

MEDBASE: Strategic Planning and Implementation of an Army
Medical Department Software Application

A Graduate Management Project Submitted for
the Degree of Master in Health Administration

17 July 2003

Forest S. Kim, Captain, U.S. Army, Medical Service Corps
Administrative Resident, Brooke Army Medical Center
3851 Roger Brooke Drive
Fort Sam Houston, Texas 78234-6200

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 17 JUL 2003			2. REPORT TYPE Final			3. DATES COVERED Jul 2002 - Jul 2003		
4. TITLE AND SUBTITLE MEDBASE: Strategic Planning and Implementation of an Army Medical Department Software Application						5a. CONTRACT NUMBER		
6. AUTHOR(S) Captain Forest S. Kim						5b. GRANT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Brooke Army Medical Center 3851 Roger Brooke Drive Fort Sam Houston, TX 78234-6200						5c. PROGRAM ELEMENT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) US Army Medical Department Center and School Bldg 2841 MCCS-HRA (US ArmyBaylor Program in HCA) 3151 Scott Road, Suite 1412 Fort Sam Houston, TX 78234-6135						5d. PROJECT NUMBER		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited						5e. TASK NUMBER		
13. SUPPLEMENTARY NOTES The original document contains color images.						5f. WORK UNIT NUMBER		
14. ABSTRACT The purpose of this research is to provide recommendations for the strategy and implementation of MEDBASE an Army Medical Department (AMEDD) software application. MEDBASE began as an Army physician assistants pet project used to ease medical readiness reporting for field medical units. The program has quickly grown into a multi-functional medical database with applications for both medical treatment facilities as well as field medical units operating in garrison or in theater. Though the application possesses a great deal of potential, program implementation has been rocky. To assist program management with problems with implementation and planning, a strategic plan was created along with the following products: SWOT (strengths, weaknesses, opportunities, and threats) analysis, vision statement, strategy map, and balanced scorecard. Securing a spot in the AMEDDs overall information system architecture was identified as the most critical issue that the team must address within the next 12-18 months. In addition, the paper suggests the use of a showcase clinic as a proof of concept in order to more effectively develop, test and market the application.						8. PERFORMING ORGANIZATION REPORT NUMBER		
15. SUBJECT TERMS MEDBASE, Strategy, Strategic Planning, Information Systems, Information Technology, Implementation, AMEDD Architecture, Strategy Map, Balanced Scorecard, Life Cycle Model, SWOT Analysis, Interim Systems, Injury Tracking, Medical Readiness, Success Factors						10. SPONSOR/MONITOR'S ACRONYM(S)		
16. SECURITY CLASSIFICATION OF:						11. SPONSOR/MONITOR'S REPORT NUMBER(S) 3-03		
a. REPORT unclassified			b. ABSTRACT unclassified			17. LIMITATION OF ABSTRACT UU		
c. THIS PAGE unclassified			18. NUMBER OF PAGES 105			19a. NAME OF RESPONSIBLE PERSON		

Acknowledgements

I must begin by thanking my wife, Emme, for her patience, love, and support during the past 12 years, and in particular, these last two.

To Richard Thorp, for his patience and flexibility during my GMPP deliberations.

To Drs. Dan Dominguez and Legnick-Hall, for their lessons on strategy, which serve as the crux of this paper.

And ultimately, to God, for his enduring love, strength, and wisdom. "To God be the glory, great things He has done..."

Abstract

The purpose of this research is to provide recommendations for the strategy and implementation of MEDBASE - an Army Medical Department (AMEDD) software application. MEDBASE began as an Army physician assistant's pet project used to ease medical readiness reporting for field medical units. The program has quickly grown into a multi-functional medical database with applications for both medical treatment facilities as well as field medical units operating in garrison or in theater. Though the application possesses a great deal of potential, program implementation has been rocky. To assist program management with problems with implementation and planning, a strategic plan was created along with the following products: SWOT (strengths, weaknesses, opportunities, and threats) analysis, vision statement, strategy map, and balanced scorecard. Securing a spot in the AMEDD's overall information system architecture was identified as the most critical issue that the team must address within the next 12-18 months. In addition, the paper suggests the use of a 'showcase' clinic as a proof of concept in order to more effectively develop, test and market the application.

Table of Contents

Introduction

- MEDBASE Overview
- Conditions which prompted the study
- Statement of the problem
- Background
- Literature Review
- Purpose

Method and Procedures

Results

Discussion

- Discussion of External Environment
- Discussion of Opportunities
- Discussion of Threats
- Discussion of Internal Environment
- Vision Building
- Formulation of Strategy Map
- Formulation of Balanced Scorecard
- Identification of Most Critical Strategic Issue

Conclusion and Recommendations

Appendices

- Appendix A. MEDBASE Information Paper for MG Farmer,
Deputy Surgeon General, Army
- Appendix B. MEDBASE Strategy Planning Sessions Outline
- Appendix C. MEDBASE Vision Building Worksheet
- Appendix D. MEDBASE Vision Building Worksheet
- Appendix D. MEDBASE Balanced Scorecard Worksheet
- Appendix E. MEDBASE Marketing Presentation

List of Tables

Table 1. Questions that should be addressed in an IT project statement.

Table 2. Selected risk zone factors in project life cycle management.

Table 3. MEDBASE competitors' strengths and weaknesses.

Table 4. MEDBASE team's internal strengths and weaknesses.

List of Figures

- Figure 1. MEDBASE stakeholder map as of December 2002.
- Figure 2. An expanded systems life cycle model.
- Figure 2. MEDBASE stakeholder analysis as of April 2003.
- Figure 4. MEDBASE strategic group map #1 comparing degree of functionality with focus of application.
- Figure 5. MEDBASE strategic group map #2 comparing product image/ quality with degree of market penetration.
- Figure 6. Strategy map for MEDBASE project team.
- Figure 7. Financial perspective of the MEDBASE BSC.
- Figure 8. Learning and growth perspective of the MEDBASE BSC.
- Figure 9. Internal process perspective of the MEDBASE BSC.
- Figure 10. Customer perspective of the MEDBASE BSC.

Introduction

MEDBASE Overview

MEDBASE is an oracle database that integrates multiple data sources into a single system used at the point of care. The program delivers administrative medical intelligence necessary to manage soldier readiness, population health, and health care delivery for soldiers, beneficiaries, and non-beneficiaries. MEDBASE was originally developed in 1997 by an Army Physician Assistant to track medical readiness information for Table of Organization and Equipment (TOE) medical units at Fort Lewis. The program has since been expanded to include a host of other functional components with emphasis on medical readiness and injury tracking. Though the application has four main modules (i.e. immunizations, profiles, medical readiness, & clinical note) recent events have focused the majority of attention on MEDBASE's ability to streamline the medical portion of the Soldier Readiness Program (SRP) as well as fill the medical information void at levels, division and below. Below is a statement used in an information paper written for Major General (MG) Farmer, Army Deputy Surgeon General:

MEDBASE corrects many of the problems of the existing medical readiness system by automating the entire medical readiness portion of the SRP. Each form required by Army Regulation (AR) 600-8-101 and corresponding Office of the

Surgeon General (OTSG) directives is included in the application. These forms include Department of Defense (DD) Forms 2795, 2796, a more comprehensive version of DD Form 2766, the medical and dental readiness portions of DA Form 7425, and an expanded version of the individual medical readiness form (IMR). MEDBASE also contains DD Form 3349 (Physical Profile), a robust immunization tracking database, and connectivity to Composite Health Care System (CHCS), the Military Healthcare System's (MHS) central clinical data repository. The result is a dramatic reduction of duplicate entry, the elimination of hand-written entry, the ability to electronically submit documents, and a more unified approach to accessing and documenting medical readiness information. Potential time and cost savings are tremendous.

Additionally, MEDBASE's electronic capture of previously paper forms along with its inclusion of more clinically relevant data fields greatly enhances the Army's ability to turn medical readiness data into meaningful information for decision making.

Though many applaud the program and support its inclusion into the Army Medical Department's (AMEDD) information system (IS) infrastructure, MEDBASE has been met with some significant opposition, especially from those who claim it is yet another costly, stand-alone system. In addition, competing systems have

weighed into the battle, arguing that the system merely replicates features already contained in existing applications. The program has also created its own set of problems with a lack of experienced program management and a strategic approach that has appeared incoherent, at times. MEDBASE has tremendous potential to solve many of the information technology (IT) problems that have plagued the AMEDD for decades. But the road towards it becoming an AMEDD enterprise solution is filled with numerous obstacles around which it must navigate.

Conditions which prompted the study

The study arose from the need to develop a strategic plan for MEDBASE as well as recommendations for implementation. In support of the strategic plan, a thorough strategic analysis will be conducted. Prior to this study, no work was conducted to organize the implementation of this application and provide a coherent strategy along with supporting analysis for Army-wide adoption. Additionally, the study attempts to document a fairly unique situation in the history of AMEDD informatics where an active duty soldier's pet project turns into a potential enterprise application. The background of this study provides the basis for an interesting case study in information system development and implementation.

Statement of the Problem

In what ways can Brooke Army Medical Center (BAMC) improve

the strategic approach and implementation of MEDBASE?

Background

Unlike many enterprise information systems that have their roots in an external contracting agency, MEDBASE began with the efforts of a lone Army Physician's Assistant, Captain (CPT) Frank Tucker, who developed the program in an effort to ease the reporting requirements for his battalion aid station at Fort Lewis, Washington. During the summer of 1998, as it is in most locations now, medical readiness reporting was cumbersome, involving multiple legacy systems that could not share information. In addition, these legacy systems lacked the functionality required by providers operating in line units where automation and electronic communication with local medical treatment facilities was minimal. Data often had to be inputted twice, three times into disparate databases and spreadsheets, and most forms with the exception of a few, had to be filled out by hand. Furthermore, extracting information for reports was an equally difficult chore.

The first version of MEDBASE consolidated several of these databases and spreadsheets into a single program with an easy to use interface. CPT Tucker developed the program using commercial, off-the-shelf products. Because of its ease of use and greatly expanded functionality as compared to existing programs, demand for the product grew immensely. By December

1999, the program had spread throughout every line medical unit in 1st Brigade, 25th Infantry Division. It was not long before providers at Madigan Army Medical Center (MAMC), the local Medical Treatment Facility, heard of the program and asked for a demonstration of its capabilities. By Spring 2000, convinced of the program's potential, MAMC began supporting the project financially in order to expand its existing capability and formally implement it throughout Fort Lewis and the medical center.

Meanwhile, at Fort Sam Houston, Texas, in December 2000, Brigadier General (BG) Perugini, Commander, BAMC, and BG Martinez, Medical Research and Materiel Command (MRMC) embarked on a mission to find a program that could track Army injuries. It was common knowledge, at that time, that no Army enterprise information system had this capability - those that had some injury tracking functionality were meager, at best. The task to identify alternative programs throughout the Military Healthcare System ultimately fell upon Lieutenant Colonel (LTC) Suzanne Cuda, Chief, Department of Health Plans Management, BAMC. From May - July 2001 alternatives were explored, but with little success. No system within the MHS had the ability to collect and track injury data the way the Army needed. However, in August 2001, MEDBASE was discovered as a possible solution. LTC Cuda flew to Ft. Lewis to interview CPT Tucker and examine his

product. After receiving a demonstration of the program, LTC Cuda was convinced that MEDBASE had the greatest potential for meeting the Army's injury tracking needs. However, quite a bit of development would need to be done in order to convert MEDBASE from a product made solely for line units to one that could be implemented throughout the Army Medical Department (AMEDD). Arrangements were made for CPT Tucker to relocate to Brooke Army Medical Center, where he would lead new development efforts on MEDBASE.

Stakeholders. In February 2002, CPT Tucker relocated from Ft. Lewis to Brooke Army Medical Center (BAMC) to lead a newly contracted development team from Choctaw Management Enterprises. Since his arrival, Both LTC Cuda and CPT Tucker have been involved in a flurry of activity. Within a relatively short period of time, multiple agencies have been introduced to the program. And with each introduction, new organizations are added, almost weekly, to the growing list of MEDBASE partners and supporters. Figure 1 is a stakeholder map that indicates several of the key agencies associated with the MEDBASE program. Consultants for the program include the Center for Health Promotion and Preventive Medicine (CHPPM), the Army Research Lab, as well as Total Army Systems Management (TASM). Agencies partnering with MEDBASE include the Integrated Clinical Database (ICDB) proponent at the Office of the Surgeon General (OTSG),

TRICARE Southwest, Medical Occupational Data System (MODS)/ Medical Protection System (MEDPROS) proponent at U.S. Medical Command (MEDCOM) and Air Force Medical Operations Agency (AFMOA). Early in the development process, LTC Cuda and CPT Tucker recognized the potential platform MEDBASE could serve for population health initiatives; thus, was born the Soldier Health Initiative (SHI). SHI is an attempt to consolidate three key health initiatives with MEDBASE serving as the data collection and warehousing tool. These initiatives include the Reproductive Health Initiative, the Corporate Wellness Program, and Project Eagle, an injury tracking study. Primary Care Optimization is another initiative attempting to use MEDBASE as a data collection platform, but is not a part of the SHI.

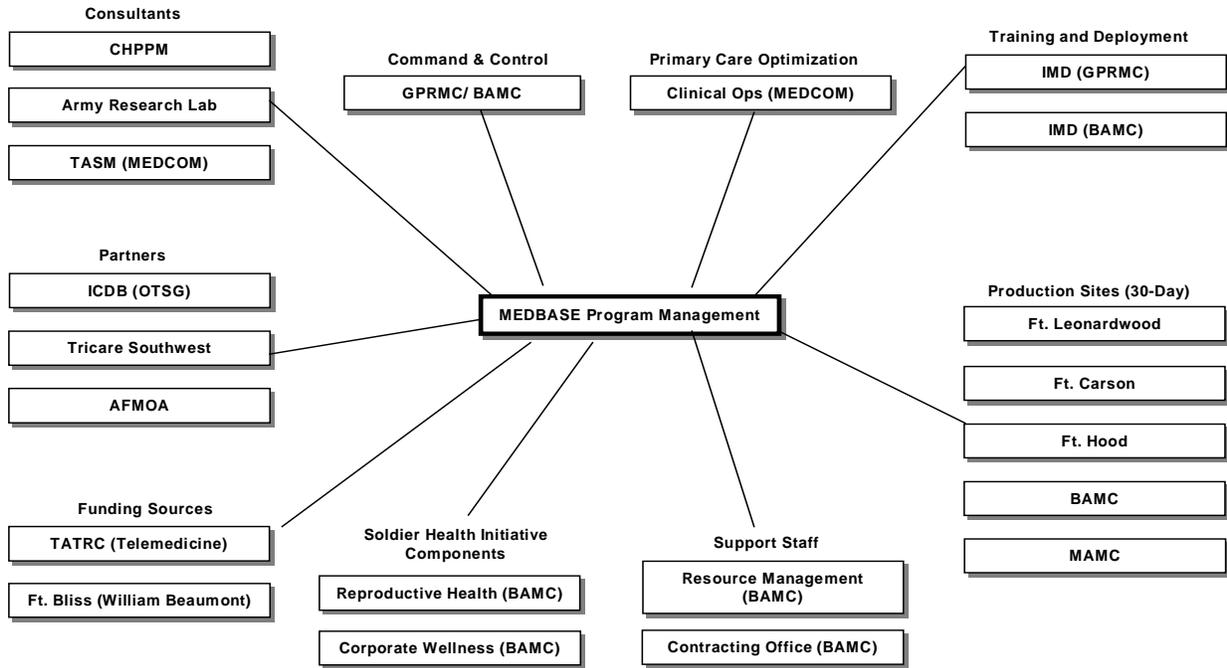


Figure 1. MEDBASE stakeholder map as of December 2002.

With the addition of each new stakeholder, the complexity of managing relationships to support the product grows. Since the inception of the new version of MEDBASE, the MEDBASE program team has found that each new agency brings with them their own strengths and weaknesses to include their own agendas, competing interests, and expectations for the program. The problem is compounded due to the limited resources available to manage the program.

Early Implementation. Like the majority of information system (IS) deployments, dates for the new version of MEDBASE or MEDBASE 2.0 implementation changed constantly (remember, MEDBASE 1.0 had been completed prior to CPT Tucker's PCS to Fort Sam

Houston and continued to be in use at Fort Lewis). An initial target of June 2002 passed without a deployable product as programmers dealt with a myriad number of changes, modifications and upgrades. In July 2002 the program went live at BAMC, first at McWethy Clinic, then at the Family Medicine Service. A major problem arose with the initial absence of trainers for the program. It was not until August that year that the first trainer was brought on board. One more was added in October.

Early in this deployment, it was apparent that the majority of complaints were concerning the clinical note component of program. Then in October 2002, anxious to get a working version of MEDBASE out to the field, BG Perugini issued a 30-day suspense for deployment of the immunization, profile and medical readiness portions of the program. The suspense included four production sites in the region that included: Brooke Army Medical Center, Ft. Hood, Ft. Leonard Wood, and Ft. Carson. Trainers were first sent to Ft. Leonard Wood and Ft. Lewis using the "train-the-trainer" approach. Trainees found the program extremely intuitive and easy to use. Although the training went off extremely well, problems arose at Ft. Leonard Wood with access to live data from CHCS through ICDB. Significant coordination hurdles with Darnall Army Community Hospital personnel, then MODS/ MEDPROS proponency concerns extended the timeline for Ft. Hood implementation. Delays in ICDB support

caused further delays at Ft. Carson. As of December 2002, Brooke Army Medical Center, Ft. Lewis, and Ft. Hood were the only production sites running MEDBASE 2.0. Problems continue to surface concerning hardware implementation and political battles with MEDBASE partners. Furthermore, no clear implementation plan has been devised based on an analysis of financial, technical and/or political feasibility.

Early Marketing. Ever since the identification of MEDBASE as a possible solution for the Army's injury tracking needs, BG Perugini has been a staunch supporter and an active proponent of the program throughout Region 6 (Great Plains Region), the Army Medical Department (AMEDD) and the rest of the Army. Upon realizing its potential, BG Perugini made it his vision and goal to make MEDBASE an enterprise system for the Army. Early marketing included demonstrations to BG Martinez, Commander, MRMC, BG Bester, Commander, CHPPM, and COL Butler, MEDCOM Chief Information Officer. In October 2002, MEDBASE was introduced to the AMEDD Technical Working Group (ATWG) as a potential AMEDD-wide enterprise system for profile injury tracking. MEDBASE briefings were given to MG Farmer, Deputy Surgeon General, BG Schoomaker, Commander, South East Regional Medical Command (SERMC), BG Dunn, Commander, Western Regional Medical Command (WRMC) and BG Ursone, Chief, Medical Service Corps (MSC) in Nov 02. During the brief to MG Farmer, the project was given a

fortuitous push. With the growing clamor of a war with Iraq and the continued absence of deployment documentation pre-dating Desert Shield/Desert Storm, MG Farmer envisioned using MEDBASE to electronically document all pre- and post- deployment medical reports. Work would need to be done to create a usable version of MEDBASE that could be installed onto a laptop computer, which could then be deployed to any soldier readiness processing (SRP) site. In Dec 02, the Training and Doctrine Command (TRADOC) surgeon was briefed on using MEDBASE to track injuries in initial entry training (IET) soldiers. In Jan 2003, LTC Cuda and CPT Tucker briefed the Technical Insertion General Officers Steering Committee (TIGOSC), a committee comprised of general officers who make recommendations on AMEDD-wide IT initiatives.

Literature Review

When it comes to the implementation of information systems, there are no guarantees for success. Some scholars estimate that between one and two thirds of IS projects fail and among the most expensive projects, approximately half will be cancelled for failing to meet customers expectations and overshooting budgets (Rusin & Williams, 2001). A review of the literature reveals several pitfalls associated with IS implementation and suggests a number of ways managers can act in order to successfully implement their programs. Critical success factors for IS implementation can be grouped into the following

categories: (1) establish a shared vision (2) plan for the entire system life cycle, (3) focus on the user, (4) neutralize IS politics, (i.e. get organizational buy-in), (5) incorporate quality throughout the process, (6) use a team approach, and (7) implement in phases. This literature review will focus on each of these critical success factors as they apply to the MEDBASE project team.

Establish a shared vision. "Without vision, the people perish". The Bible points to the need for a vision at the start of any major endeavor, and IS systems are no exception. Scholars point out that many IS projects fail because they don't align with organizational objectives (Kiely, 2002; Page, 2000). Often times, managers skimp during reengineering efforts in order to cut costs. Other times, managers select projects simply for their technological novelty or to replace existing legacy systems, not considering whether they align with the organization's strategic goals. Kiely warns that both actions will lead to a project's failure. Page (2000) writes that critical success of any major project is directly related to how well it is linked to the organization's strategic plan. Thus, IS implementation must begin and be guided by a thorough understanding of the strategic direction of the organization.

Plan for the entire system life cycle. The "systems life cycle" is a concept that is standard in the information

technology (IT) community (Thompson, 1999; Austin & Boxerman, 1998; Whitten & Bentley, 1998). According to Thompson, the system life cycle “represents a logical process for planning, executing, and managing system life cycle activities for all types and sizes of healthcare settings”. There are several system life cycle models presented in the literature (Thompson; Austin & Boxerman; Whitten & Bentley); however, most contain the following 5 key steps: plan, analyze, design, implement, and maintain. Figure 2 is an adapted version of the systems life cycle model taken from Whitten & Bentley.

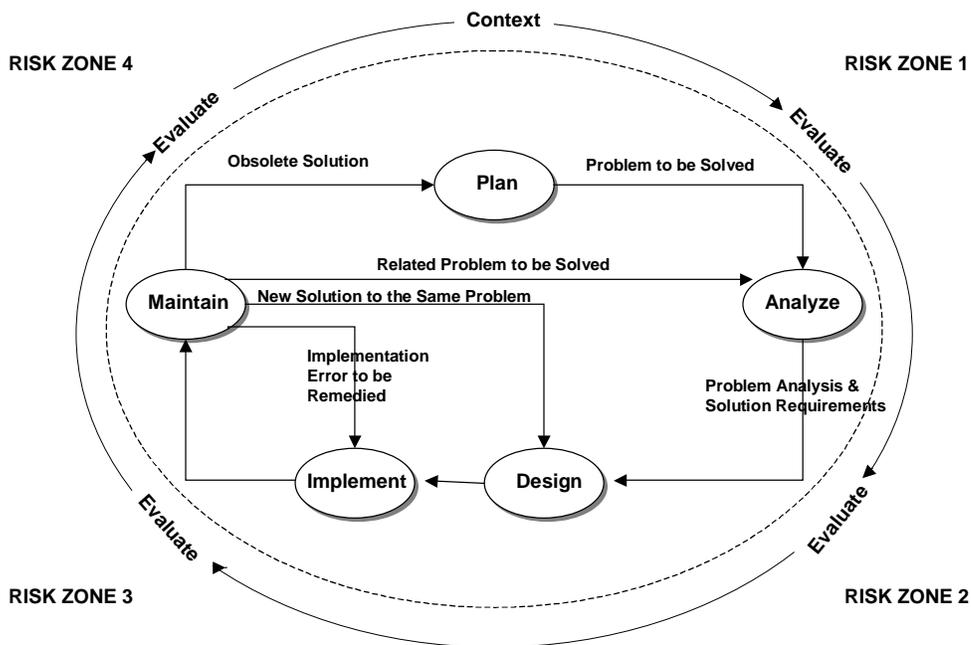


Figure 2. An expanded systems life cycle model.

The model shows each of the 5 major steps. Planning is usually the first step of the system life cycle management process. Thompson (1999) argues that though it usually represents the first step in the cycle, planning should occur throughout the entire process. Tayntor (1993) accentuates this point by stressing the need to generate planning documents for each stage of the cycle. Rusin and Williams (2001) argue that the key to quality planning is the proper allocation of time to generate a "clear and direct" project statement (p.22). Table 1 lists the questions that Rusin and Williams suggest should be answered by the project statement.

-
- Who is the project owner and who are the end users?
 - Why is the project needed and what problems will it solve?
 - What strategic goals will it offer to gain interest of users?
 - What will be the end product? How will it be determined if the project is successful?
 - When will the project be completed?
 - How much will it cost?
-

Table 1. Questions that should be addressed in an IT project statement.

As Figure 2 shows, feedback loops are contained throughout various parts of the cycle. These links are vital because of the influence each step has on the other. Figure 2 also shows

evaluation as a part of each step of the life cycle. Evaluation activities are conducted to assess the environment for risk factors that will be addressed next.

The dotted line surrounding the system life cycle represents the continuous influence of the environment on the system life cycle. According to Thompson (1999), the environment or context "introduces uncertainty...which, in turn, creates risks to successful life cycle management" (p.204). Thompson groups these risk factors into 4 risk zones corresponding to a particular segment of the system life cycle. Table 2 provides examples of risk zone factors within their respective risk zone. She argues that although these risk factors exert their influence in a particular zone, they can impact other segments of the life cycle process as well. Therefore, downstream effects should not be ignored (Thompson).

<p><u>Risk Zone 1</u></p> <ul style="list-style-type: none"> Key executive support Planning process <ul style="list-style-type: none"> User-driven Adequate resources Schedule Evaluation Vision Project manager characteristics and fit Politics 	<p><u>Risk Zone 3</u></p> <ul style="list-style-type: none"> Contract management “Go live” strategies (e.g. training) Use of product lines Impact on workflow (e.g. downtime procedures) Software/ hardware performance testing Contingency plans Celebration/ people management
<p><u>Risk Zone 2</u></p> <ul style="list-style-type: none"> Requirements-driven project Management of project scope Buy-in from stakeholders Vendor relationship(s) Change management Development/ customizing: <ul style="list-style-type: none"> Resources Timeliness New technology/ project complexity Marketing 	<p><u>Risk Zone 4</u></p> <ul style="list-style-type: none"> Planning for upgrades Maintenance activities: <ul style="list-style-type: none"> Help desk Super-users Long-term maintenance Configuration management System-change requests (SCRs) Documentation Project end Evaluation (e.g. ROI)

Table 2. Selected risk zone factors in project life cycle management.

Table 2 represents a sampling of issues that make the success of any IS implementation vulnerable. Many of these risk zone factors will be highlighted throughout the body of this paper. One of the most pivotal factors, that is, making the user drive the planning process, is addressed next.

Focus on the user. Perhaps the most cited critical success factor in IS implementation is the need to involve end users in every aspect of the implementation process. This tenet should resonate with each reader since the primary goal of IS implementation is to make sure the product meets customer needs (Rusin & Williams, 2001). But surprisingly, the literature is full of examples of problems caused by the failure to meet customer needs (Miranda, Fields, & Lund, 2001; Henderson & Deane, 1996; Treister, 1998; Rusin & Williams; Tayntor, 1993). For this reason, authors stress the need to involve end users throughout the implementation process, beginning with the planning stage. Tayntor lays out a comprehensive strategy for incorporating end user input into long-range planning that begins with the establishment of customer requirements. She recommends the use of detailed interviews that focus on the five W's: who, what, where, when, and why (e.g. "who uses the data?" and "where does the data come from?", p.14). She then recommends involving the user in both hardware and software selection beginning with the user interface. Regarding hardware, Tayntor writes that the selection of a mainframe should start with the hardware that is closest to the customer, then build upon it rather than "force-fitting applications" onto platforms selected by the IS team because of "impressive computing speed" (p.15). Regarding actual implementation, Tayntor suggests the

development of a customer plan that establishes target implementation dates and clearly defined objectives. The key to this plan is the alignment of the IS project with the customer's business objectives and to obtain buy-in from the customer (Tayntor).

An important caveat to the discussion of end user input is the role of customer expectations. Henderson & Deane (1996) note that when expectations of IS systems are unrealistically high, subsequent ratings of satisfaction are reduced. Miranda, Fields & Lund (2001) also note that major problems develop during IS implementation when there is a discrepancy between user expectations and system functionality. These authors further state that, often times, once expectations are not met the entire product is considered inadequate. Thus, after receiving input from end users, managers need to ensure that expectations about the new system are realistic through constant communication with the customer. Tayntor (1993) also suggests providing the customer with a single point of contact for all IS questions.

Neutralize IS politics (i.e. get organizational buy-in).

Though the failure to meet customer needs ranks high among the reasons for IS project failures, organizational politics is considered to be the biggest threat to successful IS implementation (Overton & Frolick, 1996). Though Overton and

Frolick focused their research on executive information systems, their findings can be applied to corporate systems. The authors use the political games metaphor developed by E. Bardach in 1977 and refined by Peter Keen in 1981 to describe 12 political games that commonly preclude successful IS implementation. They then suggest guidelines to reduce the impact of organizational politics on IS implementation.

Overton and Frolick (1996) group the 12 political games into 4 categories that include: (1) games designed to divert project resources, (2) games designed to deflect project goals, (3) games designed to dissipate project energies, and (4) games designed to disconcert project administration.

Games designed to divert project resources channel organizational resources away from their intended use toward more parochial interests, such as those of a specific department (Overton and Frolick, 1996). These games are played for the purpose of benefiting certain individuals or coalitions at the expense of the organization as a whole. Examples of these types of games are Easy Money, the Budget Game, and Pork Barrel. In the Easy Money game, individuals or departments support a project for the sole purpose of leveraging the resources that come along with it. A good example would be an agency's support for a project for the sole purpose of getting hardware that is associated with the project. In the Budget Game, IS implementors

use a high profile project in order to increase the implementing department or agency's budget, and thereby increase its discretionary funds, and by doing so, increasing its power and influence in the organization. In the Pork Barrel game, implementors offer equipment or funds to key stakeholders in order to facilitate project implementation (Overton and Frolick).

Games designed to deflect project goals modify project goals so that specific political individual or groups achieve personal gain or derail a project (Overton and Frolick, 1996). These games can be played to help achieve personal interests or disrupt a project that is undesired. These games include Piling On, Up for Grabs, and Keep the Peace. In Piling On, political players add personal or agency goals and interests to a project's initial ones after implementation has started. The result is an expanded mission for the project that slows down implementation and can often lead to failure. In the Up for Grabs game, an agency takes control of a project that was initiated by another group. The new agency then redefines project goals to suit its own agenda. This game usually occurs in the absence of a strong executive sponsor. In the Keep the Peace game, developers alter the original goals of the project in order to appease the wishes of individuals or agencies that would otherwise resist implementation (Overton and Frolick).

Games designed to dissipate project energies do just that. They cause those responsible for project implementation to waste time and energy over turf wars and other distracting issues (Overton and Frolick, 1996). These games are primarily intended to derail a project. These games include Territory, Not Our Problem/ Their Fault, and Reputation. In the Territory game, conflict occurs when the project involves an overlapping area of responsibility between two agencies or groups. Conflict arises when the agencies squabble over who has the actual authority to make decisions over the disputed area. In the Not Our Problem/ Their Fault game, persons responsible for the project, at first, avoid responsibility, then when pushed for results, blame another individual or group when difficulties occur. In the Reputation game, implementors mask a lack of progress by overstating successes and playing down delays and/or difficulties. According to the authors, this game, however, is not always counterproductive. Savvy implementors can use this game to win the confidence of key stakeholders while working through difficult stages of implementation. The problem arises when the game is played too much and stakeholders begin calling implementors' bluff. The results can be a lack of confidence leading ultimately to project demise (Overton and Frolick).

In games designed to disconcert project administration, politicians withhold or threaten to withhold resources under

their control from project administrators who need these resources to implement the project. These games are perhaps the most blatant and counterproductive (Overton and Frolick, 1996). This category of games includes Tokenism, Easy Life, and Massive Resistance. In Tokenism, departments or agencies involved in the project make only token contributions while maintaining an appearance of cooperation. This game occurs when a project has considerable support from top management, but is undesirable from the agency's point of view. The Easy Life game is similar to Tokenism, but is played by parties who feel that their comfortable positions in the organization are threatened by the project's implementation. The result is foot-dragging. In Massive Resistance, agencies opposed to the project engage in blatantly withholding critical resources from developers to preclude project implementation (Overton and Frolick).

It takes little imagination to see the effects organizational politics can have on project implementation. By playing one or a combination of these games, agencies can hinder or totally derail an IS project. In response to these games, Overton and Frolick (1996) suggest a number of ways to minimize organizational politics. Their guidelines are aimed at both senior managers and IS developers because of the impact these individuals have on project implementation.

Overton and Frolick (1996) offer four guidelines for senior managers. The first is Committed Sponsorship, which suggests that senior managers do all they can to ensure the commitment of other influential players within the organization. The authors add that this is the single most important action that senior managers can take to ensure political games do not interfere with IS implementation. The second guideline for senior managers is Empowering Developers. This recommendation involves selecting an influential, competent operating sponsor to lead the effort as well as clearly establishing spheres of responsibility and lines of authority at the beginning of the project. The third guideline is Defining Clear Specifications which involves providing "clear, specific, and enforceable objectives and budgets" (p.56) for the information system. The fourth and last recommendation for senior managers is Political Awareness. The authors stress the need for senior leaders to be aware of the political climate of the organization and overcome the pockets of resistance within the organization. These measures will help reduce political gamesmanship and facilitate IS implementation (Overton and Frolick, 1996).

Overton and Frolick (1996) suggest three guidelines for IS developers. The first is Securing Cooperation. This recommendation goes along the same lines as the first recommendation for senior managers; that is, Committed

Sponsorship. Developers need to secure the support of key agencies and individuals within the organization, sometimes simply by talking with them. The second guideline is Negotiating Effectively. As the name suggests, developers will have an easier time implementing their projects if they possess effective negotiating skills. The authors go on to state that this negotiation should be conducted from a position of power, drawing from senior management support for the project. The third and last suggestion for IS developers is Recognizing Politics. Just as senior management must be aware of the political games being played, developers need to develop a keen eye towards the political jockeying of other departments and draw on both their own negotiating skills and the support of senior management to neutralize them (Overton and Frolick, 1996).

Political games are just as much a reality in today's organizations as the IS systems themselves. As Overton and Frolick (1996) point out, the very nature of some information systems provokes deep-seated fear and uncertainty among influential individuals and agencies within an organization. In order to implement these systems, senior management must first be fully committed to them, then create buy-in throughout the organization. The awareness of the types of political games being played as well as knowing the strategies that counteract

them will help system implementors achieve greater success (Overton and Frolick, 1996).

Incorporate quality throughout the process. Though quality is recognized as being a vital component of any IS implementation, it seems that most have had difficulty incorporating it into the implementation process (Rusin and Williams, 2001). Rather than treating quality as an afterthought, Rusin and Williams suggest that IS implementors weave aspects of quality throughout the implementation process and ensure that all individuals involved understand its significance towards project success (2001).

Incorporating quality throughout project implementation begins with a quality strategy (Rusin and Williams, 2001). Rusin and Williams (2001) break this strategy into three phases: (1) planning, (2) assurance, and (3) control. Many aspects of a quality strategy have been discussed in other parts of this literature review and include guidelines such as establishing clear project goals, conducting detailed planning prior to project implementation and intensive analysis throughout, and involving the user in all these areas. Rusin and Williams (2001) add to this list by offering several pointers that can help ensure that quality remains a vital component of the process.

During the planning stage, the authors (Rusin and Williams, 2001) recommend the application of several rules that can guide the quality of a project. These rules include (2001, p.22):

- (1) Never assume customer's needs. Identify and involve all internal individuals who will be impacted by the changes.
- (2) Define the customer's needs through the development of a prototype.
- (3) Identify the stated versus the real needs through structured interviews, analysis of field intelligence, questionnaires, focus groups, and sampling.
- (4) Develop the product, processes, and controls.
- (5) Provide flexible and quick responsiveness to changing needs.

During the assurance phase, the authors (Rusin and Williams, 2001) suggest that a good project system of quality assurance will (1) identify objectives and standards, (2) be multifunctional and prevention oriented, and (3) collect and use data to measure performance and improve quality (2001, p.23). They go on to argue that quality is not the job of one person but everyone involved in the IS project. But because studies have shown that some individuals critical to maintaining quality standards do not hold to this idea, a system must be in place to assure that standards are being met (Rusin and Williams, 2001).

In the quality control phase, results are monitored to see if they comply with the quality standards and improvements are made to eliminate unwanted results through feedback (Rusin and Williams, 2001). It is critical at this junction to properly analyze the data in order to find the issues that are truly significant. Information overload is a common problem faced with implementors in this phase. To combat this, Rusin and Williams (2001) suggest the use of a Pareto Diagram to identify and prioritize problem areas. Communication is also a critical component in this phase. Like information overload, it is possible for project teams to over-communicate through too many meetings and/or reports. Project scope should be clearly delineated to each team member and information must be tailored according to the intended audience. For example, senior management should not be deluged with detailed reports; rather, communication to team members at this level should be more of an overview that includes problem isolation and recommendations (Rusin and Williams, 2001).

Rusin and Williams (2001) make a number of other recommendations such as appointing a single project manager who is responsible for the entire project life cycle and establishing a maintenance program and quality audits during and after the implementation stage. If these guidelines, as well as those mentioned above, are integrated into the entire IS

process, implementors will have a greater chance of success and avoid being another statistic in the ever-growing number of IS flops.

Use a team approach. Several authors point to the need for a team approach during project development and implementation (Kiely, 1995; Souther, 2001; Miranda, Fields, & Lund, 2001). These authors argue that the team should be cross-disciplinary in nature, involving members from Human Resources and other departments, in order to develop broad base support for the IS system (Kiely, 1995; Miranda et al, 2001). In addition, by using a team approach, those intent on embarking on a IS project can ensure that a structure is in place to handle maintenance and improvement issues (Miranda et al, 2001). Souther (2001) provides more detailed guidance towards the team approach. She recommends the establishment of three teams in what she terms the tiered team approach (p.47) These three teams consist of an executive steering team that provides the vision, the approval, and the money for the project; an executive steering committee that makes major policy decisions and general implementation strategies; and a project work team that ensures implementation is satisfactory to the organization (Souther, 2001).

Implement in phases. The last critical success factor is the use of a phased approach to IS project implementation. Because of the sophistication of today's information systems,

authors (Miranda, Fields & Lund, 2001) suggest that the implementation first begin with basic functionality then later, advanced functionality. Souther (2001) supports this sentiment claiming that a phased approach can allow implementors to address problem identification and problem resolution on a smaller scale, which also allows these lessons learned to be applied to subsequent implementation phases. Souther (2001) also suggests that the initial roll-out be conducted in the physician champion's office. She argues that the physician champion would be more likely to be tolerant of initial problems. Lastly, Souther (2001) suggests that the project be implemented in demographically different sites in order to collect more data that could be used in the remainder of the roll-out.

As mentioned throughout this discussion, the barriers that stand in the way of successful IS implementation are strong and many. Failure rates have become so high that they have become somewhat acceptable or at least expected (Rusin and Williams, 2001). Perhaps McConnell (1998) sums up the current state of affairs the best, in writing (p.vii):

About two million people are working on about 300,000 software projects in the United States at this time.

Between one third and two thirds of those projects will exceed their schedule and budget targets before they are delivered. Of the most expensive software projects, about

half will eventually be canceled for being out for control. Many more are canceled in subtle ways - they are left to wither on the vine, or their sponsors simply declare victory and leave the battlefield without any new software to show for their trouble.

By following these seven critical success factors (i.e. (1) establish a shared vision (2) plan for the entire system life cycle, (3) focus on the user, (4) neutralize IS politics, (i.e. get organizational buy-in), (5) incorporate quality throughout the process, (6) use a team approach, and (7) implement in phases), those embarking on IS projects will have a greater chance of overcoming the odds.

Purpose

The purpose of this paper is to conduct a thorough analysis of the strategic context of the MEDBASE application and provide recommendations for strategy and implementation. In support of this purpose, the following products will be provided: a SWOT analysis, the creation of a vision statement, the creation of a strategy map, and a balanced scorecard for the MEDBASE team. In addition, the analysis will result in the identification of the most critical strategic issue the MEDBASE team must address within the next 12 - 18 months, along with corresponding first steps.

Methods and Procedures

The study will rely primarily upon extensive interviews conducted with members of the MEDBASE team, and various stakeholders of the application. Interviews will be conducted throughout the course of the year and those most intimately involved with the project will be interviewed repeatedly. Additionally, the team will be observed throughout the year in both formal and informal meetings. The MEDBASE strategy will be formulated through a series of strategic planning meetings with the Commanding General, BAMC, Great Plains Regional Medical Command (GPRMC) Regional Staff, as well as the MEDBASE team. Analysis will also be conducted on various documents such as e-mails, memorandums, briefings, and requirement documents.

Results

The study resulted in the formulation of a strategic plan complete with strategy map and a balanced scorecard for the MEDBASE team. Included in the strategic plan was the identification of the most critical strategic issue the MEDBASE team must address along with recommendations for the plan's implementation. In addition, the following tools were used in developing the plan: stakeholder analysis, SWOT analysis, a list of competitors' strengths and weaknesses, the development of a big, hairy, audacious goal (BHAG) and a vivid description. The

strategic plan was primarily formulated through six strategic planning sessions conducted with key members of the MEDBASE team. Time spent working on special projects during MEDBASE implementation as well as additional interviews and meetings with consultants served to augment the information gathered at these strategic planning meetings. Each meeting was designed to cover one or two aspects of the strategic analysis leading ultimately to the creation of the team's strategy map and balanced scorecard. The strategy map and balanced scorecard were then used to determine the most critical strategic issue the team must address within the next 12 - 18 months along with the first steps in order to accomplish this task. The strategic planning sessions progressed according to the following outline:

- I. Discussion of External Environment
- II. Discussion of Opportunities
- III. Discussion of Threats
- IV. Discussion of Internal Environment
- V. Vision Building
- VI. Discussion of Team's Core Logic
- VII. Formulation of Strategy Map
- VIII. Formulation of Balanced Scorecard
- IX. Identification of Most Critical Strategic Issue
- X. Conclusion and Recommendations

This outline will also serve as the framework for the MEDBASE strategic plan.

Discussion

Discussion of External Environment

The strategic planning sessions began with a discussion of the external environment. Because of the large number of agencies that interact with the team, stakeholder analysis was used. The result was the identification of major functional areas along with their corresponding stakeholders. In addition, the analysis allowed the team to identify areas of neglect as well as help identify specific opportunities and threats, which will be discussed later in the paper.

Stakeholder Analysis

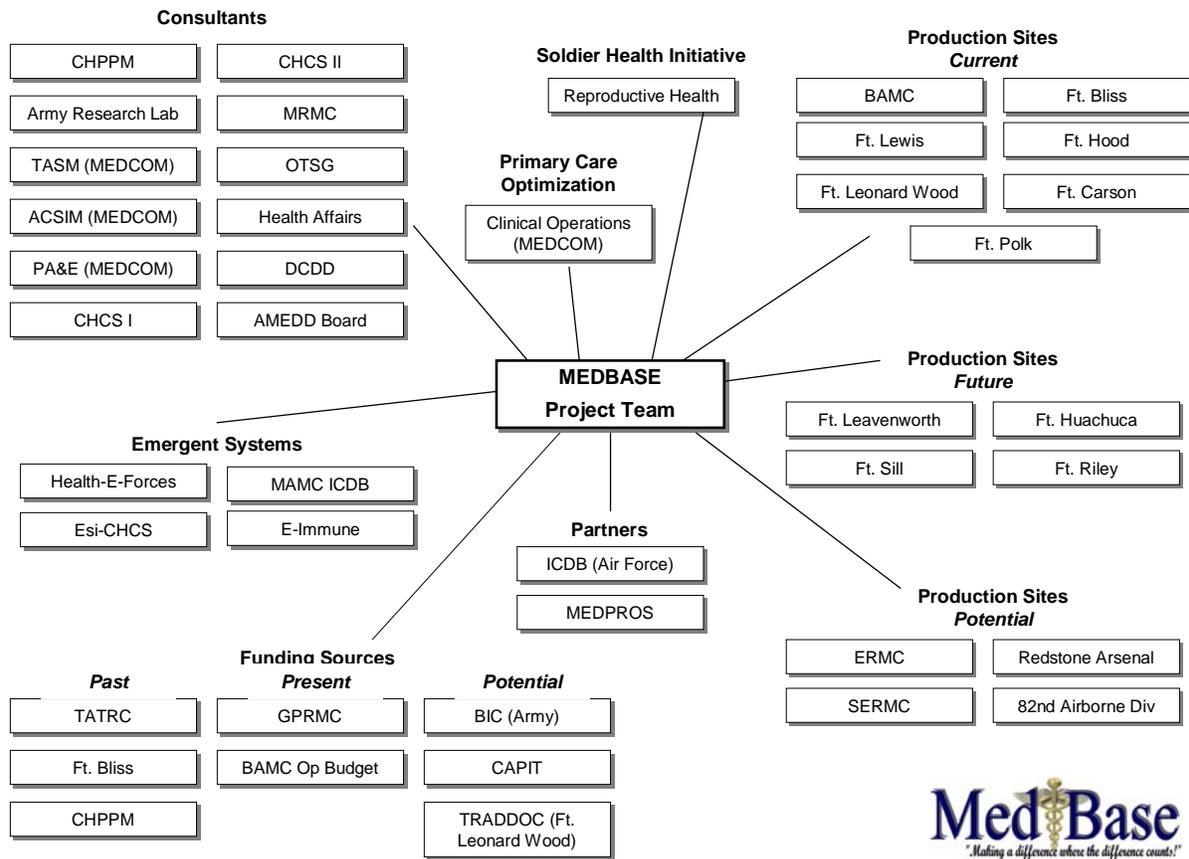


Figure 3. MEDBASE stakeholder analysis as of April 2003.

Figure 3 shows the most recent stakeholders for Medbase. In order to present a clearer picture, stakeholders are grouped under major functional areas such as consultants, funding sources, production sites, and the like. Consultants represent those agencies that provide some direction in the development of the application. Though all are not equally important, interaction with this group of stakeholders plays an important



role in determining current and future information technology (IT) trends as well as establishing the priorities of the Army's leadership in regards to information management. Emergent systems are alternative applications that are also striving to gain recognition as an enterprise system and that share certain functionalities with MEDBASE. Partners include those agencies that share a formal relationship with MEDBASE. ICDB, as mentioned earlier, serves as the application's link to CHCS. MEDPROS is used to populate MODS - the Army's readiness database. Past, present and potential funding sources are also included in the analysis as well as current, future, and possible production sites. In order for MEDBASE to be successful, this group must be expanded. If drawn in true form, there would be lines connecting each box with the MEDBASE team. But for the sake of clarity, these lines were omitted and simply drawn from each major functional area.

The figure shows that there are numerous agencies that have a stake in MEDBASE. In addition to those listed, each box represents a litany of sub-agencies, each containing a different host of personalities. The number of boxes in the stakeholder analysis provides some indication as to the complexity of the MEDBASE environment.

It is critical to the success of the application that the team successfully manages relationships with each of these

stakeholders. Close relationships are required between the team and its consultants in order to ensure that the application is in line with the needs and priorities of the Army. Maintaining close ties to this functional group is critical because of the changing nature of these needs and priorities in the minds of the Army's leadership. The team must also carefully watch the emergent systems in order to understand the direction these systems are taking with their application and to prevent further duplication of functionality among them. Since initial implementation, relationships between the project team and production sites have been challenging because of the limited customer support personnel available. A good product is only half the equation. To ensure success, the team must strengthen its bond with this stakeholder group through better implementation and customer support. Two programs that depend upon MEDBASE as a platform for data management, the Soldier Health Initiative and Primary Care Optimization, have recently taken a backseat to more pressing issues. Stakeholders such as these are important to the team because of their ability to market the application, thus, creating greater demand. Though not the most pressing stakeholders, the project team must ensure that healthy ties are maintained, so that any attention given to the initiative can be shared with MEDBASE. Lastly, the linchpin to MEDBASE's strategy is to secure adequate funding. This can

only be accomplished by anticipating the IS needs of the Army through the team's relationship with its consultants. As needs are identified and addressed, MEDBASE will find itself in a better position to become incorporated into the AMEDD's overall IM architecture. Previous funding sources used for development (i.e. TATRC, Ft. Bliss, CHPPM) have dried up and the team has come to rely upon intermittent regional and local military treatment facility (MTF) support. These latter funding sources are at risk. Therefore the future success of MEDBASE depends on a programmed budget independent of local operational funds, which are always at risk.

Discussion of Opportunities

The stakeholder analysis is also effective in helping identify potential opportunities. Opportunities for MEDBASE are defined as the chance to receive programmed funding and/or increase market share. Upon discussion with the MEDBASE team, the following opportunities were identified, listed in order of importance:

- MEDCOM, Assistant Chief of Staff, Information Management (ACSIM), AR 25-1 process, Point of Contact (POC): Jan Eagan
- MEDCOM, Program, Analysis & Evaluation (PA&E), Venture Capital, POC: COL Anderson, Joanne Sear
- MEDCOM, PA&E, Business Initiative Council (BIC), POC: COL Anderson, Joanne Sear

- Office of the Surgeon General (OTSG), Interim Outpatient Medical Record Working Group (IOMRWG), POC: LTC Crowther
- TRADOC, Ft. Bliss, POC: MG VanTworp
- CHPPM, POC: BG Bester
- Ft. Lewis, Corporate Wellness, POC: Teresa Bruder

The order was determined based on the potential for success as well as the time required to submit the required documentation. Though the AR 25-1 does not have a funding source tied to it, the process is required in order for an IT initiative to move through approval channels. Plans are also in the works to include a funding source(s) for IT initiatives that make their way through the process and are found worthy of implementation. The CAPIT provides a means for securing venture capital funds for initiatives such as MEDBASE. The BIC or Business Initiative Case is an Army-level program that awards capital to Army-wide initiatives. The process begins with a review of the proposal at MEDCOM, PA&E, then works its way up through the Office of the Surgeon General, then to Department of the Army level. Perhaps, the opportunity that is getting the most attention lately is the Interim Outpatient Medical Record Working Group (IOMRWG). MG Farmer, Deputy Surgeon General, commissioned the group because of the barrage of briefings he was getting on interim information systems. The charter of the group is to assess the current interim systems in the Military

Healthcare System, perform a cross-walk of their functionalities, and make a recommendation for those functionalities along with their corresponding systems that should or should not become a part of the enterprise system. Though welcomed by the MEDBASE team, the working group has become mired, at times, with political innuendos and turf wars. Though scheduled to present their recommendations by June 2003, the group has yet to make any significant determinations. Nevertheless, participation in this group is a vital step in becoming a sanctioned AMEDD enterprise system. MG VanTworp, Commander, TRADOC, queried the MEDBASE team about the possibility of using MEDBASE to track the medical status of basic trainees at Ft. Bliss. If the program would prove successful at that location, funds would be provided to expand the program throughout the Army. CHPPM, Ft. Lewis, and ERMC would also provide funding if certain conditions for functionality and implementation were met. The problem with pursuing these latter opportunities is the lack of available resources as well as the uncertain commitment made on behalf of the proponent. Additionally, though possibly profitable, priority for deployment has remained with Great Plains Regional Medical Command - its current funding source. Only if greater, more consistent funding sources were made available would the project team have enough resources to implement at sites outside

of the region. As the adage goes, MEDBASE needs to have money in order to get money.

Discussion of Threats

The greatest threat facing MEDBASE is the reduction of funds for development and sustainment. Currently, the primary funding source for the application is the Great Plains Regional Medical Command. Because of growing budget constraints, these operational funds are at risk. Furthermore, there is growing momentum in the Army Medical Department to consolidate the development efforts of existing interim systems (for example, the work of the IOMRWG). If for some reason the recommendation is made not to include the primary functionality found in MEDBASE, development efforts could be greatly impeded. In addition to these threats, there are a number of existing interim systems that are vying for enterprise status along with the additional funding that would follow. Enterprise status would most likely come in the form of inclusion into the Composite Health Care System, version II (CHCSII) - the MHS's clinical repository. The following is look at these alternate interim systems along with corresponding strengths and weaknesses.

Identification of Competitors' Strengths and Weaknesses

ICDB – HealthEForces/ MAMC ICDB	Esi-CHCS
<p style="text-align: center;"><u>Strengths:</u></p> <ul style="list-style-type: none"> - CHCS Core - HL7 interface - software development kit (2nd Version) - strong administrative team - funding - \$8M POM - political – solid support structure; presence in National Capital Region - history <p style="text-align: center;"><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - development team – 2 developers (product is 5 years old) - very limited functionality – output device 	<p style="text-align: center;"><u>Strengths:</u></p> <ul style="list-style-type: none"> - web-based - cheap (free-ware) - based on CHCS - based on ICDB - writes back to CHCS - user-friendly <p style="text-align: center;"><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - based on CHCS – slow (15-20 seconds per look-up) - limited functionality - security violation
<p>E-Immune</p> <p style="text-align: center;"><u>Strengths:</u></p> <ul style="list-style-type: none"> - web-based <p style="text-align: center;"><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - limited market – at one place - requires license per user (commercial, off-the-shelf program) - not flexible - extremely limited functionality (just immunizations) - does not integrate with anything 	

Table 3. MEDBASE competitors' strengths and weaknesses.

Based on Table 3, it is clear that those applications based on ICDB (Health-E-Forces & MAMC ICDB) are the interim systems that pose the greatest threat to MEDBASE. What provides these applications the greatest strength is the programmed funding which allows them quite a bit of flexibility in development and implementation. However, all three competing systems have limited functionality. This is an area where MEDBASE has and

will continue to capitalize upon. MEDBASE's robust development team holds the key to their competitive advantage. Esi-CHCS has the advantage of writing back to CHCS as well as being web-based. But there are serious concerns about the program because of the security threat it poses. E-immune is the application that poses the least threat. This application, though web-based, has extremely limited functionality and does not integrate with any existing programs. Furthermore, E-immune is based off of commercial, off-the-shelf software requiring a license for every single user. Implementing this application throughout the AMEDD would quickly become a very costly venture.

Strategic Group Maps. To further assist in describing the external environment and the positioning of existing applications, 2 distinct strategic maps were drawn up. The first compares degree of functionality with the focus of each application (Figure 3). The second compares product image/quality with degree of market penetration (Figure 4). Two other applications, MEDPROS and Provider GUI were included in the group maps. Though these applications are already corporate systems and therefore not in competition with MEDBASE, there inclusion provides for a more complete picture of the competitive environment.

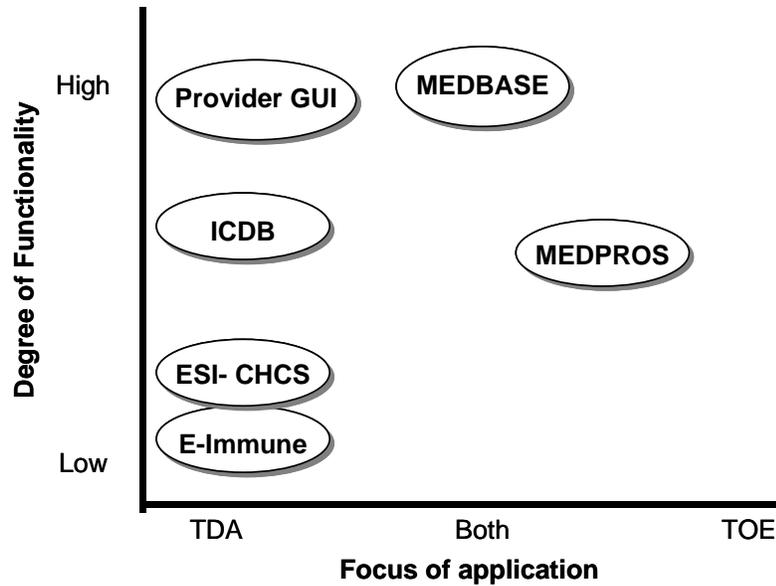


Figure 4. MEDBASE strategic group map #1 comparing degree of functionality with focus of application.

Figure 4 shows that in terms of focus of application, MEDBASE is in a class of its own providing functionality to both the fixed facilities (TDA) and deployable units (TOE), unlike the other competing systems. Additionally, among all of the applications, MEDBASE has the greatest amount of functionality. Thus, compared to the rest of the applications, MEDBASE excels in both product breadth and scope, providing both a greater amount of functionality, with application in more settings. This strategy map clearly shows the competitive advantage MEDBASE has in comparison with competing systems. As further analysis will show, this is a strength that the MEDBASE team should capitalize on.

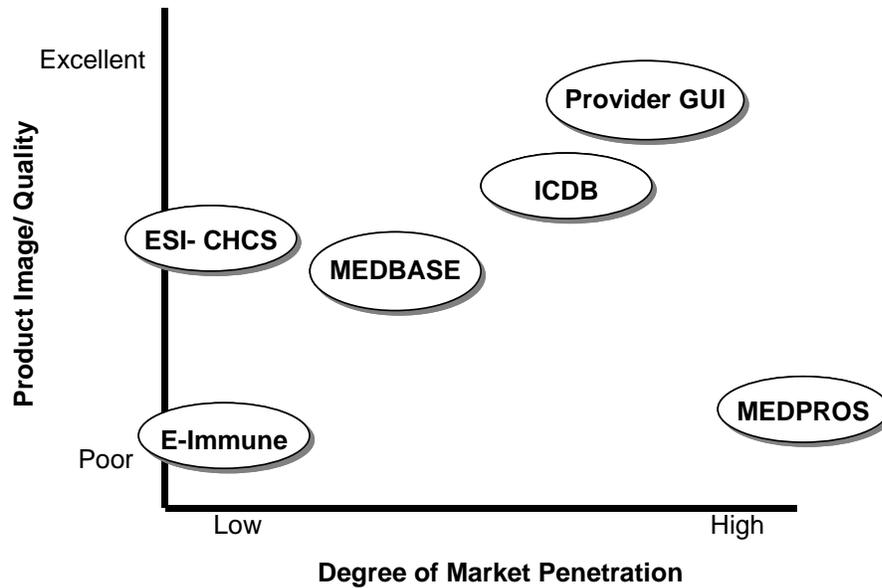


Figure 5. MEDBASE strategic group map #2 comparing product image/ quality with degree of market penetration.

Using product image/ quality and degree of market penetration as the Y and X axis, respectively, paints a different picture. Unlike the first strategy map, Figure 5 shows MEDBASE positioned in the middle of its competitors with an average product image and below average market penetration. The project team must work to improve the image of the product. Though not directly correlated, an improved image should assist in gaining greater market share. Actions must also be taken to increase the degree of market penetration. Improving on these two fronts will involve the entire project team - from general management to program management to developers to support staff.

What follows is an internal assessment of the project team along with the identification of team strengths and weaknesses.

Discussion of Internal Environment

Ginter, Swayne, and Duncan (1998) provide a good framework for assessing a business unit's internal environment. The authors break down the internal environment into 7 subsystems. A minor modification from their model provided the following 7 subsystems for the MEDBASE team: (1) general management, (2) program management, (3) development, (4) IT Support, (5) financial, (6) marketing, and (7) physical facilities. In addition to providing the general framework, Ginter, Swayne, and Duncan suggest determining strengths and weaknesses in terms of four similar factors included in each of the subsystems (1998). These four factors make up an "audit checklist" that can be used to assess each subsystem. The four factors along with an abbreviated list of follow-on questions are (1998):

(1) Staff - Do we have adequate staff in terms of both numbers and qualifications? Can current staffing base support expected future developments?

(2) Information and Technology - Is the internal information flow relative to each of the subsystems sufficient to support day-to-day activities, and do we have a system for obtaining strategic information outside the organization?

(3) Technical Capabilities - Do we have the equipment, facilities, and knowledge necessary to accomplish the tasks required in each functional area?

(4) Synergy - Are the objectives of the functional areas appropriate organizational goals given the organization's competitive position, resources, and opportunities?

General Management	Program Management	Development	IT Support
Expectations exceed resources (W)	Lack of experience, formal training, & maturity (W)	<u>Speed of development (S)</u>	Reliance on BAMC shared assets (S)
High level of involvement of PM (S)	<u>Flexibility (S)</u>	<u>Proficiency (S)</u>	Reliance on BAMC for customer support (W)
Constantly changing requirements (W)	Inability to execute, enforce stated objectives (W)	Half of developers were hired from failed program (W)	Underresourced (W)
Disconnect between CG's directives and GPRMC's executions (W)		Poor process for unit testing (W)	Lack of experience and maturity (W)
Opportunist mentality among general managers (S)		Poor methodology for development (W)	<u>Flexibility (S)</u>
		Inability to comply with stated objectives (W)	Lack of integration with developers (W)
		Lack of integration amongst team (W)	
		Sufficient staffing (S)	
Financial	Marketing	Physical Facilities	
Underresourced (W)	No marketing plan (W)	Space limitations in IMD (W)	
Unsecured funding for outyears (W)	Outsourcing costs too high (W)		
	Misrepresentation in the field (W)		
	No staff (W)		
	Solid presentation (S)		

Table 4. MEDBASE team's internal strengths and weaknesses.

Table 4 provides a list of the MEDBASE team's strengths and weaknesses in light of the four factors described above. While creating the table, the project team found strengths and weaknesses that were common throughout each of the subsystems. One general weakness noted was the lack of alignment among the

entire team. The team also lacked sufficient experience and maturity in running an application of this size and scope. Staffing was an issue in some areas such as IT Support and Marketing. And of course, the lack of sufficient resources was cited as a major weakness. In terms of common strengths, the team listed flexibility throughout several of the subsystems. Another key strength that was identified was the opportunist mentality among the general managers. Critical to the success of the application was the speed of development. In fact, members of the team explained that the combination of these three factors, namely, flexibility, the opportunist mentality of general managers, and speed of development, were the primary reasons for MEDBASE's success to this point. The background to this paper support this conclusion as general managers were able to identify needs/ opportunities throughout the Military Healthcare System and quickly direct the project team towards developing functionality that supported these efforts.

In order to ensure future success for the application, the MEDBASE team must address both common strengths and weaknesses. In particular, steps need to be taken to ensure greater alignment among each subsystem of the project team, in particular, between general management, program management, developers, and support personnel. Actions must also be taken to expand the current skill-base of the team whether through

training or hiring of new personnel. Obtaining resources remains a top priority. In addition to addressing these weaknesses, the team must ensure that it nurtures its core competencies.

Flexibility and speed of development are critical to succeed in the complex environment in which MEDBASE operates. And general managers need to continue searching out opportunities within the external environment.

Vision Building

No strategic plan would be complete without a discussion of a business unit's vision and mission. Collins and Porras in their seminal article, Building Your Company's Vision (1996), broke vision down into two parts: core ideology and envisioned future. The authors define core ideology as "a consistent identity that transcends product or market life cycles, technological breakthroughs, management fads, and individual leaders" (1996, p.66). A company's core ideology, the authors suggest, is made up of core values and a core purpose. Core values are defined as the essential tenets of an organization or a small set of timeless guiding principles. Core purpose is defined as the organization's reason for being and reflects people's idealistic motivations for doing the company's work. The authors go on to state that core values are not created, but are inherent within the company. Management's job is to find what they are. Management also has the responsibility of

determining the organization's core purpose. Because Collins and Porras' work centered on visionary companies that had spanned decades, such as Disney or Microsoft, we chose not to deliberate on core ideology. We reasoned that these two components would be difficult to ascertain because of the infancy of the project team. Rather, we focused on the authors' second component of vision: envisioned future. Envisioned future is made up of two parts: a 10 - 30 year big, hairy, audacious goal (BHAG) and a vivid description. The authors define a BHAG as a clear and compelling goal that requires 10 - 30 years to complete. The BHAG serves as a unifying focal point of effort, has a clear finish line, and requires thinking beyond current capabilities of the organization and the current environment. The best example of a BHAG was Kennedy's goal of getting a man on the moon. Collins and Porras argue that BHAGS can be thought of in four broad categories (1996, p.72):

- (1) Target BHAGs (quantitative or qualitative) such as Wal-Mart's 1990 goal of becoming a \$125 billion company by the year 2000 and Henry Ford's goal of "democratiz[ing] the automobile" in the early 1900s.

- (2) Common-enemy BHAGS that involve David-versus-Goliath thinking such as Nike's 1960 goal to "Crush Adidas!" and Honda's goal in 1970 to "destroy Yamaha!".

(3) Role Model BHAGs suit up-and-coming organizations with examples such as Stanford University's goal in the 1940s to "become the Harvard of the West".

(4) Internal-transformation BHAGs suit large, established organizations and include examples such as Rockwell's 1995 goal to "transform [the] company from a defense contractor into the best diversified high-technology company in the world".

During one of the strategy sessions, key leaders wrote BHAGs for MEDBASE in each of the four broad categories. Examples included:

- Become the Microsoft for health information systems for the Department of Defense (DoD).
- Crush ICDB!
- Save the DoD \$500 million in development costs.

Ultimately, the leadership settled upon the following BHAG:

Become the healthcare information system of choice for the DoD.

The second component of Collin and Porrás' vision is the vivid description (1996). They define vivid description as a vibrant, engaging and specific description of what it will be like to achieve the BHAG. In essence, it is the translation of the vision from words into pictures. The authors cited the

imagery Henry Ford used to describe life after the automobile as a means of communicating this concept. In the early 1900s, Henry Ford wrote:

I will build a motor car for the great multitude...It will be so low in price that no man making a good salary will be unable to own one and enjoy with his family the blessing of hours of pleasure in God's great open spaces...When I'm through, everybody will be able to afford one, and everyone will have one. The horse will have disappeared from our highways, the automobile will be taken for granted...[and we will] give a large number of men employment at good wages.

After a number of submissions from the MEDBASE team, the following vivid description was drafted:

The DoD will have a single medical system that can be accessed anywhere in the world. Users will not think twice about accessing the system because of its speed and ease of use. Data collection and aggregation will occur as a by-product of the clinical/ administrative encounter resulting in tremendous time and personnel savings (equivalent to the the introduction of the PC). Leaders at every level will know, at a glance, the health of their population(s) and pin-point areas of improvement. Because of its accuracy, reliability, and comprehensive nature, most routine and every major medical decision will involve this system.

Formulation of the MEDBASE Strategy Map

In 1992, Robert Kaplan and David Norton published their groundbreaking work on the balanced scorecard - the revolutionary performance management system that helps senior leaders set corporate strategy and objectives, then translate them into a coherent set of measures. Later in 2000, Harvard Business Review published a collection of Kaplan and Norton's essays called, Focusing Your Organization on Strategy - with the Balanced Scorecard. The collection contained three articles that were intended to provide an outline for developing an organization's strategy using the balanced scorecard. The balanced scorecard consists of four areas: (1) financial, (2) customer, (3) learning and growth, and (4) internal processes. The authors argue that most companies focus on measuring financial performance at the neglect of the three other key areas. The balanced scorecard allows an organization to create alignment by communicating high-level goals down to all levels of the company. The scorecard also allows executives to focus on those elements in the company that provide competitive advantage, thus are critical to the organization's success.

Kaplan and Norton described the methodology they use to develop a balanced scorecard in the first article of the series titled, Putting the Balanced Scorecard to Work (1993). The balanced scorecard process begins with the question, "What is my

vision of the future?" The authors recommend answering this question by describing the company's vision. The next question asked is, "If my vision succeeds, how will I differ?" The question is asked for each of the four perspectives: to my shareholders (financial), to my customers (customer), with my internal management processes (internal processes), and with my ability to innovate and grow (learning and growth). Next, Kaplan and Norton recommend asking, "What are the critical success factors?" The question must be answered in each of the four perspectives. And the final question posed is, "What are the critical measurements?" Again, measures are found that can be applied to each of the four perspectives.

Following this methodology, the MEDBASE team began with the creation of two lists. The first described what the program would look like in each of the four perspectives based on the vision (BHAG and vivid description); the second identified critical success factors that would be needed to achieve the vision (Appendix D). The result was the creation of the MEDBASE Strategy Map shown in Figure 6.

Kaplan and Norton (1993) recommend placing the company's most crucial perspective at the base of the strategy map - most crucial meaning the perspective that all other perspectives will build upon and the failure to achieve would cause the failure of the entire strategy. They also opine that each successive

perspective should build upon the one beneath it, ultimately achieving success in the final perspective at the top of the strategy map.

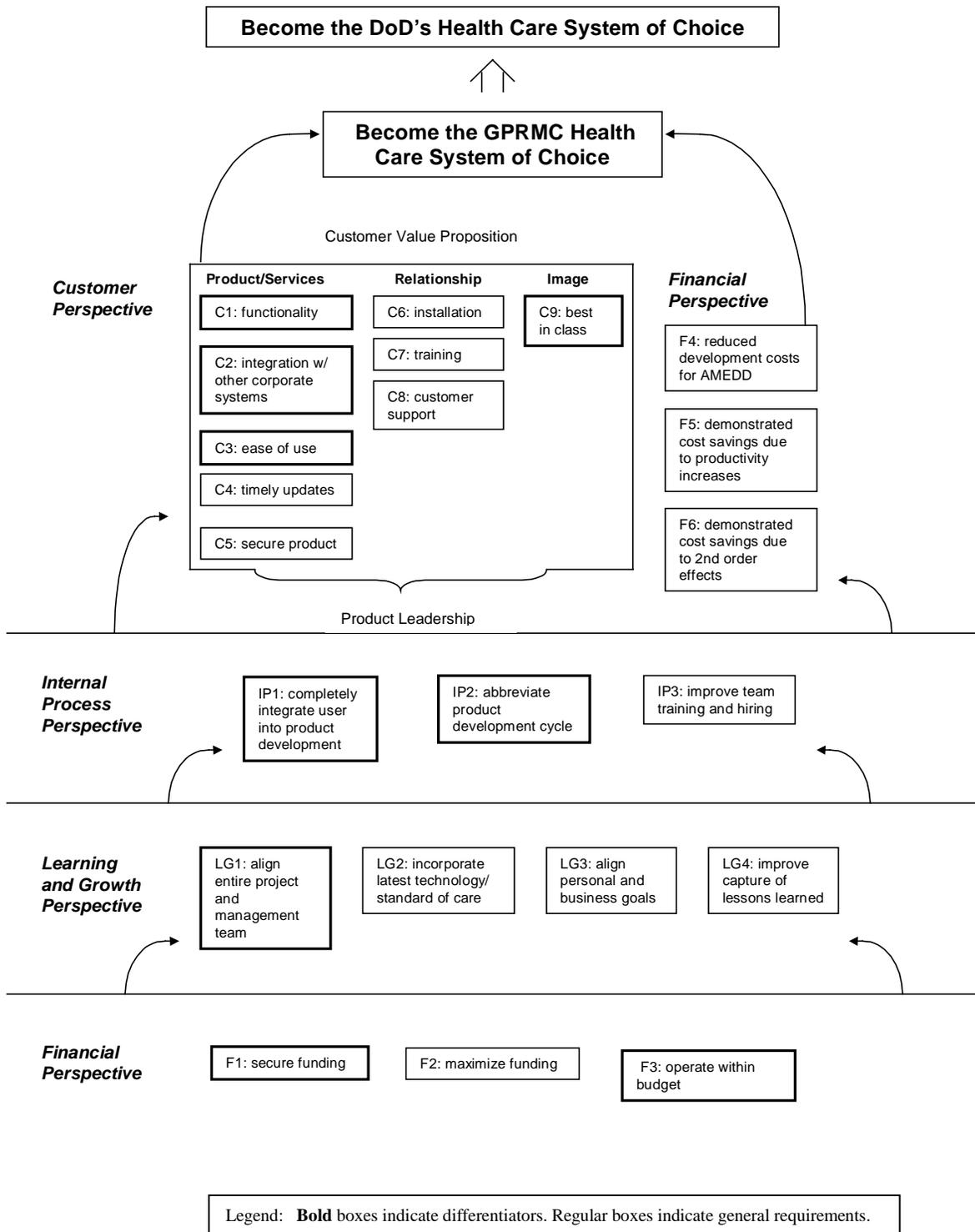


Figure 6. Strategy map for MEDBASE project team.

The MEDBASE strategy map (Figure 6) begins with the financial perspective and ends with the customer perspective. The financial perspective serves as the foundation of the map because without the procurement of adequate funds, the program would be shut down. Consequently, the top of the map is occupied by the customer perspective because of the value placed on civil service by the federal sector, unlike the corporate sector whose primary goal is profit. The learning and growth perspective serves as the second building block as well as the engine for increasing organizational effectiveness. The third building block is the internal process perspective. This perspective is critical for creating the product and services that will eventually meet customer need in the last perspective. Bold blocks represent those objectives that provide the MEDBASE team with a competitive advantage. These blocks should be emphasized when developing the balanced scorecard. Plain blocks indicate objectives that are general requirements needed to remain viable in the industry.

Within the financial perspective, the working group determined that securing funds (F1), maximizing funds (F2), and operating within a given budget (F3) were the most critical success factors in this area. All the analysis leading up to this point stresses the need to ensure funding for the ongoing concern of the application. Once these funds are secured, F2, or

maximize funding, captures the need to apply them to specific areas identified in a business case analysis and towards those areas that enhance the team's core capabilities. Good stewardship of federal funds also plays a part in the strategic plan and is captured in F3 (operate within budget).

Within the learning and growth perspective, four objectives were identified that include aligning the entire project team and management team (LG1), incorporating the latest technology/ standard of care (LG2), aligning the personal and business goals of employees (LG3), and improving the capture of lessons learned throughout the product life cycle (LG4). Poor alignment was identified as a weakness throughout the project team, thus some initiatives along with corresponding metrics must be created to monitor improvement in this area (LG1, align entire project and management team). This box is highlighted because of its importance in differentiating MEDBASE with its competitors. An advantage that the project team has been able to sustain to date is the fact that all programmers and developers are in-house, compared with other programs whose development shops are contracted on the outside. This has given the team a tremendous advantage in terms of development speed and flexibility as well as allowing full user integration. The potential for even greater synergy exists and must be capitalized upon. LG2 or incorporate latest technology/ standard of care relates to the

desire of general management to have the application at the cutting edge of functionality. The latest standards of care should be quickly absorbed into the program. MEDBASE has created a name for itself because of its expanded functionality as compared with existing applications. This advantage should continue to be exploited. LG3 (align personal and business goals) refers to the need to further align members of the team in an effort to create greater synergy and improved morale. Initiatives should channel the energies used by employees to achieve their higher-order life goals into their activities at work. LG4 (improve capture of lessons learned) is essential for any organization in order to learn from its mistakes. Initiatives must include measures to capture lessons at every point of the product life cycle from development to implementation to customer support.

The working group included the following objectives in the internal process perspective: completely integrate user into product development (IP1), abbreviate product development cycle (IP2), and improve team training and hiring (IP3). A tremendous strength of the MEDBASE team that was not mentioned in the internal assessment but should have been, is the high degree of user integration that the application has been founded on and continues to enjoy. As told in the background section of this paper, the primary motivation for the creation of this

application was the frustrations experienced by an end user, namely, CPT Tucker, and his efforts at simplifying reporting procedures to his commanders. This strength continues to this day with CPT Tucker's virtual omnipresence in each phase of development. The leadership team has also been fortunate to have a clinician, LTC Cuda, who is also intimate with the development process and provides real-time testing of the application. This same spirit of user integration must not only be maintained, but expanded into each part of the product life cycle, most importantly, development and testing. Metrics must be established to monitor the amount of time end users are involved with the application prior to its release. IP2 indicates the need to build upon the team's development speed, thus nurture one of its core competencies. Lastly, in the internal process perspective, initiatives and measures in IP3 will allow the team to grow in its capabilities and competencies through both improved team training and the hiring of the right personnel.

The customer perspective contains the largest number of objectives since the customer's evaluation of the product will ultimately determine whether the team is successful or not. Objectives in this perspective include: functionality (C1), integration with other corporate systems (C2), ease of use (C3), timely updates (C4), secure product (C5), installation (C6), training (C7), customer support (C8), and best in class (C9).

The combined effects of success in these objectives should result in achieving product leadership for the team.

Kaplan and Norton, in their article, Having Trouble with Your Strategy? Then Map It (2000), are careful to point out the inherent trade-offs in developing customer value proposition strategies. The authors hold to the assertion that an organization cannot be all things to all people and argue that one of the greatest areas of application for application of this principle is in developing customer value proposition strategies. Kaplan and Norton assert that customer value proposition strategies can fall into three categories: (1) operational excellence, or companies that excel at competitive pricing, product quality, and on-time delivery; (2) customer intimacy, or companies that excel at offering personalized services to customers and at building long-term relations with them; or (3) product leadership, or companies that excel at creating unique products that push the envelope. The emphasis placed on boxes in the product/ services and image category communicates that the team is using the product leadership customer value proposition; that is, how well the product performs will be the ultimate benchmark for success.

Objectives C1 - C3 address aspects of the program that drive its success, namely MEDBASE's expanded functionality, integration with corporate systems such as CHCS and MEDPROS, and

the application's easy to use interface and methodology. Both timely updates and the earning of all the proper security credentials are general requirements needed to remain viable in the industry, but were included in the strategy map because of the importance placed on shoring up these areas by general management. Additionally, C5 - C7 (installation, training, and customer support) are general requirements but are vitally important in increasing market share for the product.

Ultimately, the goal of the MEDBASE team is to produce the best information system available with the requisite support structure in place, which should lead to happy customers. This objective is captured in C8, to be the best in class.

Three additional financial objectives were included in the strategy map: reduced development costs for the AMEDD (F4), demonstrated cost savings due to productivity increases (F5), and demonstrated cost savings due to second-order effects (F6). These objectives were included at the top of the strategy map because they are considered outcomes rather than requisite objectives. Therefore, placing them in the financial perspective at the base of the map would not make logical or strategic sense. These objectives are intended to prove the value of the application to the AMEDD leadership as well as those in Congress who will be writing the bill for the program. Thus, capturing this data is essential.

It is important to note that as the project team matures and accomplishes these initial tasks, objectives on the strategy map should change as well. For example, once security credentials are received and measures are put into place to maintain them, C5, or secure product, should be replaced with another timely objective.

Though success is certainly not guaranteed, by adhering to the proposed strategy map the MEDBASE team can improve its chances for achieving its goal of first becoming the GPRMC health care system of choice and ultimately become the DoD's health care system of choice. It is important to note at this point that what name the application has in the future is not of great concern. The project team is fully aware of the fact that, the success of MEDBASE could very well spell the end of MEDBASE as users now know it. In the long run, the functionality found in MEDBASE would probably be absorbed into CHCS II. Success, at that stage would then be measured to what degree this occurs.

Formulation of Balanced Scorecard

At the time of this writing, the metrics associated with each objective identified in the strategy map were not fully developed. In the last strategic planning meeting with the MEDBASE program manager, LTC Cuda, it was determined that metrics should first be developed for the top five balanced scorecard (BSC) objectives as determined by general management.

This would help to phase-in the balanced scorecard and not overwhelm those responsible for tracking BSC metrics. Once the targets, measures, and objectives of these objectives were fully operationalized, others could be created. The top five objectives identified were: operate within budget (F3), align entire project and management team (LG1), completely integrate user into product development (IP1), abbreviate product development cycle (IP2), and functionality (C1). What follows is a preview of the completed scorecard containing the measures, targets, and initiatives of the objectives given above.

Financial				
	<i>Objectives</i>	<i>Measures</i>	<i>Targets</i>	<i>Initiatives</i>
"To succeed financially, how should we appear to our shareholders?"	F1: secure funding			
	F2: maximize funding			
	F3: operate w/l budget	% of programmed budget	actual spending within 10% of programmed quarterly budget/ within 2% of year end budget	quarterly budget report and briefing to program management
	F4: reduced development costs for AMEDD			
	F5: demonstrated cost savings due to productivity increases			
	F6: demonstrated cost savings due to 2nd order effects			

Figure 7. Financial perspective of the MEDBASE BSC.

In the financial perspective of the BSC, general management chose to focus on objective F3 (operate within budget). As Figure 7 shows, the measure is the percent of programmed budget spent. The target is actual spending within 10% of the quarterly budget, and within 2% of the entire budget. The main initiative for this objective is the creation of a quarterly budget report showing burn rates as well as the establishment of a quarterly briefing where budget performance can be conveyed to both general and program management where problem areas can be identified and corrected as needed.

Learning and Growth				
	Objectives	Measures	Targets	Initiatives
"To satisfy our shareholders and customers, at what business processes must we excel?"	LG1: align entire project team and management team	hours per week spent between functional areas	8 hours biannually for entire project team; 4 hours weekly between program management and developers; 3 hours weekly between trainers and developers	biannual briefing to entire team; weekly updates w/ key leaders; weekly meetings b/ trainers and developers; publish balanced scorecard and strategy map
	LG2: incorporate latest technology/ standard of care			
	LG3: align personal and business goals			
	LG4: improve capture of lessons learned			

Figure 8. Learning and growth perspective of the MEDBASE BSC.

LG1 (align entire project team and management team) was selected as the first objective to operationalize in the learning and growth perspective of the BSC. The primary measure

would be the number of hours spent between members of each functional area. As shown in Figure 8, the targeted number of hours depends on the interaction between specific functional areas. For example, four hours per week between program management and developers was determined because of the critical importance of synergy and alignment between these groups. A lower number of hours (8 annually) was selected for formal interaction among the entire project team. This could take place during biannual retreats that involve every member of the project team. The target number of hours for interaction between developers and trainers could occur during weekly meetings. All this interaction would serve to facilitate the communication flow among the entire project team, thereby increasing team alignment. Another major initiative would be the publication and distribution of the MEDBASE strategy map and balanced scorecard. Both tools could be used during meetings to communicate general management's priorities as well as to monitor performance.

Internal Process				
	<i>Objectives</i>	<i>Measures</i>	<i>Targets</i>	<i>Initiatives</i>
"To achieve our vision, how will we sustain our ability to change and improve?"	IP1: completely integrate user into product development	# testing hours spent with clinicians	72 additional hours	increase number of clinicians in product testing
	IP2: abbreviate product development cycle	% of given requirements within specific development cycle that are operationalized	85%	cross-train developers; daily updates with program management to ensure completion of priority requirements
	IP3: improve team training and hiring			

Figure 9. Internal process perspective of the MEDBASE BSC.

The two objectives chosen in the internal process perspective (Figure 9) were IP1 (completely integrate user into product development) and IP2 (abbreviate product development cycle). The number of testing hours spent with clinicians will measure IP1. The target will be 72 hours in addition to the hours currently spent by clinicians performing testing. This target would require the recruitment of additional clinicians to the testing process. IP2 is critical to enhancing one of the MEDBASE team's core competencies, speed of development. This objective would be measured by the percentage of requirements determined by general management that are operationalized within a given development cycle. The target would be 85% of given requirements. This goal would entail cross-training developers

as well as ensuring that daily tasks are prioritized in accordance with the requirements list.

Customer				
"To achieve our vision, how should we appear to our customers?"	Objectives	Measures	Targets	Initiatives
	C1: functionality	% of targeted functionality used in specific clinic (ex. % of clinical encounters created in MEDBASE compared to total number of clinical encounters)	70%	selection and creation of 'showcase' clinic
	C2: integration w/ other corporate systems			
	C3: ease of use			
	C4: timely updates			
	C5: secure product			
	C6: installation			
	C7: training			
	C8: customer support			
	C9: best in class product image			

Figure 10. Customer perspective of the MEDBASE BSC.

Functionality or C1 was selected as one of the most critical objectives by general management under the customer perspective of the BSC (Figure 10). Measuring this objective would be crucial in determining the extent of product usage during implementation - a crucial statistic that currently is

not measured. The measure would have to be tailored to the specific functionality that is emphasized during implementation. For example, use of MEDBASE to record clinical encounters at a primary care clinic could be measured by comparing the number of clinical encounters created in MEDBASE compared to clinic's total clinical encounters. Once these numbers are determined, a percentage could be calculated. The percentages could then be tracked. The target in each of these areas would be 70%. The tracking of this objective would have to involve increased participation from the entire MEDBASE team through the creation and implementation of what I have deemed a 'showcase' clinic. More explanation of this concept will follow in the recommendations section of the paper.

Most Important Strategic Issue Within the Next 12 - 18 Months

It is clear that the survival of the MEDBASE project team depends on its ability to secure programmed funds. Though this can be done piecemeal through partnerships with one or several subordinate commands, such as TRADOC, the long-term future of MEDBASE is contingent upon its acceptance into the AMEDD's overall IS architecture, whether as a strictly interim system or as an interim system that integrates into CHCS. It goes without saying that MEDBASE would prefer the latter in order to ensure that the work has been done can be carried into the future. This in turn, is dependent upon the project team's ability to

anticipate, develop, and in many cases, refine the functionality that is most needed and absent within the AMEDD's current IS infrastructure. The case that this functionality in fact exists and is proven must then be made to the AMEDD leadership. Thus, the most critical issue the MEDBASE team faces within the next 12 - 18 months is to prove the value of the application to the AMEDD leadership, so as to secure a spot in the overall AMEDD architecture. Once this is done, program dollars are more likely to follow.

Conclusion and Recommendations

In support of this endeavor, the MEDBASE team must first take steps to clear up confusion in the field and among the AMEDD leadership regarding its functionality and effectiveness. Because of the application's wide degree of functionality, questions have abounded in the field regarding MEDBASE's intended use. As one MEDBASE marketing presentation shows (Appendix E), what once was intended as an application aimed at injury tracking, has grown into multiple modules suitable for primary and specialty care, as well as preventive medicine use. Additionally, the political moves of other applications vying for program dollars have muddied the waters. Leaders are now faced with the problem of keeping track of the claims of several competing systems. The case for defining what is most lacking in

the current AMEDD IS infrastructure must be made cogently to the AMEDD leadership. Subsequently, the MEDBASE team must demonstrate that it has the functionality to fill this gap and do so successfully.

Though MEDBASE has enjoyed some success in these two areas, several obstacles still remain. Because of the high speed of development and the constant push to bring the product to market, emphasis has not been placed on product implementation. The result has been rather tepid market acceptance. Most users have failed to utilize the full potential of the application and those that have tried have been faced slow-downs due to bugs. In order to rectify these problems, the recommendation is made to ~~create a 'showcase' clinic. The intent would be to focus the~~ majority of the team's efforts on one, local clinic in order to showcase it throughout the region and the rest of the AMEDD. Because of limited resources, all other sites should be given a lower priority. The team must begin by identifying a clinic within BAMC that could make use of a majority of the application's functionality. Once the clinic is identified, the entire staff must be given an overview of the application and receive sufficient training. Support personnel must work closely with clinic members in order to ensure that all questions are answered and that bugs are identified early in the process. Once the program is in use, the next step would require that the team

apply the metrics found in the customer perspective of its balanced scorecard in order to measure progress. In particular, C1 must be monitored closely in order to determine how effective the program is in meeting provider needs. If the percentage of use remains low in each of the application's functional areas, the project team can be keyed in to the fact that the product is not delivering on its promise and that providers are using more traditional means of documenting care. Development efforts can then be focused on issues that arise during implementation in order to improve the product. Significant lessons learned would be captured if this process is closely followed that could then be applied to future implementations. Once enough data has been collected and the application has proven successful, the results can be used to promote MEDBASE throughout the AMEDD.

Once MEDBASE has secured a spot in the AMEDD architecture, the rate of development could slow, leaving more resources for quality control, implementation, and enhancements to those modules commissioned by the AMEDD leadership. Though the team has been successful up until this point using a robust, adaptive strategy - simultaneously targeting multiple users with differing functional needs - the current development pace cannot and should not be maintained indefinitely.

Appendix A

MEDBASE Information Paper for MG Farmer, Deputy Surgeon General,
Army

The purpose of this paper is to recommend MEDBASE as the enterprise solution for capturing medical readiness data, to include pre- and post- deployment information. Existing practice is disjointed and only partially automated resulting in significant inefficiencies and the inability to capture critical clinical information. MEDBASE automates and consolidates the entire medical readiness process. The result is a streamlined approach to soldier medical readiness and the unprecedented collection of clinical data for decision making.

Existing practice remains primarily a paper system and fails to capitalize on current automation technologies. During pre- and post- deployment SRPs, medics continue to fill out multiple forms by hand. Of particular note are DD Forms 2795 and 2796 (Pre-deployment Health Assessment, Post-deployment Health Assessment, respectively). The forms are generated via forms flow or by copying existing blank forms and completed by the health care provider. The Army Medical Surveillance Activity (AMSA) then requires the forms to be copied in duplicate, with one copy remaining at the company level and the original mailed to AMSA Headquarters. There, the paper forms are manually entered into a centralized database for data warehousing.

A similar process is involved when generating the medical readiness portion of DA Form 7425 (Readiness and Deployment Checklist) and DD Form 2766 (Adult Preventive and Chronic Care Flowsheet). In the case of the former, medics must search several sources to populate the form including MEDPROS, CHCS, the soldier's shot and medical records, and profile(s). Once the form is populated, the information is used to update MEDPROS. An additional step is required as the medic must then update MOBILAS. The process of generating DD Form 2766 is also an entirely paper process. However, though this form serves as the soldier's only medical record in theater, there is still no data repository for the information contained on this form. The result is the inability to conduct timely queries for disease surveillance, injury tracking, and population health initiatives for conditions that occurred in theater.

Under the existing SRP process, the Individual Medical Report (IMR) produced by MEDPROS is the only document that is generated electronically. However, because the IMR is a separate screen within MEDPROS, its completion adds an additional step to the entire SRP process.

MEDBASE corrects many of the problems of the existing system by automating the entire medical readiness portion of the SRP. Each form required by AR 600-8-101 and corresponding OTSG directives is included in the application. These forms include DD Forms 2795, 2796, a more comprehensive version of DD Form 2766, the medical *and* dental readiness portions of DA Form 7425, and an expanded version of the IMR. MEDBASE also contains DD Form 3349 (Physical Profile), a robust immunization tracking database, and connectivity to CHCS, the MHS's central clinical data repository. The result is a dramatic reduction of duplicate entry, the elimination of hand-written entry, the ability to electronically submit documents, and a more unified approach to accessing and documenting medical readiness information. Potential time and cost savings are tremendous. Additionally, MEDBASE's electronic capture of previously paper forms along with its inclusion of more clinically relevant data fields greatly enhances the Army's ability to turn medical readiness data into meaningful information for decision making.

Lessons learned from Desert Shield/ Desert Storm indicate that the medical community lacked appropriate measures to capture a soldier's pre- and post- medical conditions, along with medical complications that arose in theater. Problems with medical documentation related to deployment continue to exist. The use of MEDBASE could go a long way in correcting these deficiencies. It is for this reason and for the reasons mentioned above that I recommend MEDBASE as the enterprise solution for capturing medical readiness information.

Appendix B

MEDBASE Strategy Planning Sessions Outline

MEDBASE Strategy Planning Outline

Wednesday, 2 April, 2003

- I. Discussion of External Environment
 - A. Stakeholder Analysis
 - 1. Hand out copies of original
 - 2. Use mind-mapping technique
 - 3. Group stakeholders into respective categories (i.e. partners, competitors, funding sources, approving/ certifying bodies, implementation sites)
- II. Discussion of Opportunities
 - A. Fishbone Diagram
 - 1. Have Fishbone scales set up
 - 2. Focus on approving/ certifying bodies and funding sources
 - 3. Sub-branches should include names of actual POCs
 - 4. Rank in order of importance
- III. Discussion of Threats
 - A. Identification of Rivals' Strengths and Weaknesses
 - B. Strategic Group Maps
- IV. Discussion of Internal Environment (Strengths and Weaknesses)
 - A. Discuss Framework (need to modify from exhibit 4-3, p. 118)
 - B. Provide Statistics
 - C. Discuss Strengths and Weaknesses (to include staffing, information and intelligence, technical capabilities, and synergy)
 - D. Identify critical areas for success
 - E. Identify core competencies, resources, capabilities
 - F. Identify core values
- V. Discussion of Team's Effectiveness (Where we are at)
 - A. Provide Statistics
- VI. Vision Building (Where we want to go)
 - A. Brief outline of Collins' and Porras' Framework
 - B. Formulate BHAG and Vivid Description
 - 1. Have team members right out 2 – 3 BHAGs, read aloud and formulate
 - 2. Have team members right out 1 paragraph describing how the Army will look 10 years from now and what role MEDBASE will have in that
- VII. Discussion of Team's Core Logic and Implications
 - A. Provide Brief description of each
 - B. Provide Microsoft example
 - C. Provide Implications based on External Environment
- VIII. Formulation of Strategy Map
 - A. Provide Outline
 - B. Discuss Changes, Modifications
- IX. Formulation of Balanced Scorecard
 - A. Discuss Key Metrics –or- Have team members write metrics on sticky pad and

consolidate afterwards

X. Formulation of Next Critical Steps

A. Based on Analysis of External/ Internal Environment, Vision, Strategy Map and BSC, Identify 1 - 2 of the most critical steps required in order to ensure success

Appendix C

MEDBASE Vision Building Worksheet

Medbase Strategy Planning Meeting
Vision Building

Collin & Porras Vision Building Framework (Building Your Company's Vision, Harvard Business Review, Sep-Oct, 1996)

Vision consists of *Core Ideology & Envisioned Future*

Core Ideology

Core Values

- the essential and enduring tenets of an organization
- a small set of timeless guiding principles
- require no external justification
- have intrinsic value and importance to those inside the organization
- Examples: Merck – corporate social responsibility, honesty and integrity, unequivocal excellence in all aspects of the company; Walt Disney – no cynicism, creativity, dreams, and imagination, fanatical attention to consistency and detail

Core Purpose

- the organization's reason for being
- reflects people's idealistic motivations for doing the company's work
- Examples: 3M- to solve unsolved problems innovatively; Nike – to experience the emotion of competition, winning, and crushing competitors; Wal-Mart – to give ordinary folk the chance to buy the same things as rich people; Walt Disney – to make people happy

Envisioned Future

10-to-30 year BHAG

Vivid Description

10-to-30 year BHAG

- Big, Hairy, Audacious Goal
- is clear and compelling
- serves as a unifying focal point of effort
- acts as a catalyst for team spirit
- has a clear finish line
- requires 10 – 30 years to complete
- requires thinking beyond current capabilities of the organization and the current environment
- should not be a sure bet (only 50 – 70% probability of success)
- should require extraordinary effort and a little bit of luck
- can be thought of in terms of four broad categories:

Target BHAGs can be quantitative or qualitative:

- Become a \$125 billion company by the year, 2000 (Wal-Mart, 1990)
- Democratize the automobile (Ford Motor Company, early 1900s)
- Become the company most known for changing the worldwide poor-quality image of Japanese products (Sony, early 1950s)

Common-enemy BHAGs involve David-versus-Goliath thinking

- Knock off RJR as the number one tobacco company in the world (Philip Morris, 1950s)
- Crush Adidas! (Nike, 1960s)
- Yamaha so tsubusu! We will destroy Yamaha! (Honda, 1970s)

Role-Model BHAGs suit up-and-coming organizations

- Become the Nike of the cycling industry (Giro Sport Design, 1986)
- Become as respected in 20 years as Hewlett-Packard is today (Watkins-Johnson, 1996)
- Become the Harvard of the West (Stanford University, 1940s)

Internal-transformation BHAGs suit large, established organizations

- Become number one or number two in every market we serve and revolutionize this company to have the strengths of a big company combined with the leanness and agility of a small company (General Electric Company, 1980s)
- Transform this company from a defense contractor into the best diversified high-technology company in the world (Rockwell, 1995)
- Transform this division from a poorly respected internal products supplier to one of the most respected, exciting, and sought-after divisions in the company (Components Support Division of a computer products company, 1989)

Vivid description

- a vibrant, engaging and specific description of what it will be like to achieve the BHAG
- translating the vision from words into pictures
- passion, emotion, and conviction are essential

Examples:

“I will build a motor car for the great multitude...It will be so low in price that no man making a good salary will be unable to own one and enjoy with his family the blessing of hours of pleasure in God’s great open spaces...When I’m through, everybody will be able to afford one, and everyone will have one. The horse will have disappeared from our highways, the

automobile will be taken for granted...[and we will] give a large number of men employment at good wages.” – Henry Ford

“We will create products that become pervasive around the world... We will be the first Japanese company to go into the U.S. market and distribute directly... We will succeed with innovations that U.S. companies have failed at – such as the transistor radio... Fifty years from now, our brand name will be as well known as any in the world... and will signify innovation and quality that rival the most innovative companies anywhere... ‘Made in Japan’ will mean something fine, not something shoddy.” –

Appendix D

MEDBASE Balanced Scorecard Worksheet

What is Our Vision of the Future?

1. Mission Statement: To provide users the tools necessary to efficiently perform daily business practices across multiple echelons of care and report to commanders relevant medical intelligence as a product of the health care practice rather than the administrative burden of it.
2. Vision Statement: To become the healthcare information system of choice for the DoD.
 - a. How will this be measured?
 - (1) Market share v. alternative systems
 - (2) Program budget v. alternative systems
3. Small Business Unit: Consists of General Management, Program Management, Developers, and IT Support (System Administration & Customer Support)

If Our Vision Succeeds, How Will We Differ?

Everyone will use a single medical system for the DoD that is infinitely scalable, remarkably fast and tremendously easy. This will streamline the medical process and maximize quality and productivity. Commanders will know at a glance, their unit's medical status and will be able to make effective decisions from such intelligence. MEDBASE will be the easiest and fastest way of recording, analyzing, and administering medical data.

I have a vision to create a software application that takes the guesswork out for every user. We will succeed because we have built this software for the people, and by the people. This will be an extension of them no matter where they are.

MEDBASE will be on every desktop, including portable and detachable clients. Everyone will use the program and not think about it. Tasks will be simplified in terms of time and personnel requirements thanks to MEDBASE. MEDBASE will satisfy our healthcare needs for aggregation and analysis of data. The entire spectrum of care to include soldiers, providers, family members, and administrators will benefit from the increased quality of care provided through the use of this powerful tool.

We will build a medical information system that will be driven from the user level. It will aggregate data from all existing and future data sources and bring that information to the point of care. Our beneficiaries will have their information no matter where they go in the world. The patient information will be protected from all who are ineligible to access it.

The DoD will have a single medical system that can be accessed anywhere in the world. Users will not think twice about accessing the system because of its speed and ease of use. Data

collection and aggregation will occur as a by-product of the clinical/ administrative encounter resulting in tremendous time and personnel savings (equivalent to the introduction of the PC). Leaders at every level will know, at a glance, the health of their population(s) and pin-point areas of improvement. Because of its accuracy, reliability, and comprehensive nature, most routine and every major medical decision will involve this system.

To Our Shareholders (Financial Perspective)...

- program will cost drastically less than the current enterprise system to develop and implement
- will be able to provide our shareholders with details of how resources are being spent
- resources will be tied to specific areas of the program's business plan
- will be able to provide demonstrable cost reductions (clinical, administrative)

With Our Ability to Innovate and Grow (Innovation and Learning)...

- entire team from General Management to Program Management to Developers to Support Personnel will be fully aligned and integrated
- experienced and fully trained personnel in their respective fields will fill key positions
- fully aligned personal and business goals
- continually learn from each new deployment/ implementation

With Our Internal Management Processes (Internal Perspective)...

- program team will be highly flexible, able to flex to changing priorities/ requirements/ opportunities
- project management will be mature/ experienced
- developers will be able to leap-frog the advances of any competitor due to proficiency and speed of development
- project team will be able to anticipate changes in user preferences and needs and develop/support the program accordingly
- developers will understand customer segments and build best-in-class functionality
- developers will create needed functionality that currently does not exist
- project team will have superior project management that results in products delivered on spec and on time, and become the DoD's cost leader

To Our Customers (Customer Perspective)...

Our product...

- will delight the customer
- will be the best in class
- will be tremendously easy to use
- will contain functionality that currently does not exist for our users
- will contain all of the functionality needed by the user
- will be continuously updated as user requirements change
- will be remarkably fast

- will greatly improve productivity by eliminating redundant data entry, interfacing with all other data sources
- will provide commanders and their staff with easy-to-interpret, real-time, useful reports
- will aggregate all data entry inputted at the point of care from garrison to theater
- will be able to access information anywhere in the world
- will be able to enter data anywhere in the world (PC, laptop, palm, etc)
- will be relatively free of bugs
- will be a secured system

Our service...

- will fuel explosive enthusiasm for the product
- will entail a comprehensive marketing program
- will entail hassle-free installation
- will entail complete, easy-to-replicate training
- will entail rapid, comprehensive customer support

What are the Critical Success Factors?

Financial Perspective:

- Secured funding independent of BAMC operating budget
- Resources matched with specific areas of business plan
- Accurate tracking of costs
- Costs benchmarked against funding of alternate systems
- Implementation linked with research team(s) to capture results (to include administrative and clinical)

Innovation and Learning Perspective:

- Alignment among entire project team and general management
- Alignment between personal and business goals
- Improved capture of lessons learned throughout product life cycle

Internal Processes Perspective:

- Abbreviated product development cycle
- Cross-trained developers
- Improved product testing before release
- Initiation of project management training
- Improved screening process for new hires (first skills, then culture match)
- Complete user integration into product development cycle

Customer Perspective:

For our product...

- Continual customer input (TDA, TOE, administrative, clinical, clerk, provider, medic, commander, population health) and feedback i.e. customer-driven development

- Interfaces with current and future data sources
- Continual link to DoD policy makers, commanders, leaders to understand changing priorities and requirements
- Creation of multiple, scalable platforms (for PC, laptop, palm, etc)
- Creation of scalable, easy-to-replicate, reliable server architecture
- Creation of web-interface
- Receipt of all requisite security credentials

For our service...

- Creation of marketing plan
- Creation of installation plan
- Improved training plan
- Improved customer support training/ more robust customer support cell

Appendix E

Medbase Marketing Brief Presented to TIGOSC February 2003



Soldier Health Initiative
We keep em' fit to fight!

LTC Suzanne Cuda
Suzanne.Cuda@cen.amedd.army.mil

CPT Frank Tucker
Frank.Tucker@cen.amedd.army.mil



Brooke Army Medical Center
Department of Health Plans Management

7/16/03 <http://www.bamc.amedd.army.mil/shi>

Medbase Charter

- Medbase Mission
- Medbase Objectives
- Medbase Concept
- Problem Statement
 - Immunization Example
 - Information barrier example
- Initial Scope
- Constraints
- Project Organization
- Financial Analysis
- Summary

7/16/03

<http://www.bamc.amedd.army.mil/shi>

2

Medical Readiness

Mission

- To provide users the tools necessary to efficiently perform daily business practices across multiple echelons of care and report to commanders relevant medical intelligence as a product of the health care practice rather than the administrative burden of.



7/16/03

<http://www.tamc.amedd.army.mil/sfa>

3

Medbase Objectives



- Provide **COMMANDERS** access to real-time critical medical information
- Integrate clinical information systems in the readiness process (MEDPROS/MOBLAS)
- Cross multiple information system domains
MTF → Area of Operations
- Reduce deployment processing time by reducing administrative burden
- Provide force health protection through trend analysis of health care encounters
- Reduce complexity of data entry requirements
- Establish a program office at USAMISSA

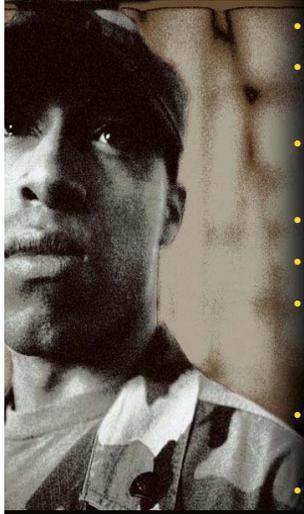
7/16/03

<http://www.tamc.amedd.army.mil/sfa>

4

Medbase Concept

MEDICAL READINESS for the TRANSFORMING ARMY



- Medical information that supports the **COMMANDER**
- Transforms clinical data into information used to manage soldier health and readiness
- Integrates multiple medical and administrative systems
- Leverages technology and medicine at point of care.
- Eliminates double data entry & enhances data quality
- Secure infrastructure (HIPAA compliant), comprehensive, performance oriented, reliable, and intuitive.
- Scalable and open architecture (Oracle, C++, COM, DLL, Terminal Service)
- Bottom Line: We are the "dash 10" for soldier health

7/16/03

<http://www.tamc.army.mil/sla>

8

Problem Statement

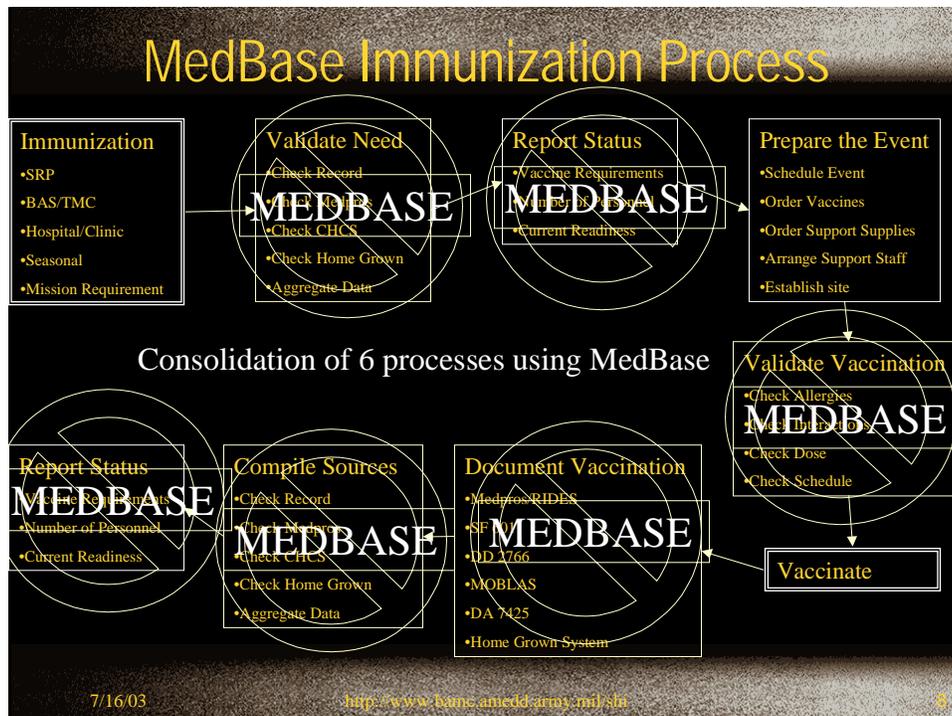
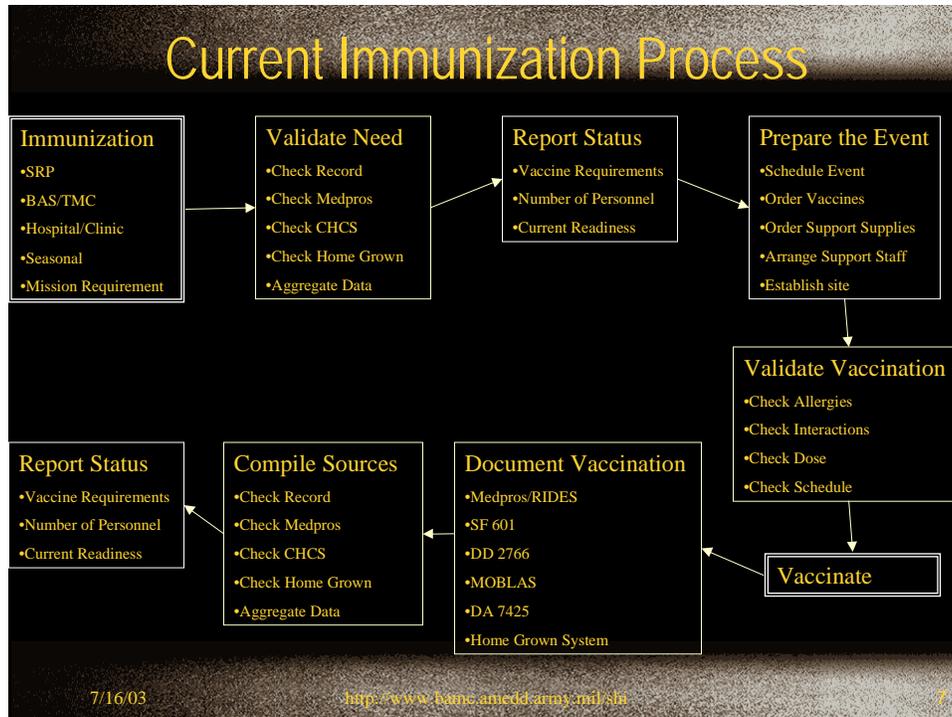
- Failure to bring medical intelligence to the deployment process
- Current deployment process is reactive.
- Medical Readiness is not a by-product of normal health care practice
- Inadequate medical information to line commanders
- Lack of longitudinal medical record
- Redundant data entry

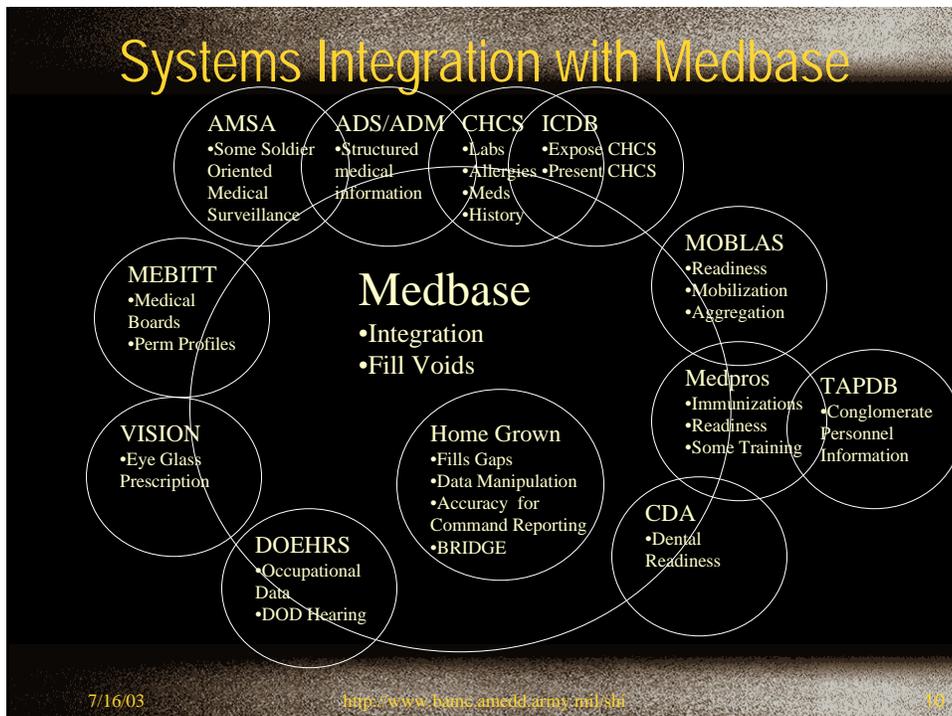
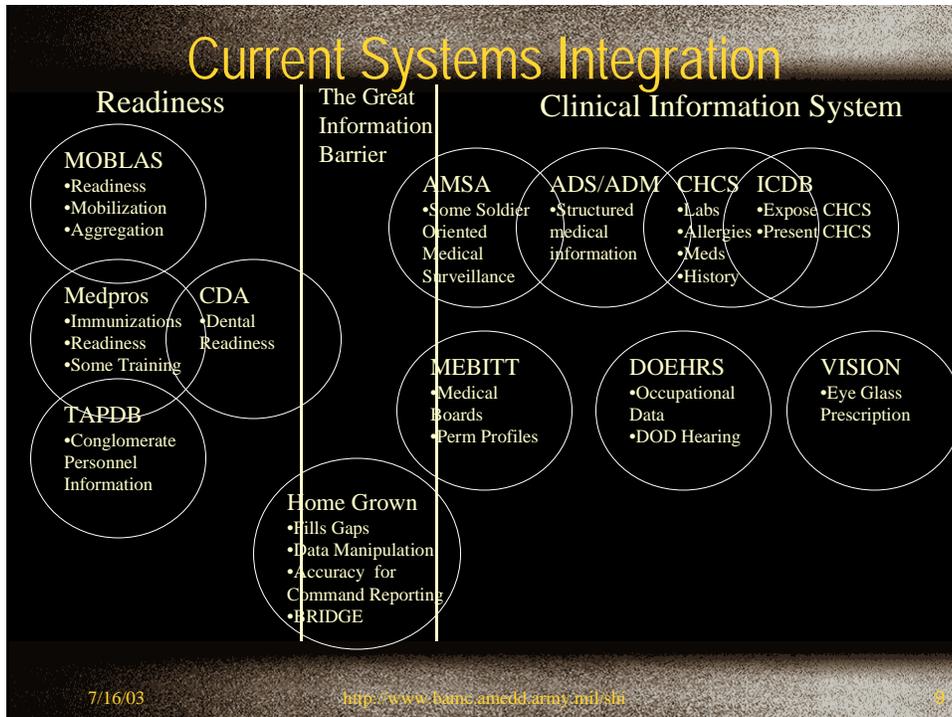


7/16/03

<http://www.tamc.army.mil/sla>

8





Medbase Scope

- Immunization
- Medical Training
- Medical Readiness
- Electronic Medical Record for spectrum of the battlefield
- Soldier Oriented Population Health
- Profile and Injury Tracking
- Reproductive Health Tracking
- Medical Executive Decision Support and Analysis Tool (MedSTAT)



7/16/03 <http://www.hqmc.amedd.army.mil/sla> 11

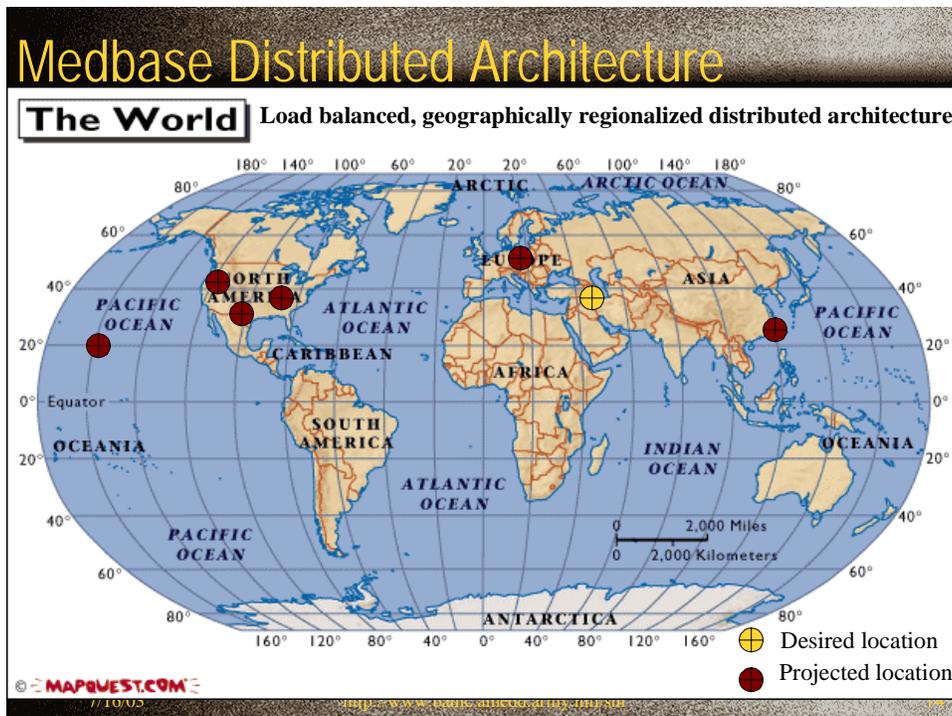
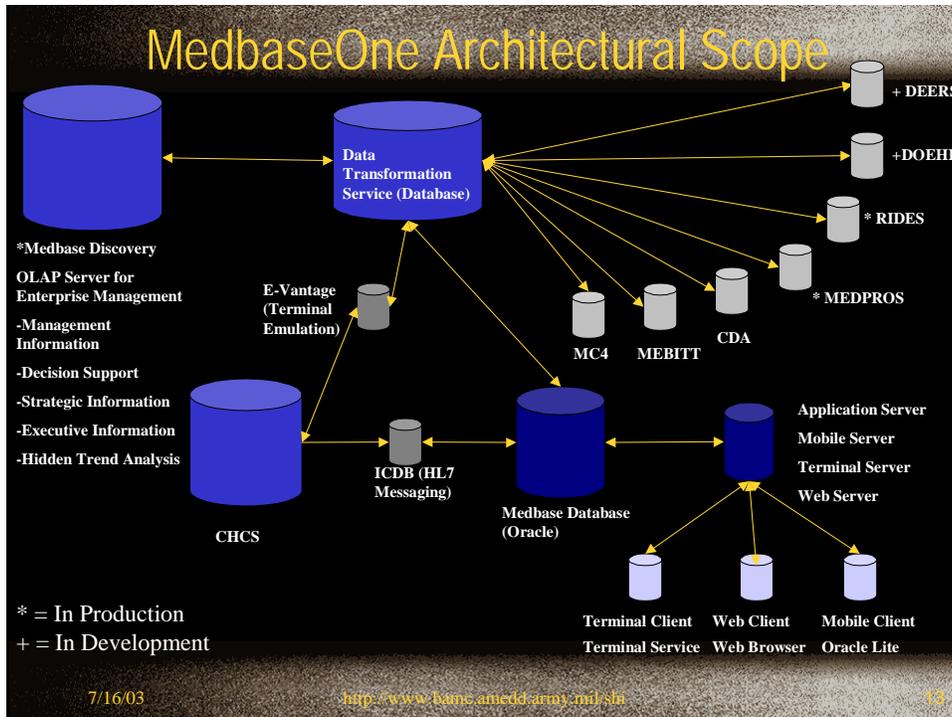
Medbase Modules

*Immunizations	+Clinical Note
##*Pre/Post Deployment	+Health Care Templates
##*DA 7425 (MOBLAS)	CHCS order entry
##*Readiness oriented DD 2766	+Medical Coding
*Readiness tracking	+Patient Administration
*Medical Training tracking	Provider Administration
##*DNBI tracking	*Medical Reference
##+Command Subscription Reports (email)	##* Ad Hoc Reporting (report building wizard)
##*Profiles (OTSG test and previous 3349 version)	*Healthy People 2010
##*Soldier Population Health	HEDIS
*Data Transformation Services	Patient Education
+Disconnected / asynchronous client	Patient "dash-boards"
+Savable data to media (PIC)	##+Executive Decision Support System

Unique Capability
*** = In production**
+ = Near production



7/16/03 <http://www.hqmc.amedd.army.mil/sla> 12



Medbase Constraints...

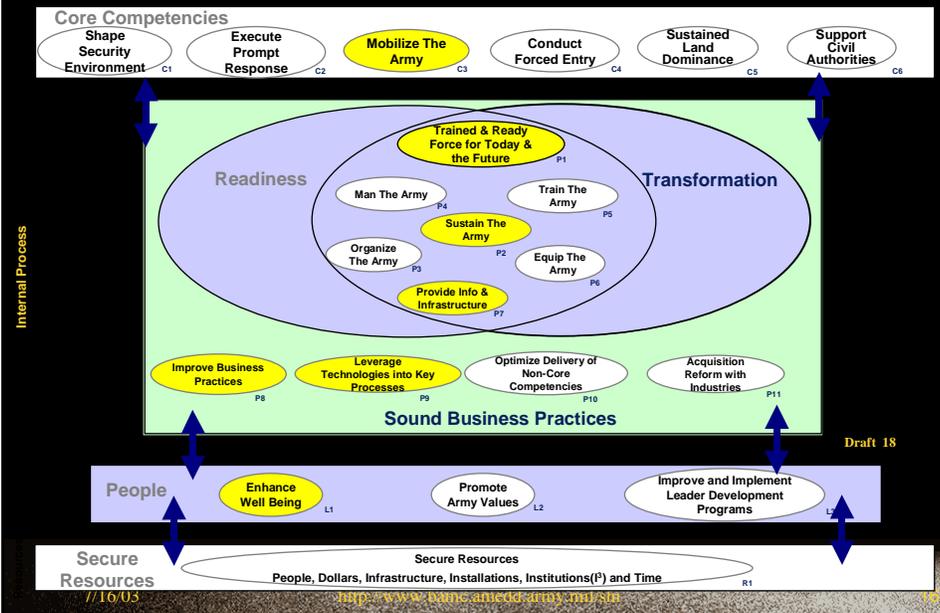
- Lack of experienced Program Management
- Lack of adequate resources
- Lack of willingness to share data & development
- Relies on presence of ICDB
- CITPO must approve separate interface to CHCS
- Enterprise endorsement

7/16/03

<http://www.hqmc.army.mil/sla>

18

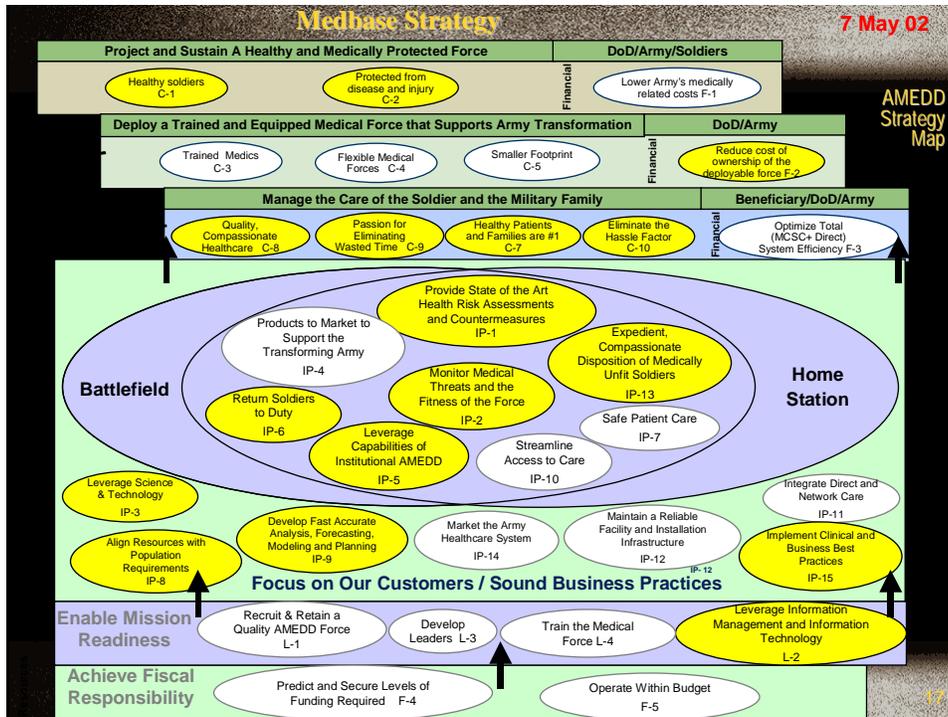
Medbase Strategy



7/16/03

<http://www.hqmc.army.mil/sla>

19

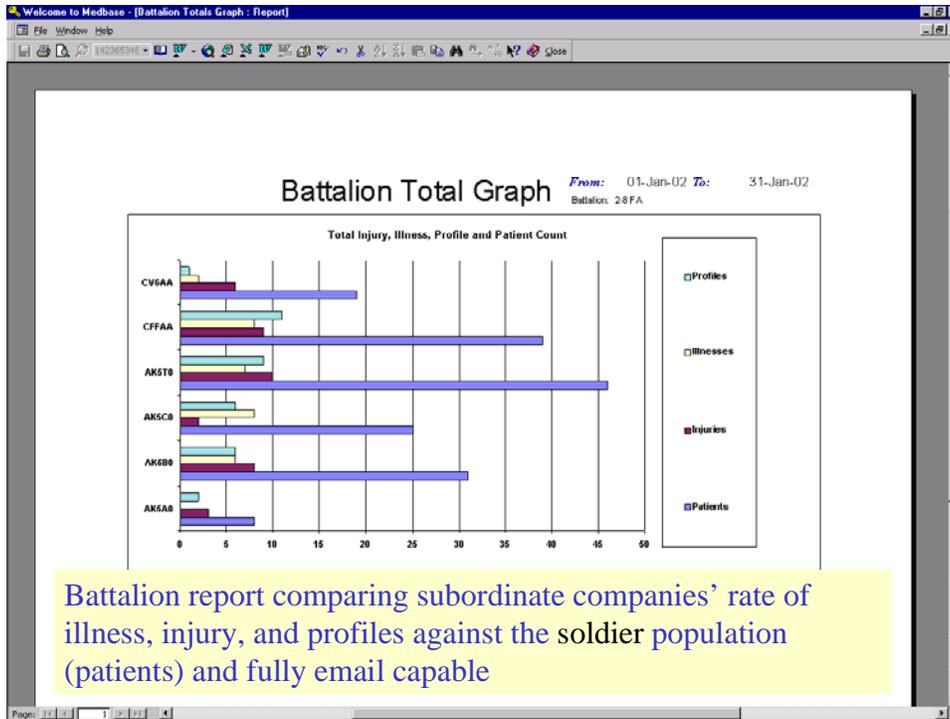


DNBI Report (FSC LAG 1ST CAV FT HOOD)

State Center: 13242202
Individual Preparing Report: [Name]
Phone: [Number]
E-mail: [Email]

CATEGORY	INITIAL VISITS	FOLLOW UP	RATE	NOGGED/STED REFERENCE RATE	DAYS OF LIGHT DUTY	LOST WORK DAYS	ADMTS
Cardinal Operational Stress Practices	0	0	0.0%				
Demotivators	0	0	0.0%				
Gas Infections	0	0	0.0%				
Optometrists	0	0	0.0%				
Head Care	0	0	0.0%				
Injury Rec_Aperts	0	0	0.0%				
Injury Misc	0	0	0.0%				
Injury Work_Ting	0	0	0.0%				
Injury Other	0	0	0.0%				
Optometrists	0	0	0.0%				
Psychiatric Mental Disorder	0	0	0.0%				
Respiratory	0	0	0.0%				
SMI	0	0	0.0%				

•Only automated Pre/Post deployment form
•Only automated profile both 3349 and new OTSG test form
•Only automated DNBI report



Battalion Temporary Profile

Battalion 2-8 TA

Company	Name	Grade	SSN	Start	End	Profile	PULHES Code	Total
AKSA0	LAHR, RYAN	SPC	██████████	03-Apr-02	10-Apr-02	NO RUN JUMP MARCH		2
AKSA0	MCGOTTIGAN, MICHAEL	SGT	██████████	20-Mar-02	29-Apr-02	RUN JUMP MARCH AT OWN PACE		
AKSB0	WONGWUI, MINO	SGT	██████████	03-Apr-02	30-Apr-02	QUARTERS		1
AKST0	ANDERSON, MICHAEL P	SGT	██████████	03-Apr-02	27-Apr-02	NO RUN JUMP MARCH or RUCKING		1
CFFAA	GARMAN, NICKO R.	PV2	██████████	03-Apr-02	30-Apr-02	QUARTERS		1

Battalion profile roster broken down by company and fully email capable

Wednesday, April 03, 2002 Page 1 of 1

Welcome to Medbase - [Battalion Readiness : Form]

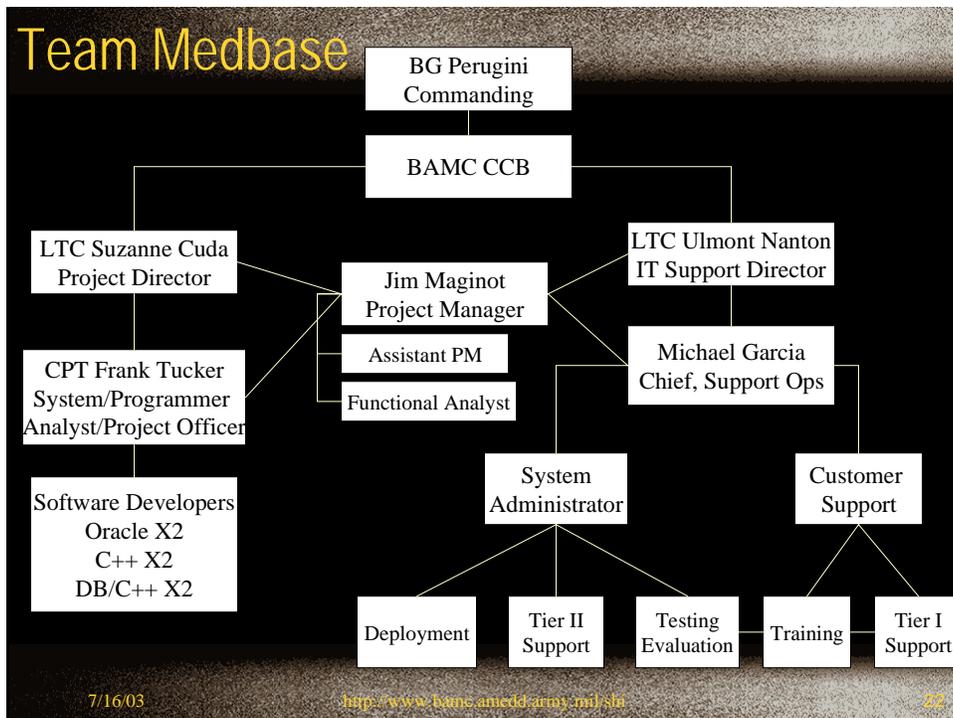
Medical Readiness System 2.0

Dental Class III and IV	40	94.26%
Hearing Exam	170	75.61%
Eye Exam	52	92.54%
Hiv Test	8	98.85%
PAP (Females)	1	99.86%
Pregnant	0	100.00%
P3/P4 PULSES	9	98.71%
DNA	1	99.86%
No-Inserts Issued	26	96.27%
Medical Warning Tag	7	99.00%
Yellow Fever	473	32.14%
Tetanus-Diphth	72	89.67%
Polio	147	78.91%
Influenza	13	98.13%
IPPD	136	80.49%
MMR	32	95.41%
Typhoid	527	24.39%
Hepatitis A	93	86.66%
Hepatitis B	118	83.07%
Meningococcal	69	90.10%
Rabies	1	99.86%
Japanese E	1	99.86%
Anthrax	57	91.82%
Total Readiness (Rabies not included):		83.38%

Wednesday, January 29, 2003

Battalion Form
Company Form
Post Form
Change User
BN Readiness
Quick Ref
Full Ref

Battalion composite report with readiness drill down in simplified metrics. Once again, fully email capable



Financial Analysis

Software Development	Unit Cost	Y1 QTY	Y1 cost	Y2 QTY	Y2 cost	Y3 QTY	Y3 Cost	Totals
Technical Writer	65	1 FTE		70	1 FTE	74	1 FTE	224
Functional Analyst	90	1 FTE		96	1 FTE	103	1 FTE	310
Project Manager	100	1 FTE		107	1 FTE	114	1 FTE	344
System Analyst/Programmer (SA/P)	100	1 FTE		107	1 FTE	114	1 FTE	344
Software/Database Developer	150	2 FTE		161	2 FTE	172	2 FTE	516
Software Developer	140	2 FTE		150	2 FTE	160	2 FTE	482
Oracle Developer	120	2 FTE		128	2 FTE	137	2 FTE	413
Web Developer	110	2 FTE		118	2 FTE	126	2 FTE	378
				936		1002		3010
Sustainment	Unit Cost	Y1 QTY	Y1 cost	Y2 QTY	Y2 cost	Y3 QTY	Y3 Cost	Totals
Database Administrator	120	1 FTE		128	1 FTE	137	1 FTE	413
Data Analyst	80	1 FTE		86	1 FTE	92	1 FTE	275
Tier I Support/Trainers	40	12 FTE		43	12 FTE	46	12 FTE	138
Tier II Support	80	6 FTE		86	6 FTE	92	6 FTE	275
Tier III Support (previous SA/P)	100	1 FTE		107	1 FTE	114	1 FTE	344
MISC (Office/Travel)				200		100		350
				649		581		1795
Totals			Year 1	Year 2	Year 3	3 Years		
Hardware				360	0	0		360
Software Development				936	1002	1072		3010
Sustainment				649	581	565		1795
Total Cost				1946	1583	1636		5165

***Cost figures multiplied by 1k, assumes continuing current development tempo, 7% inflation per year**

7/16/03 <http://www.hqmc.amedd.army.mil/sla> 23

Summary

- **Significant Points**
 - Increase real time medical intelligence to the Commander
 - Reduce data entry redundancy
 - Integrate multiple facets of medicine (TOE & TDA) through a point of care strategy
 - Feed data to the corporate systems ie CDR, CDA, MEDPROS, DOEHRS, DEERS, MOBLAS, SPECTACLE
 - Provide a soldier oriented population health system (PMCS for the soldier)
 - Low cost, rapid development, high yield flexible open architecture
- **Request to the TIGOSC**
 - Enterprise endorsement with formal program management

7/16/03 <http://www.hqmc.amedd.army.mil/sla> 24



Soldier Health Initiative
We keep em' fit to fight!

LTC Suzanne Cuda
Suzanne.Cuda@cen.amedd.army.mil

CPT Frank Tucker
Frank.Tucker@cen.amedd.army.mil



Brooke Army Medical Center
Department of Health Plans Management
<http://www.bamc.amedd.army.mil/shi>

7/16/03 26

References

- Austin, C.J., Boxerman, S.B. (1998). Information systems for health services administration. Chicago: Health Administration Press.
- Collins, J.C., & Porras, J.I. (1996). Building your company's vision. Harvard Business Review, Sept - Oct, 65-77.
- Ginter, P.M., Swayne L.M., Duncan, W.J. (1999). Strategic management of health care organizations (3rd ed.). Malden, MA: Blackwell.
- Henderson, R.D. (1996). User expectations and perceptions of a patient management information system. Computers in Nursing, 14(3), 188-193.
- Kaplan, R.S., & Norton, D.P. (1993). Putting the balanced scorecard to work. Harvard Business Review, Sept - Oct, 5-19.
- Kaplan, R.S., & Norton, D.P. (1996). Using the balanced scorecard as a strategic management system. Harvard Business Review, Jan - Feb, 27-37.
- Kaplan, R.S., & Norton, D.P. (2000). Having trouble with your strategy? Then map it. Harvard Business Review, Sept - Oct, 45-53.
- Kiely, T.J. (1995). Managing change: why reengineering projects fail. Harvard Business Review, 73(2), 8-9.

- McConnell, S. (1998). Software project survival guide: how to be sure your first important project isn't your last. Redmond, WA: Microsoft Press.
- Miranda, D., Fields, W., Lund, K. (2001). Lessons learned during 15 years of clinical information system experience. Computers in Nursing, 19(4), 147-151.
- Overton, K., Frolick, M.N. (1996). Politics of implementing EISS. Information Systems Management, 13(3), 50-58.
- Page, C.K. (2000). Critical success factors for implementing a clinical information system. Nursing Economics, 18(5), 255-257.
- Rusin, R.S., Williams, A. (2001). Challenges in incorporating a quality strategy into information systems development efforts. Topics in Health Information Management, 21(4), 21-29.
- Souther, E. (2001). Implementation of the electronic medical record: the team approach. Computers in Nursing, 19(2), 47-55.
- Tayntor, C.B. (1993). Customer-driven long-range planning. Information Systems Management, 10(4), 13-20.
- Thompson, C.B. (1999). Analysis, process, and techniques: case study. Computers in Nursing, 17(5), 203-206.
- Treister, N.W. (1998). Physician acceptance of new medical information systems: field of dreams. Physician Executive,

24(3), 20-24.

U.S. Army Medical Command. (2002). Army medical department information management (MEDCOM regulation 25-1). Fort Sam Houston, TX: U.S. Army Medical Command.

Whitten, J.L., Bentley, L.D. (1998). Systems analysis and design methods. 4th Ed. Boston: McGraw-Hill.