as discrete pharmacy inventory locations subject to the general requirements for inventory management and control as described throughout this document
- Ideally, the remote location management application will integrate with other technologies and systems to provide guidance to both pharmacy and nursing personnel to the specific location of medications not housed on carousels and UBCs.
- For example, the UBC patient profile would indicate which medications are available in the cabinet and which are to be obtained from the individual patient supply, the refrigerator or controlled bulk storage unit.

Controlled Substances Management System

Management of controlled substances, especially those in DEA Schedule II, requires extraordinary documentation and accountability. At the same time, it is the Division’s intent to achieve the same levels of “closed loop’ control and accountability for all medications. The Division currently uses a proprietary system for this purpose. The selected Medication Process Technology solution must be able to provide leading-edge accountability, control and reporting capabilities.

IV Robotics

The Division is intensely interested in the potential utility of robotic devices to automate the preparation of small and large volume infusions. As might be expected, the volumes of such dosages used in the oncology setting are quite significant. This may be obvious given recognition that the majority of chemotherapeutic and related therapies must be administered parenterally.

The Division has identified its requirements for IV robotics (see functional requirements questionnaire). At the same time, we recognize that these are emerging technologies offered by a small number of companies. However, IV robotics is largely excluded from this expectation.

The Division believes that its needs will best be served through a separate, but coordinated, selection process for such technology. The technology partner will be required to commit to work closely with the selected IV robotics company to assure full integration with the selected solution. The IV robotic company will be equally required to achieve the necessary systems and functional integration with the full solution suite.

Electronic Physician/Pharmacy Order Management Systems (ePOMS)
Communication among the primary patient team is the most critical function that affects the quality and efficiency of care delivery. Orders written by physicians provide the specific directions to pharmacy, nurse and others regarding the care that is to be provided.

The use of scanning technology and related software (ePOMS) appears to offer the best middle ground between the current process (faxing) and CPOE.

- The paper order is scanned at the nursing unit and transmitted to the pharmacy where it will be visualized on a monitor.
- Each transaction is dated and timed serving as a proxy for that information if it has been omitted.
- Orders for the same patient will be grouped and linked for more effective entry into the pharmacy information system. However, order entry will continue to be a duplicative transcription step.

**Work Flow Management**

- Work flow management functionality or the ability to track order processing from receipt to administration (e.g., “fedex” point to point tracking) will be integrated with the inventory management and dispensing (Centricity) applications.
- Such functionality would allow nurses using the system to determine where a pending order resides rather than calling a pharmacy dispensing area.
- Moving to a largely “cart-less” distribution model will greatly reduce the time-demand aspects of order processing, leaving order entry, verification and release as the major rate-limiting steps for medications obtained from UBCs.
- Work flow management is a routine function in retail pharmacy systems, but far less common in hospital pharmacy systems.

**Technology Partner Responsibilities**

**Technology Partner Commitment to Patient Care**

MDACC will be committing its pharmacy supply chain and fundamental ability to support pharmacy patient requirements and results to the design and functionality of the contracted Medication Process Technology solution. This will require the parties to enter into a full partnership with specific responsibilities and accountabilities for successes and advance planning to avoid operational failures and/or minimize their impact on patient care should they occur. The fundamental question is “How do we know that your solution works in the manner described and functions with the highest degree of reliability”?

The Technology Partner will:

- Provide at least two references of customers that have successfully implemented your proposed Medication Process Technology solution. Reference customers must be sufficiently comparable in organizational scope and scale.
- Describe your solution’s quality assurance program.
- MDACC requires that the solution components operate with less than 5% unplanned down time in any rolling quarter and no more than 4 hours unplanned down time at a single episode. Please describe and document your:
  - Your solution’s operating performance with particular reference to comparable scope and scale
  - Training support (initial and on-going)
  - Preventative maintenance
  - Routine service
  - Repair service
• Hardware and software requirements for integration and interoperability

**Solution Interoperability**

It is of critical importance that the respective technologies and systems have the necessary interoperability to function as fully integrated, end-to-end solution. Providing the full complement of technologies and systems need to enable the MDACC Division of Pharmacy desired future state for the pharmacy supply chain is understood to be significant challenge for any given partner. Nevertheless, we believe it must be incumbent on the selected partner to assume full responsibility to assure the compatibility and functionally of and among all components of the solution whether those that are proprietary to the Technology Partner or those providing through a third party.

Respondents will:

- Provide a description of those technologies to be provided by a third-party and the identity of that third party.
- Document how you can validate the functionality and interoperability of third party technology.
- Describe how possible gaps in your solution could be supplemented with a third party in fulfilling the specific functional requirement.
- Describe the requirements for additional hardware or software needed to implement the third party technology.
- Describe how implementation of third party technology will be coordinated with implementation of your own solution.
- Detail what guarantees and assurances will be provided that the inclusion of the third party technology will yield a result that fulfills the specific requirements.
- Detail the impact developing and implementing such third party solutions will have on current and future pricing.
- Provide at least two references for customers that have successfully implemented the subject third party technology as part of your technology solutions.

**Solution Development**

MDACC Division of Pharmacy anticipates the possibility that the specific requirements of this RFP may exceed the design of currently available technology and systems in some or many aspects. The RFP response must clearly delineate “what is” from “what might be”.

The extent to which some functionality is “under development” will require:

- A very detailed description of the gap between the current and planned functionality.
- Detail of critical of the gaps in fulfilling the specific functional requirement.
- Requirements for additional hardware or software needed to implement the new functionality.
- The time table for completing the development of such functionality.
- Recommended solutions to managing the gap until such time as development is completed.
- Detail of guarantees and assurances that will be provided that the development plan will be completed on time and will yield a result that fulfills the specific requirements.
- Details of any impacts in developing and implementing such new functionality on current and future pricing.
- Detail an understanding of what MDACC resources are required to support such development and how that investment will generate positive returns.

**Implementation Timing and Schedule**

Given the scope and magnitude of the Division’s plan for a Leading Edge Supply Chain Solution, it is...
assumed that the full implementation will extend over a two to three year period beginning with finalization of business arrangements. Plans for remodeling and significantly enlarging the physical environment of the Division’s space are underway with expected completion estimated for late 2009. Consequently, some of the larger technologies (e.g., carousels) would not be installed until construction is completed. Therefore, the selected technologies will be implemented in several phases. While acknowledging these physical facilities limitations, the Division desires to commence implementation based on the earlier mutually agreeable time schedule following the completion of the contracting approval process. It should be possible to implement many elements of the full solution prior to the completion of the pharmacy construction project. The Division and the Technology Partner will work together to determine which of those elements are sufficiently functional on a relatively “stand-alone” basis until full integration can be achieved.

MDACC requests that all bidders submit an implementation schedule with the RFP responses. The Implementation Schedule submitted will become part of the final contract with the selected Technology Partner. Please specify timelines by week and function.

Your implementation plan should include at a minimum:

- Flow of the implementation to optimize the impact of each technology on a stand-alone basis while waiting for the subsequent phases that will integrate them into the full end-to-end complement.
- Implementation plan quality assurance program.
- Training (initial and on-going).
- Implementation staffing (please resume summaries detailing implementation experience) for the project manager and key resources.
- Expected MDACC staffing requirements (numbers individuals, required experience, time commitment and duration.

**Implementation Risk Management**

The Division of Pharmacy’s Planning Team has identified a number of implementation-related risk factors. The RFP response must describe how your proposed implementation plan will mitigate those risks over which you would be expected to have control as well as those for which you are able to make recommendations including but not limited to:

<table>
<thead>
<tr>
<th>Risk Factors During Implementation</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrating Technology and Processes</td>
<td>Poorly designed processes that do not take advantage of the technology will cause delays in medication delivery.</td>
</tr>
<tr>
<td>Availability of Dedicated Staff</td>
<td>If sufficient staff is not directly dedicated to implementation, timelines will not be met.</td>
</tr>
<tr>
<td>Interruption of Distribution Processes</td>
<td>Switching technology and processes will cause delays as staff become accustomed to the new methodology.</td>
</tr>
<tr>
<td>Equipment Transition Logistics</td>
<td>The ability to implement the new systems while still using the existing systems can cause issues with space, timing, and processes.</td>
</tr>
<tr>
<td>Failure of Initial Education and Training</td>
<td>Staff will not be able to use new systems and processes, causing delays in medication delivery.</td>
</tr>
</tbody>
</table>
### Risk Factors During Implementation

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities Installation Issues</td>
<td>Ability of Facilities to provide resources in a timely manner to meet the needs of the project can cause delays in implementation.</td>
</tr>
<tr>
<td>Technology Partner Fails to Meet Contract Requirements</td>
<td>Potential delays in implementation or failure of project.</td>
</tr>
</tbody>
</table>

### Risk Factors Post Implementation

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Acceptance of New Processes</td>
<td>If staff does not accept the change in processes, the system will not work as efficiently as designed causing even slower delivery of medications.</td>
</tr>
<tr>
<td>Lack of Follow-up Education and Training</td>
<td>Staff will not fully remember new workflow and processes causing delay in delivery of medications.</td>
</tr>
<tr>
<td>Improper Equipment Placement, Sizing and Configuration Estimates</td>
<td>Delivery can be slowed due to excessive time needed to retrieve medications.</td>
</tr>
<tr>
<td>Technology Partner Fails to Meet Contract Requirements</td>
<td>Technology Partner failures may create delays in the project timeline, which may ultimately create overall project failure.</td>
</tr>
<tr>
<td>Excessive Equipment Downtime</td>
<td>Delivery costs will increase as more tasks are required to be completed manually.</td>
</tr>
<tr>
<td>Poor Workflow</td>
<td>Benefits from increased automation will be lost if workflows are poor.</td>
</tr>
</tbody>
</table>

### Technology

**Integration Requirements**

The selected Medication Process – Supply Chain Technology solution must integrate with the:

- Distribution Partner Order Management Application
- Inventory Management System
- GE Centricity Pharmacy Information System

**Technology Standards**

MDACC requires the Distribution Partner’s software application conform within reason to the MDACC IT / IS Standards and Information Security requirements provided (see Attachment C)
Hardware and Software

- All hardware (technologies and devices) are to be the most current versions.
- All current software updates of applications covered by this RFP will be at no additional cost. (Software updates are later versions of existing software, which do not necessarily introduce new functionalities, but enhances current functionality).
- Technology Partner will supply MDACC in advance a release summary of all changes and modifications included in the hardware or software update.
- Release summaries should specifically include any functionality that is a required fix, other functionality that may have been impacted by new or changed code, a list of any new features added and a summary of how hardware and/or software performance will be improved by the update.
- When notification of pending available update is provided, such notification will include the estimated duration of such update process with the option to defer update to a later time.
- Hardware and software updates will be scheduled to occur at mutually agreed upon times to minimize downtime and interruptions from work.
- MDACC must approve all release summaries.
- In this RFP we define a hardware or software upgrade as addition of new functionalities.

Support, Training and Maintenance

Training

MDACC Division of Pharmacy requires that all training for newly installed pieces of equipment or software, per this Request for Proposal, be included in the pricing. Training includes new installation training, new hire training, and training when upgraded software is installed. Training programs must validate user competency and provide resources for retraining and updating as needed.

Your RFP response should address the following:

- Relevant training you offer and the prices you that would be charged to your most strategically important customers for such training,
- Technical level prerequisites required for each relevant class or training session,
- Number/type of MDACC Division of Pharmacy staff expected to attend each class and in total,
- Usual location of any such offered class or training sessions,
- Usual duration and schedule of any such set of classes or training sessions,
- Training materials required,
- Usual method of performing ongoing (new employee) training and upgrade training,
- Technical and equipment needs for the training environment if training is performed on-site at MDACC,
- Prices that would be charged to your most strategically important customers for class offerings, and material to be covered, if “Train the Trainer” classes are to be provided,
- Additional training costs for which MDACC Division of Pharmacy would be subject to in exchange for such training if computer-based training is to be provided.

Support and Maintenance

- MDACC Division of Pharmacy requires twenty four hour (24) support for software and hardware issues,
- MDACC Division of Pharmacy expects regularly scheduled preventative maintenance on all installed pieces of equipment,
MDACC Division of Pharmacy requests a dedicated Help Desk representative to facilitate faster resolution of issues along with guaranteed response time in accordance with the following specifications:

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Description</th>
<th>Initial Response</th>
<th>Frequency of Updates</th>
<th>Targeted Resolution Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent</td>
<td>Total equipment failure</td>
<td>Within 1 hour of notification</td>
<td>Continuously until issue is resolved</td>
<td>Immediate</td>
</tr>
<tr>
<td>Critical</td>
<td>Multiple equipment malfunction</td>
<td>Within 2 hours of notification</td>
<td>Every hour from time of initial notification</td>
<td>4 hours</td>
</tr>
<tr>
<td>Major</td>
<td>Key piece of equipment is not functioning correctly, but a mutually agreed upon workaround exists.</td>
<td>Initial response within 4 hours of notification</td>
<td>Every 2 hours from time of initial notification</td>
<td>8 hours</td>
</tr>
<tr>
<td>Minor</td>
<td>An issue exists that does not impact the main functionality of the equipment.</td>
<td>Initial response within 24 hours of notification</td>
<td>Once every business day from time of initial notification</td>
<td>48 hours</td>
</tr>
</tbody>
</table>

MDACC Division of Pharmacy requires the Distribution Partner to maintain the relevant applications at an industry supported life cycle in regards to the operating systems, hardware, middleware and all other components.

**Warranties**

- Technology Partner is to warrant that all items listed in your proposal include all items necessary to meet the specification requirements outlined in this RFP.

- Technology Partner is also to warrant that all portions and modules of the hardware and software are compatible with each other and that when implemented as a system, the hardware and software will perform all of the functions for which it was intended.

- The RFP response should list all warranties to be provided for the proposed solution and related services.

**Disaster Recovery**

The Distribution Partner shall have and provide a copy of a disaster plan to react in an appropriate and pro-active manner to computer system, local, regional, or national emergencies, defining disaster procedures for MDACC Division of Pharmacy, specifying procedures for delivery, communications, and alternative computer capabilities in case of mainframe computer failure, to prevent loss of service. Changes to the disaster plan must be submitted to the MDACC Division of Pharmacy’s Director of Pharmacy Operations and Manager of Pharmacy Finance for prior approval. The disaster plan must be reviewed at least annually with MDACC Division of Pharmacy.
The information system/technology aspects of the disaster plan must meet the specifications and requirements of the MDACC Division of Pharmacy Director of Pharmacy Informatics to be provided at start up.

MDACC Division of Pharmacy will provide Distribution partner with their Emergency Drug list which will be incorporated into Distribution Partner Disaster Recovery Plan.

**Performance Expectations**

The performance of the Technology Partner is a critical success factor in the relationship with MDACC. More importantly, the specific performance of the Medication Process – Supply Chain Technology solution is critically important to the well-being of patients served. Given the desired scope of the technology solution, manual work-arounds to system down-time or failures will be exceedingly labor intensive, necessarily inefficient and carry significant risks for interruption of patient care services. Manual work-arounds created by the technology gaps must be investigated and corrected within a three month period.

**Uptime Guarantees**

- The Division of Pharmacy serves patient needs 24/7. Annual hours of service are 8,760 (24 hours per day for 365 days annually excepting Leap Years)
- The Medication Process – Supply Chain Technology solution must be available to support operations on a full-time basis, therefore, the expected uptime is 100%.
- **Uptime** is the number of hours that any or all Medication Process – Supply Chain components are fully operable not including planned maintenance.
  - Given that demand may be expected to fluctuate throughout the day and week, planned maintenance must be scheduled to have the least possible impact on patient care.
  - Uptime will be tracked by field service reports.
- **Downtime** is the number of hours for which the solution and/or components are inoperable with regard to responding to medications orders excluding planned maintenance including updates and upgrades.
  - Downtime will be tracked by field service reports.
- **Slow-time** is the number of hours for which the solution and/or components cause delays or work-arounds to optimal patient care processes excluding planned maintenance including updates and upgrades.
  - Slow-time will be tracked by field service reports.
- Fees at risk will be assessed for failures to meet Uptime guarantees.

<table>
<thead>
<tr>
<th>Meets Uptime Target</th>
<th>Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 hours per month</td>
<td>$10,000</td>
</tr>
<tr>
<td>Between 3 and 10 hours per month</td>
<td>$25,000</td>
</tr>
<tr>
<td>Greater than 10 hours per month</td>
<td>$50,000</td>
</tr>
</tbody>
</table>
Business Interruption Response Times

☒ Fees at risk will be assessed upon the timeliness of response for Urgent, Critical and Major Severity levels as outlined in the Section of Maintenance and Support.

☒ The Technology Partner guarantees to meet these response criteria at least 99% of the time on a monthly basis. All episodes will be documented at the time of incident through a response log maintained by an assigned owner designated by MDACC.

☒ The Technology Partner and MDACC will debrief within 48 hours of the resolution of an Urgent, Critical and Major Severity event to review the log, identify areas that went well for both parties during the resolution process and areas for improvement.

☒ MDACC will calculate the percentage of responses received as outlined in the guarantee response intervals. If the response events do not meet the percentage guarantee on a monthly basis, the Technology Partner will pay a Business Interruption Penalty (BIP) as follows:

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>BIP per episode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent</td>
<td>$50,000</td>
</tr>
<tr>
<td>Critical</td>
<td>$25,000</td>
</tr>
<tr>
<td>Major</td>
<td>$10,000</td>
</tr>
<tr>
<td>Minor</td>
<td>None</td>
</tr>
</tbody>
</table>

These expectations speak to the effectiveness and reliability of the Technology Partner’s Medication Process – Supply Chain Technology solution. The specifics parameters will be tracked and measured on a rolling quarter basis.

If such fees-at-risk are assessed, payment to MDACC will be in the form of a check paid to MDACC.

Pricing Proposal (see Pricing Work Sheet)

☒ The Technology Partner should submit a bid price based on all the services discussed in this RFP. Any exclusions and/or aberrations from this pricing should be duly noted and highlighted. MDACC is particularly looking for pricing separated out by the following categories:

  • Hardware and devices
  • Adjunctive materials (packaging, labels, etc)
  • Software
  • Training
  • Maintenance and licensing
  • Support

• At a minimum, please provide the following breakouts of pricing elements. To the extent that any pricing and/or fees are variable, please provide the value on a unit of service basis as well as the definition of the unit of service.
<table>
<thead>
<tr>
<th>License Fee</th>
<th>This should be totally inclusive for your proposed solution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Fee</td>
<td>This is any annual fee(s) you may require and must include the date, relative to the project timeline, at which the fee will begin. E.g. should not include any warranty period.</td>
</tr>
<tr>
<td>Professional Service Fees</td>
<td>You must identify all Professional Service Fees required with your solution, to include number and types of individuals, period of effort for each individual, the rate for each individual and the total project fee for each individual. This category must also include any system enhancement fees.</td>
</tr>
<tr>
<td>Training Fees</td>
<td>Please identify what level, type and frequency of training you recommend and the price associated with this recommendation.</td>
</tr>
<tr>
<td>Data Conversion Fee</td>
<td>Please identify your best estimate and assumptions for data conversion effort and any fees associated with the effort. MDACC Division of Pharmacy is requesting conversion of a minimum of 2-years of purchase history and point of sale data.</td>
</tr>
<tr>
<td>Implementation Fees</td>
<td>Please identify a recommended implementation strategy, including a schedule of sites, the level of support you will provide and the associated costs for that support. Please assume that your level of support for implementations will diminish as MDACC Division of Pharmacy becomes more familiar with the product.</td>
</tr>
<tr>
<td>Travel and Per Diem</td>
<td>You must provide some estimated level of travel costs. Please include assumptions with your estimates.</td>
</tr>
<tr>
<td>3rd Party License Fees</td>
<td>Please identify ALL 3rd party technology required to support your proposed solution. You must break out each 3rd party element, ensure it’s cost is included in your proposal or indicate if MDACC Division of Pharmacy must acquire the technology. When the price is included in your proposal, you must identify license fee(s), annual maintenance fee(s) and level of maintenance (i.e. 24 * 7 *365).</td>
</tr>
<tr>
<td>Other Charges</td>
<td>Please identify any charges that may not fit within the above categories.</td>
</tr>
</tbody>
</table>

**Fees for Upgrades, Updates and Support Services**

- What are typical rates as a percentage of purchase prices for maintenance (24 x 7 support)? Break out hardware software, interfaces, user support, client, server, and other hardware, and infrastructure.
- Please describe any discounts or other benefits your company is prepared to offer.
- What additional incentives (discount off each) will you offer MDACC Division of Pharmacy for these services?
- If any aspect of support and maintenance is currently (or is likely to be later) subcontracted by your company, please precisely delineate the specific support and/or maintenance functions so subcontracted, and also set forth in detail the set of standard operating procedures any such subcontractor would be contractually obligated to perform under the terms of any relevant agreement with your company.

**Professional Services Fees**

- How do you typically determine your professional service fees, e.g. for solution implementation, operations, and management costs? What are your professional service fees/hour by specialty?
Product Additions

- How do you handle and fund additions to a product once a customer has purchased the product?
- Do you agree to take the following into consideration when negotiating with MDACC Division of Pharmacy on additions to a purchased product?
  - The margin for similar products under the Agreement.
  - The prevailing market margin for similar products at the time of the product’s introduction.
  - Other factors that in its discretion considers relevant to such a determination.

Payment Terms and Electronic Transmission of Software

- Indicate if you can deliver any licensed software programs by electronic means via a MDACC Division of Pharmacy designated File Transfer Protocol (FTP) site.
- Please indicate if you are prepared to offer any additional discounts for pre-payment or accelerated payments on valid invoices.

Most Favored Customer Pricing

- We strongly believe that any licensing, implementation, training, support and maintenance fees should not be any less favorable than those offered your most strategically important or otherwise favored customers.
- Please indicate your willingness to agree to a “most favored customer” provision in any Agreement resulting from this RFP process, warranting that the total price offered to for products and services provided in your proposal are in accordance with your most favorable pricing terms.

Evaluation of Responses

MDACC may at its discretion, award a contract based on initial proposals received without discussion of such proposals with the Technology Partners. MDACC will rank each proposal based on several factors:

- How closely the Respondent kept to the requirements of the RFP
- The ability of the Respondent to Partner with MDACC to create a leading edge solution with technology, systems and a collaborative relationship that defines a new operational model for pharmacy practice
- Ability of Respondent to meet MDACC’s current and the future growth needs
- How the Respondent scored on the answers to RFP questions

Discussion and Best and Final Offer

MDACC reserves the right to discuss RFP responses with the Respondent to clarify answers. It will be assumed that all Respondents will put forth their best and final offer initially.

Negotiations

MDACC expects to enter into negotiations with the selected Respondent to finalize details about the services requested as soon as possible to ensure late 2008 implementation start date.
Attachment A

Current Pharmacy Service Areas

MDACC Pharmacy Department services many locations within the hospital system:

- Inventory Control
- Inpatient Pharmacy Locations
  - Central IV Pharmacy
  - Central Robot Pharmacy
  - Central Unit-based Cabinet
- Investigational Drug Pharmacy
- Outpatient Pharmacies
  - Retail Pharmacies (3)
  - Ambulatory Treatment Centers (4)
  - Operating Rooms (1)
  - Emergency Center (1)
- 5th floor Operating Room Satellite
- 7th floor Intensive Care Unit Satellite
- 9th floor Pediatric Satellite
- 11th floor Satellite
- 14th floor Satellite (not complete as of yet)
- Unit Based Cabinet (UBC)
  - 104 Main UBC units
  - 42 Auxiliary UBC units
  - 11 Single tower UBC
  - 3 Integrated Single Main units
  - 2 Integrated Double Main units
  - 1 2 Drawer Main unit
- All satellite service locations
- Off-site satellite locations
- CAPS IV
- CAPS

<table>
<thead>
<tr>
<th>Current Locations of Unit-based Cabinets</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT</td>
</tr>
<tr>
<td>PTU</td>
</tr>
<tr>
<td>PEDI</td>
</tr>
<tr>
<td>PED</td>
</tr>
<tr>
<td>PACU2</td>
</tr>
<tr>
<td>PACU</td>
</tr>
<tr>
<td>P12B</td>
</tr>
<tr>
<td>P12A</td>
</tr>
<tr>
<td>P11B</td>
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<tr>
<td>P11A</td>
</tr>
<tr>
<td>P10B</td>
</tr>
<tr>
<td>P10A</td>
</tr>
<tr>
<td>P09B</td>
</tr>
<tr>
<td>P09A</td>
</tr>
<tr>
<td>P08B</td>
</tr>
</tbody>
</table>
Current Locations of Unit-based Cabinets

<table>
<thead>
<tr>
<th>Location</th>
<th>Process</th>
<th>Average Daily Volume</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manual Order Entry into Centricity® Pharmacy</td>
<td>3,500</td>
<td>Medication orders daily</td>
</tr>
<tr>
<td>Inpatient Pharmacy</td>
<td>McKesson Robot®</td>
<td>5,000</td>
<td>Unit doses dispensed daily</td>
</tr>
<tr>
<td></td>
<td>Manual Preparation</td>
<td>1,500</td>
<td>Unit doses dispensed daily</td>
</tr>
<tr>
<td></td>
<td>IV Preparation</td>
<td>1,600</td>
<td>Sterile compounds prepared daily</td>
</tr>
<tr>
<td>ATC Pharmacies</td>
<td>Manual Order Entry into Centricity® Pharmacy</td>
<td>3,400</td>
<td>Medication orders</td>
</tr>
<tr>
<td></td>
<td>Non-Chemotherapy IV Preparation</td>
<td>520</td>
<td>Sterile compounds</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy IV Preparation</td>
<td>400</td>
<td>Sterile compounds</td>
</tr>
<tr>
<td>Retail Pharmacies</td>
<td>Manual Order Entry into Centricity® Pharmacy</td>
<td>1,200</td>
<td>Medication orders</td>
</tr>
<tr>
<td></td>
<td>SP200 Robot</td>
<td>750</td>
<td>Prescriptions</td>
</tr>
<tr>
<td></td>
<td>Manual preparation</td>
<td>450</td>
<td>Prescription</td>
</tr>
</tbody>
</table>

Attachment B

Historical Pharmacy Volumes

Patient volumes are expected increase by 5-6% annually. It may be assumed that pharmacy volumes will at least match increases in patient volumes.
<table>
<thead>
<tr>
<th>Location</th>
<th>Process</th>
<th>Average Daily Volume</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory Control</td>
<td>Demand picks</td>
<td>160</td>
<td>Requests on demand for individual drugs</td>
</tr>
<tr>
<td></td>
<td>Inventory management</td>
<td>235</td>
<td>Replenishment restocking</td>
</tr>
<tr>
<td>Nursing Units</td>
<td>Inpatient Pyxis Medstations®</td>
<td>6,200</td>
<td>Unit doses</td>
</tr>
<tr>
<td></td>
<td>Outpatient Pyxis MedStations®</td>
<td>8,000</td>
<td>Unit doses</td>
</tr>
<tr>
<td>Central Admixture Pharmacy Services (CAPS)</td>
<td>Technology Partner Prepared IVs</td>
<td>2,700</td>
<td>IV doses</td>
</tr>
</tbody>
</table>
Attachment C

Overview of M. D. Anderson’s Information Technology
The document that follows presents an overview of the information technology infrastructure at The University of Texas M. D. Anderson Cancer Center, including its data centers, networks, servers, desktops, applications, as well as information security and compliance requirements.
It is important to note that specific product versions, releases, patch levels, etc. are not detailed in this document as they can vary considerably with time. For example, while Microsoft Internet Explorer is adopted as a standard web browser product, only a specific set of versions may be supported for use at the Institution. Vendors responding to a Request for Proposal (RFP) are therefore asked to verify currently supported versions of products when appropriate.

Data Centers
M. D. Anderson operates two major data centers: (1) a 12,000 square foot primary data center located in the Main Campus and (2) an 11,000 square foot Co-Location Center located in Northwest Houston. This second facility is currently undergoing significant expansion in order to support our growing disaster recovery programs, along with those of nearby The University of Texas System component institutions.
The majority of M. D. Anderson’s mission critical computer applications are housed at the primary Data Center, running on an IBM mainframe with an MVS/ESA operating system, DEC Vax minicomputers, Red Hat Linux, IBM AIX, and Microsoft Windows 2003. Key details about our data centers include:

- IBM Z890 mainframe (710 mips) with 38 terabytes of storage at the primary facility,
- IBM Z800 mainframe (up to 300 mips) with 19 terabytes of storage at the Co-Location Center facility,
- HP-C6000 1072 AMD processor-based high performance computing cluster with over 2 terabytes of distributed memory and infiniband interconnects, for research applications.
- HP 32 processor SMP Itanium system with 128GB of shared memory for research applications needing very large memory.
- 100 IBM P-Series open systems with 133.5 terabytes of storage,
- 45 terabytes of storage in HP-EVA systems for research based data. One VAX Cluster and 2 Alpha systems, and
- Total data storage (including both data center facilities) is currently approaching 400 terabytes.

Networks
M. D. Anderson operates a campus-wide Ethernet data communications backbone that connects all campus locations for purposes of electronic mail and other collaboration, access to web-based resources, and access to numerous application systems and databases. Key details about our networks include:

- Over 60,000 ports with 30,000 currently active nodes,
- Over 600 LAN switches, 1,200 wireless access points and 30 routers, and
- Connectivity provided to all Main Campus locations, South Campus locations, Science Park facilities in Bastrop County, Texas, as well as several outreach facilities across the Houston metropolitan area.
Network assets include: fiber and copper cable infrastructure, network switches and routers, SAN switches, wireless access points, terminal servers, uninterruptible power supplies (UPS), as well as network sniffers, probes and other monitoring tools.

Servers
M. D. Anderson has deployed over 800 servers operating under various operating systems. While Microsoft 2003 Server, IBM AIX and Red Hat Linux platforms are currently supported. It should be noted that although not necessarily our preferred server solutions, many applications are Novell Netware, Microsoft Windows NT and 2000, or Macintosh OS server based. The Institution has deployed a high performance computing cluster supporting genomics, population studies and other research activities, along with a high availability computing cluster that supports financial systems.

For the research community, the Institution has deployed a high performance computing cluster supporting computational Biology, Genomics, Population studies and other research activities, along with a high availability computing cluster that supports financial systems. The Institution has a 4-node HP Itanium based Oracle10g cluster attached to the EVA storage in the primary datacenter that is replicated in the co-location center with a similar HP-EVA storage system. An application development/production is deployed as well; clustered production systems, with separate development, test, staging systems, all based on Redhat Linux.

We have deployed a large storage array network (SAN) installation within our primary data center, managed using Tivoli Storage Manager. Several other large (Microsoft Windows) servers currently support our campus-wide e-mail, collaboration, and groupware needs.

M. D. Anderson has implemented numerous Hewlett Packard servers in clustered, active/active, active/passive or standalone (enterprise server) configurations. There are currently over 16,000 customers across the campus connected to this large set of enterprise servers. M. D. Anderson is currently migrating our server infrastructure to one based on Microsoft Exchange 2007, an enterprise-wide Active Directory, and Microsoft based file and print services.

A small number of specialized departmental applications run on the Sun SPARC Station platform with Sun OS (UNIX) as the operating system.

Telecommunications
M.D. Anderson operates a campus-wide Avaya telecommunications system and ATM (Asynchronous Transfer Mode) network backbone that connects all campus locations for purposes of telephone communications, voicemail, long distance, and access to associated adjuncts. Key details about our system and network include:

- Over 26,000 ports with 34 cabinets operating on a single switch platform supporting all of the owned and leased buildings throughout the Main and South Campus locations.

- The platform includes both traditional TDM (Time Division Multiplex) and VoIP (Voice over Internet Protocol) switching.

- The supported adjuncts include: Octel Voicemail (2 – 250’s & 1 - 350), ACD (Automatic Call Distribution) including a comprehensive statistical reporting module and Vocera.

- T1 Connectivity is provided to the Fax Server, Bed Management System, and other adjunct applications. Call recording is provided by an IP-connected Witness call recording system.

- Connectivity to the Science Park facilities in Bastrop and Smithville are provided over point-to-point T1 facilities to two independently operating Avaya telecommunications systems.

- Outreach facilities are connected to the campus-wide Avaya telecommunications system using VoIP technology. Over 200 VoIP telephones are deployed.
• Interactive Voice Response (IVR) utilizes text-to-speech technology to initiate calls to patients and administer surveys for clinical departments.

• CTI (Computer Telephony Integration) is delivered via the Avaya Interaction Center to multiple departments.

• T1, DS3, OC3, GigaMAN, DecaMAN, OPT-E-MAN and ISDN-PRI provide the wide area connectivity.

• BES (Blackberry Enterprise Server) platform supports over 3,000 Blackberry devices with pager integration.

Telecommunications assets include: fiber and copper cable infrastructure, as well as uninterruptible power supplies (UPS).

**Desktop Systems**

M. D. Anderson currently supports over 23,500 desktop (and notebook) computers. Microsoft Windows XP has become the predominant desktop operating system, with approximately 2,500 Macintosh systems OS based personal computers being used in select areas of the campus. M. D. Anderson has adopted several desktop computing related standards, including Lotus Notes for collaboration (electronic mail, calendaring, and collaboration), Microsoft Office (word processing, spreadsheets, presentation graphics, and databases), as well as the Internet Explorer, Safari, and Firebox web browsers. Other established standards include: Trend Micro OfficeScan, Adobe Acrobat Reader, the Novell Netware client and ZENworks, and the Altiris Client Management Suite. (Both of the Novell products will eventually be removed from our standards as Microsoft file and print services as well as Altiris Client Management are implemented across the enterprise; furthermore, M. D. Anderson is currently migrating from Lotus Notes to Microsoft Exchange based messaging.) From a hardware perspective, M. D. Anderson currently acquires Windows based systems from Dell along with Apple systems based on the Macintosh operating systems, as well as HP desktop printers and scanners. Finally, M. D. Anderson utilizes the Citrix environment for cross-platform access via institutional standard desktop computers. Finally, M. D. Anderson has prepared a list of institutionally approved and supported desktop computing products, along with other preferred software titles. The most recently published *M. D. Anderson Information Technology Standards* document is provided as a detailed attachment.

**Applications**

There are approximately 175 major applications in use at M. D. Anderson in support of our clinical care and education missions as well as institutional operations. In addition, over 10,000 databases of various scope and size have been developed and implemented. Over 150 applications for the research community in the fields of Genomics, Proteomics, Drug development/ drug discovery, Molecular modeling and Bioinformatics along with numerous molecular biology databases are implemented.

**Commercially Available Applications**

Major commercially available application systems for administrative, financial, and some clinical areas that are in use at M. D. Anderson include:
Administrative/Financial Applications

- HCC (cost accounting, contract management)
- Hyperion Planning (budgeting and forecasting)
- Hyperion Enterprise (financial consolidation)
- Hyperion Strategic Finance (economic modeling)
- Hyperion BI+ (reporting and analytics)
- SmartStream (State of Texas Regents budgeting)
- IDX (physician billing)
- Kronos (automated time and attendance)
- Lawson (asset management, inventory control, general ledger, accounts payable, supply chain)
- Infor (GEAC general ledger)
- PeopleSoft (payroll, human resources management)
- Mainsaver (computerized maintenance management)
- Siemens Building Management
- Siemens Invision (hospital and clinic billing)

Patient Care Applications

- Apollo (cardiology)
- Centricity (pharmacy)
- Cerner (blood bank and laboratory) – to be replaced near-term with MAK blood bank and SOFT laboratory applications
- Eclipsys (chart management)
- IMPAC (radiation oncology)
- Impath (anatomic pathology)
- LanVision (scanned patient records)
- MAK (blood bank)
- MaxSys II (care management)
- McKesson APS robot pharmacy system
- Mediserve (respiratory care)
- PICIS (anesthesiology and critical care)
- Pyxis (medication distribution)
- Siemens Invision (ADT, census, patient management)
- Siemens Novius (radiology)
- Stentor (PACS)
**Internally Developed Applications**

In addition to the above set of key commercially available applications, a considerable amount of internal software development occurring at M. D. Anderson, notably including **ClinicStation** (the institutional electronic medical record), **ResearchStation** (for research nurses), and the **TissueStation** tissue banking system.

**ClinicStation** provides a single source of clinical information needed to support our clinical care and research operations. Developed using a services oriented architecture (SOA) framework, **ClinicStation** provides online gateways to information maintained in other systems, including those supporting diagnostic imaging, laboratory, pathology, pharmacy, etc., in a highly integrated manner. M. D. Anderson is currently developing, deploying and enhancing the **ResearchStation** and **TissueStation** applications for our world-class research community. These applications are being built around the principles of integration with our suite of clinical systems as well as collaboration with external cancer research efforts.

All applications supporting M. D. Anderson’s Basic and Translation Research areas are either web services enabled, or web based in their current state. They are integrated into other systems where ever appropriate. They are primarily in the J2EE environment and/or a combination of Perl/PHP/Java technologies.

Other internally developed applications in used at M. D. Anderson currently include:

- CORe (Clinical Oncology Research System)
- FReD (management of grants, contracts and other sponsored agreements)
- Involved Provider Database
- myMDAnderson.org (customized patient and physician portal)
- PDMS (Protocol Data Management System)
- RIMS (Research Information Management System)
- Single point information data repository (SPiDR)

**Application System Standards and Directions**

M. D. Anderson has adopted the following information technology related frameworks, standards and strategic directions:

- CSSP (web page layout control)
- HL7 clinical data protocol
- J2EE environment (e.g., Tomcat, JRun)
- LDAP based authentication
- Operational Data Stores (ODS)
- Services Oriented Architecture (SOA) framework
- VMWare for server virtualization
• XHTML 1.0 based web pages
• Business Objects XI Enterprise (Crystal Reports XI)
• Hyperion Financial Reporting
• Hyperion Interactive Reporting
• Hyperion Web Analysis
• Microsoft Active Directory
• Microsoft Exchange Server and Microsoft Outlook
• Microsoft .NET Framework (with Avanade ACA.NET extensions)
• Microsoft SharePoint
• Microsoft SQL Server or Oracle platforms for databases
• Microsoft Team Foundation Server
• Microsoft Visual Studio
• Microstrategy Report Services
• Microstrategy OLAP ServicesOracle DBMS
• Percussion Rhythmyx (web content management)
• Quovadx Cloverleaf integration engine
• Documentum (enterprise document management)
• ImageNow (administrative document management)
• Stentor (medical imaging)

Information Security and Compliance Requirements
M. D. Anderson has a comprehensive information security program that includes an ongoing risk assessment, disaster recovery planning, as well as incident prevention and management. Supporting incident prevention and management efforts are a variety of security tools, including desktop and server anti-virus, intrusion detection and prevention systems, multiple firewalls, etc. Additionally, an identity management program, currently based on Shibboleth and Novell eDirectory, is in place across the enterprise. Finally, M. D. Anderson is currently implementing Microsoft Active Directory with central LDAP-based authentication as part of a large infrastructure upgrade project.
M. D. Anderson has established the following information security guidelines based on regulatory requirements and security best practices:

Administrative Safeguards
Proper auditing should be in place and comply with M. D. Anderson Policy. Auditing logs should be retained and reviewed regularly according to M. D. Anderson Policy. Logs for systems containing electronic protected health information must be kept for a period of 6 years.

Applications should provide a means to allow granular access to the system in order to facilitate the user’s ability to perform only the actions necessary to carry out their job duties.
Account administration functions should be informed of terminated employees in a timely fashion. User accounts creation, modification and deactivation is to be managed (centrally) by the Accounts Services Team in the Information Security Department.

Access to M. D. Anderson’s information resources requires assignment of unique User IDs and passwords for each system user. Granting of vendor accounts must follow M. D. Anderson’s Security Network Connections Agreement.

All systems, including those approved by the Food and Drug Administration (FDA) must have a method defined by which they can be patched/updated in a timely manner in order to respond to new security vulnerabilities. At a minimum, a system should support the use of current institutional standards such as the Trend Micro client and the Altiris agent.

Applications should “lock” accounts after no more than 5 incorrect logon attempts have taken place, in accordance with M. D. Anderson Policy.

Applications should ensure adherence to established M. D. Anderson password policies and naming conventions.

Critical applications should provide for alternate modes of operations and/or disaster recovery capabilities when necessary.

Vendors will be required to provide a service level agreement to include the assurance of reasonable time frame for addressing security related issues.

**Physical Safeguards**

All servers related to the application should be able to be housed in a secure facility such as the M. D. Anderson data center.

Final disposition of electronic confidential and restricted confidential information, and/or the hardware or electronic media on which it is stored must occur in a manner compliant with institutional policy and relevant security and privacy regulations.

**Technical Safeguards**

Applications should support “strong” authentication and not pass user IDs and passwords across the network in “clear text.” Although encryption of transmission within the M. D. Anderson network is not a requirement, it is strongly recommended.

Applications should facilitate a process for emergency access during either planned or unplanned outages. If the system administrator is not available, then there should be procedures for obtaining necessary electronic protected health information during an emergency.

Applications should provide a method to automatically “log off” users after 15 minutes of idle time.

Applications should accommodate measures to effectively address where data is stored but also how it is transmitted between locations, including the use of encryption to adequately protect electronic protected health information (ePHI).
Systems providing public access should have an interface front end placed in the Demilitarized Zone (DMZ). If authentication to the system is required, then such authentication should be encrypted. The back end system will be placed on the appropriate segment of the network. A Virtual Private Solution (VPN) should be deployed if the system is being accessed by a third party vendor.

**Other Requirements**

Test functions should be kept either physically or logically separate from production functions.

Where appropriate, identification logon banners shall have warning statements that include the following topics: (1) unauthorized use is prohibited, (2) usage may be subject to security testing and monitoring, (3) misuse is subject to criminal prosecution; and (4) no expectation of privacy except as otherwise provided by applicable privacy laws.

A risk analysis shall be conducted prior to rollout of a solution to determine the level of security that needs to be implemented to protect the information as required by policy or statutory regulations. The assessment should address the confidentiality, integrity and availability of the information. The implementation of controls used to mitigate identified risks should be appropriate and cost effective.

Systems must be deployed in an area where adequate limited access controls are maintained and monitored.

Where technically feasible, applications and directories are required to be connected to the M. D. Anderson’s deployed identity management infrastructure.

Implementation of systems solutions must accommodate required application availability, dependencies with other systems, as well as requirements for data recovery, physical access and disaster recovery, in a manner that complies with all institutional, state and federal mandates.

End user interfaces must comply with accessibility standards, guidelines and regulations.

Systems that process transmit or store cardholder data must comply with all Payment Card Industry (PCI) standards and regulations.

Systems that maintain transmit or store Social Security Numbers must comply with Policy #166 of The University of Texas System Administration Policy Library, available online at http://www.utsystem.edu/policy/ov/uts166.html.

Systems that maintain, transmit or store digital research data must comply with Policy 167 of The University of Texas System Administration Policy Library, available online at http://www.utsystem.edu/policy/ov/uts167.html.