CHAPTER 4. MANAGING TECHNOLOGY IN THE MILITARY LABORATORY

4-1. INTRODUCTION

a. Healthcare initiatives have mandated that military laboratories begin to look at the way they do business to ensure the highest quality healthcare be provided in a timely manner. The USAMMA has been tasked to look at their business operations in comparison to the commercial counterparts and provide improvements. In some aspects this method has been effective, but in others there are military issues that cannot be addressed by comparing operations with the commercial sector.

b. Contracting methods have been developed in the commercial sector that can be taken advantage of by military laboratories. These new ways available for equipment and supply contracts allow the laboratories to keep up with the latest developments in technology, which was difficult to accomplish previously when facilities were purchasing equipment.

c. Issues that are not addressed include military readiness and training and the high turnover of military personnel that affects the efficiency of the laboratory. These issues have an impact on staffing and equipment configuration as they relate to workload. It is necessary to develop benchmark indicators other than the commercial benchmarks to properly look at the operations of military laboratories.

d. The TARA team determined that this process could most effectively be applied and the greatest cost avoidance realized at Army medical centers. To maximize effective use of high-volume analyzers at medical centers, the TARA team suggests that laboratory testing be consolidated in each RMC to the extent practical. This consolidation will ensure that high-volume analyzers at the medical centers operate as cost-efficiently as possible and allowing in some cases removal of underused equipment at medical activities.

4-2. EQUIPMENT CONTRACTING FOR THE LABORATORY

a. The TARA team suggests when replacing the major analyzers, all methods of contracting for analyzers should be considered. The technology for the major analyzers is continuously improving and a capital investment in these types of analyzers is not always prudent. These analyzers can become obsolete within a couple of years or test menus can change and the return on investment would be low. The high supply costs for these analyzers should also be considered. Once the instrument is purchased, the facility needs to continue expenditures on supplies. Some contracting methods incorporate expenditures and supplies in the rental costs.

b. There are three different methods of acquiring laboratory equipment.

(1) <u>The traditional contracting method</u> is purchasing equipment. This method is valid when acquiring equipment that is low in cost or has a long life expectancy, both in terms of useful life and technology obsolescence. Examples of this type of equipment in the laboratory would be microscopes and centrifuges. A number of government contracting agencies keep central contracts for this type of equipment to achieve volume discounts. The General Services Administration (GSA),

Department of Veterans Affairs National Acquisition Center, or the DSCP has contracts available. In other cases, the facility can contract on their own to purchase equipment. In the case of purchasing equipment, local procurement dollars will be used for CEEP (less than $100,000) and centrally managed procurement dollars (through the USAMEDCOM) for SuperCEEP ($100,000 to $250,000) or MEDCASE (more than $250,000) equipment.

(2) Reagent rental contracting is based on leasing the equipment for a monthly fee that can be very low with the guarantee that the MTF will buy a certain volume of reagents from the company supplying the equipment. Contracting for this method is usually done individually by each facility with the vendors. Although this avoids the high initial expenditure and considers the cost of supplies, in most cases the equipment is owned by the facility at the end of the lease. Again this does not consider new technological developments, changes in mission, obsolescence, or facility needs.

(3) Cost-per-test is similar to reagent rental in that it is based on purchases of reagents or supplies for the analyzers. The difference is that the equipment is owned by the vendor and can be upgraded or turned in at the end of each contract year. Cost-per-test contracting is based on annual workload, and vendors work with the facility to determine what equipment configuration is appropriate for their workload and mission. A number of regional cost-per-test contracts with different vendors exist that offer volume discounts. Prices vary in accordance with the volume, percent utilization of a specific vendor's equipment, type of service contract and equipment and configuration within the facility. Contracts are done either through a central or regional government-contracting agency.

4-3. MILITARY LABORATORY BENCHMARK INDICATORS

a. The laboratory benchmark indicators are collected at each facility. The indicators from the different facilities will be used to establish peer groups based on relative case mix index, average daily patient load and inpatient work units for hospital based laboratories, and ambulatory work units and outpatient visits for clinic based laboratories.

b. The indicators are based on workload, manpower, and expense. Data from an entire calendar year is used for analysis. The indicators are derived from CHCS workload, Expense Assignment System–IV (EAS-IV), and MEPRS. The TARA team members do not validate the data but accept it as reflected in the reports. Attention to detail by the laboratory manager and staff inputting the data is vitally important if accuracy of data is to be assured. Laboratory management personnel should validate Uniform Chart of Accounts Personnel System (UCAPERS) and CHCS workload input on a monthly basis.

c. The following data is collected and tabulated during a requested or medical center site visit:

(1) Workload

(a) D codes: ancillary current procedural terminology (CPT) weighted procedures for 12 months and ancillary CPT reportable tests for 12 months.

(b) F codes: CPT weighted special programs procedures for 12 months and CPT reportable special programs tests for 12 months.

(c) Total workload: total CPT weighted procedures for 6 months and total CPT reportable tests for 12 months.

(2) Personnel

Full-time equivalents (FTEs) assigned
FTEs available
FTEs percentage available
Percentage of direct expenses (personnel)
CPT weighted/FTE (assigned)
CPT weighted/FTE (available)
CPT reportable tests/FTE (assigned)
CPT reportable tests/FTE (available)

(3) Expenses

D codes for ancillary cost/weighted test and ancillary cost/reportable test
F codes for cost/weighted test and cost/reportable test
Total workload for total cost/weighted test and total cost/reportable test

4-4. LABORATORY AUTOMATION

a. Single instrument automation is applicable to almost any facility that is performing testing in house. Automated analyzers are known for their “walk away” operations. The technician can load the analyzer with bar-coded samples, and the analyzer will automatically perform the tests while the technician leaves to perform other duties. Most Army MTFs that perform laboratory testing, with the exception of some of the smaller outlying clinics, will have some type of automated analyzer.

b. Total laboratory automation is the automation of all aspects of clinical pathology from specimen receipt to result reporting. In most cases, all automated analyzers are arranged in a track system that routes the bar-coded specimen tubes to the designated analyzers for tests to be performed. This process can eliminate a significant percentage of the staffing requirements of a laboratory. At the initial stages in the development of total laboratory automation, there was great market interest in adopting this process. As more facilities have investigated this process, it has been found that the greatest benefit can be achieved at large facilities performing high volumes of testing, up to 10 million aliquots per year. This high volume can be found at an 800- to 1,000-bed facility that is also receiving specimens from other facilities or at a commercial reference laboratory that supports nationwide operations. No Army facilities currently have a volume high enough to justify incorporating total laboratory automation. In the future, a DOD reference laboratory may be the place to consider total laboratory automation. However, as the majority of testing stays within the different medical centers and medical activities, testing volumes do not warrant total laboratory automation and currently is not a recommendation for any military facility.

c. Although total laboratory automation is not right for all facilities, many facilities are finding that there is potential in automation beyond that of the single automated analyzer. As a modification to total laboratory automation, work area automation has evolved. Work area automation takes a section of the laboratory and automates the processes within that section. The greatest benefit for work area automation has been achieved in the chemistry and hematology areas of the laboratory. A section can be arranged in a track mode similar to that of total laboratory automation where the laboratory worker takes the bar-coded specimens and places them on sample holders to be delivered to the various workstations. The workstations can then be set up to perform all designated tests, reflex any samples that do not meet a determined algorithm, and flag any specimens that may need manual testing. This takes the concept of total laboratory automation and uses it on a smaller scale. There are potential reductions in FTE requirements as well as increases in efficiency and reductions in manual handling.

d. In addition to automating test-work areas, pre-analytical stages also can be automated as part of this work area automation concept. In many facilities, specimen delivery and processing has been automated, benefiting the pathology department. Specimen delivery can be automated either through a pneumatic tube system, through a robotic delivery system programmed to perform any ward pickups as well as making programmed stops at all the different testing areas in the laboratory, or both. Automation of specimen processing can increase efficiency and decrease errors as a result of manual handling as well. Specimens that have been bar coded can be loaded into a modular system that reads the bar codes and sorts the specimens by the work area that will perform the tests. For specimens that need to be spun down, the modular system can be sent through a track system to a large centrifuge and spun before delivery to the work area.

e. Work area automation seems to be the best fit for Army facilities with high workload volumes. Costs will be much lower than that of total laboratory automation. The work cells can be designed around the current footprint of most facilities as opposed to reconstructing departments for total laboratory automation. FTE requirements can still be decreased within each work area.

f. Other issues exist that need to be addressed in considering robotics and automation. The first is determining what the workflow philosophy will be, depending on the needs of the laboratory. The second issue is looking at the pre-analytical stage. Should that stage be automated, and if not, what needs to be done in this stage to accommodate the automation of other sections of the laboratory? A third issue is determining which areas can benefit the most from automation. The laboratory manager should consider areas where there is a high volume of repetitive functions that require little thinking. If the facility is performing a high volume of routine chemistry but a low volume of special chemistry, it makes more sense to automate only the routine chemistry area. If there is a high volume of testing in an area but there is a lot of technologist interpretation involved, perhaps it would not be effective to automate this area. It is important to automate the work that requires little user interface. The tedious tasks that are being done by technologists should be automated so that these employees can be used more efficiently and appropriately.