

ACKNOWLEDGMENTS

There were many individuals who assisted me during the research and writing of A STUDY TO DETERMINE THE EFFECT OF CONTINUING MEDICAL READINESS TRAINING ON HEALTH CARE PRODUCTIVITY AND RESOURCE UTILIZATION AT WILFORD HALL USAF MEDICAL CENTER. I would like to thank the staff of the Center for Graduate Management Project and the Biostatistics Section of the Directorate of Resource Management, Baylor University for their office and patiently trained. In Partial Fulfillment of the Requirement for the Degree was Dr. Cliff Butzin. His encouragement and assistance with the statistical analysis Master of Health Administration appreciated. Lastly, the person who deserves by most recognition for her tireless support and Captain Brian J. Acker by wife Gail. She has been a wonderful mother to me since July 1989 and my most supportive friend.

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CHAPTER I

INTRODUCTION

Conditions Which Prompted the Study

Readiness for war is recognized as the primary mission of the medical departments of the Military Services.¹ The principal mission of the Air Force Medical Service is "to provide the medical support needed to maintain the highest possible degree of combat readiness and effectiveness of the Air Force".² Not surprisingly, past and present Air Force Surgeon Generals have declared medical readiness their number one priority.³ However, Yarrington explains that the emphasis on medical readiness has not always been as strong as it is today. It was not recognized until the immediate post-Vietnam era that a significant number of medical personnel were either unable, unwilling, or poorly trained in the care of acutely injured patients.⁴ Moreover, in the past two decades, the Soviet Bloc has had a tremendous buildup in military power. They have attained the capability to effectively attack our air bases deep in the rear area of the theater in Europe.⁵ Consequently, in future wars, air bases will no longer provide a "safe haven" from which to launch and retrieve air missions and in which to care for casualties in a stable environment -- modern technology has brought the air base into the range of initial conflict.⁶

As a result of past lessons learned and predictions for the future, the present emphasis on medical readiness has a significant accent on training. In September 1984, Headquarters, United States Air Force (HQ USAF) issued a directive requiring all Air Force

Medical Treatment facilities (MTFs) to provide wartime training to all of their military medical personnel on an annual basis.⁷ The foundation of this training is provided in a program the Air Force has entitled Continuing Medical Readiness Training (CMRT).

Concurrent with the emphasis on medical readiness training, the Air Force Surgeon General's office and the Major Commands are "encouraging" an increase in health care productivity. For example, there is an effort in the Department of Defense to decrease the costs associated with the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). They suggest that this can be accomplished by increasing accessibility and primary productivity in the direct care system. These two conflicting objectives, increasing hours spent in readiness training and increasing productivity, have long been an issue with Air Force physicians and MTF commanders. The general belief is that medical readiness requirements significantly impact health care productivity. Additionally, the cost of this training, at least at Wilford Hall USAF Medical Center (WHMC), has been ill-defined.

The Administrator of WHMC made the comment "Unfortunately, CMRT runs Wilford Hall, Wilford Hall doesn't run CMRT!" That comment encompasses the feelings of WHMC's executive management. No one has ever systematically examined the impact CMRT has had on health care productivity and resource utilization at WHMC. It is the intent that the results from this study will be used by executive management to assess the impact of CMRT and to assist in managing WHMC's resources.

Training to all of its military medical personnel on an annual basis. Air Force Regulation 160-25.

Research Question

To determine the effect of Continuing Medical Readiness Training (CMRT) on health care productivity and resource utilization at Wilford Hall USAF Medical Center (WHMC).

Background Data On WHMC and the CMRT Program

Wilford Hall USAF Medical Center is the largest medical treatment facility in the Air Force Medical Service. It is designed as a 1009 bed medical center, but presently has a current operating bed capacity of 818. This tertiary care medical center, with its 4,100 civilian and military personnel, support primary missions of medical treatment, readiness for peacetime disasters and wartime contingencies, graduate medical and dental education, and clinical investigations. It provides its beneficiaries more than 135 clinical specialties and subspecialties.

The Operations and Maintenance (O & M) budget for FY 87 and FY 88 was \$79,480,000 and \$77,256,000 respectively. The current FY 89 budget was set at \$81,132,000.

Each month, there are approximately 2,000 patients admitted, 75,000 outpatients seen, 600,000 lab tests performed, 170,000 prescriptions filled, 43,000 X-ray films made, and 1,100 surgeries conducted. These workload statistics are staggering, however, they reflect the productivity one might expect from a MTF of this size and magnitude.

As previously mentioned, WHMC has a requirement to provide Continuing Medical Readiness Training to all of its military medical personnel on an annual basis. Air Force Regulation 160-25,

Medical Readiness Planning and Training, defines CMRT as "training in core and elective individual and field medical skills, which are vital to each member of the Air Force medical service". This training must be conducted in a field environment and include sleeping at least one night in the field.¹¹ The components of CMRT are generally the same for each MTF, however, the methods in which this training is presented may differ.

Continuing Medical Readiness Training, as it currently exists at WHMC, is conducted at a wooded twelve-acre permanent site adjacent to the Medical Center known as "Camp Rissington". The training is held Thursday and Friday of each week during the months of September through June. It is curtailed during July and August because of the extreme hot weather normally experienced during these months.

There are 26 Readiness Training Schedule Points (RTSPs) representing the major sections of the Medical Center. Individuals assigned as RTSPs receive a monthly personnel listing of individuals due for CMRT. Each RTSP has a monthly quota of personnel they must schedule. It is the responsibility of the RTSP to schedule personnel so as to minimally impact productivity of their sections.

There are seven full time instructors who conduct CMRT. They train not only WHMC personnel, but medical personnel from Kelly AFB, Randolph AFB, Brooks AFB, and units of the Air Reserve Forces (ARF). Additionally, in 1988, WHMC CMRT instructors provided approximately 1,000 Army personnel from Fort Sam Houston common task training. Annually, an average of 4,500 personnel are trained

at Camp Rissington. Approximately 2,500 (55%) are WHMC personnel.

1. Data will be accepted for the personnel and non personnel cost

Objectives associated with CMRT is:

1. Review the available literature and other sources of costs information pertinent to health care productivity and military medical readiness.
2. Define the components of CMRT as they apply to WHMC.
3. Determine if CMRT has a significant effect on the productivity of selective clinical areas and ancillary departments.
4. Determine if there is a significant difference between the number of Non Available Full-time Equivalent (NAFTEs) during the 4th quarter of FY87 and FY88 and the 1st, 2nd and 3rd quarters of FY87 and FY88.
5. Determine the opportunity cost, resulting from CMRT, in lost outpatient visits (OPVs) and Health Care Units (HCUs).
6. Identify the total non-personnel and personnel costs associated with CMRT at WHMC.
7. Determine the cost per student trained
8. Determine the opportunity cost, resulting from CMRT, in potential reimbursements.
9. Determine the total cost savings for CMRT benefited by WHMC due to alternative procurement methods for supplies, equipment and labor.

3. Data obtained from MEPS is considered to be a reliable source of information.

Criteria

1. Data will be accepted for the personnel and non personnel cost estimate associated with CMRT if:
 - (a). Consideration has been given to only the pure costs associated with the activity (Pure Costs are those costs eliminated if the program is cancelled).¹²
 - (b). It can be substantiated by the reports generated by the Medical Expense and Reporting System (MEPRS) and other pertinent historical records and if it can be accepted as valid by CMRT personnel.
2. Statistical tests will be considered significant at the .05 alpha level.
3. The results of this study must be accepted as valid by the hospital administrator.

Assumptions

1. Additional manpower will not be added to a clinic or ancillary service during CMRT training days.
2. Outpatient Visits (OPVs), and the Health Care Unit (HCU) are considered appropriate measures of health care productivity for the clinical areas. Weighted Procedure Values (WPVs) and the College of American Pathology (CAP) values are considered appropriate measures of productivity for clinical pathology.
3. Data obtained from MEPRS is considered to be a reliable source of information.

Limitations

1. The large magnitude of WHMC and its services prohibits analysis of all the sections within the facility. Therefore, the sections selected for analysis represent the major areas of interest to executive management.
2. MEPRS data is available for only two fiscal years -- FY 87 and FY 88.
3. Costs that do not have an audit chain could be overlooked in the personnel and non-personnel cost estimates.

Review of the Literature

Several reports and documents were found within the Air Force and at WHMC addressing readiness and its impact on productivity and resource utilization.

Major Edward Poetschke, of the Air Force Office of Medical Support, Brooks AFB, Texas, calculated the costs of medical readiness training in terms of lost OPVs. By using simple ratio analysis, he estimated that Air Force wide, there would have been an additional 310,171 additional patients (2.4%) seen by providers in fiscal year (FY) 1987. The per provider daily visits would have increased from 17.9 to 18.2 visits per day. He concluded that readiness requirements have a minimal effect on productivity. However, this study admittedly did not address all costs of time for readiness such as unit level medical readiness training. Further, Poetschke's approach does not account for the variables of inpatient care and direct medical readiness expenses, nor does it report its results by individual MTF.

In April of 1987, Capt Robert Mason, then the Assistant Administrator for Medical Resource Management at WHMC, submitted a suggestion, through the Air Force Suggestion program, to move CMRT training to the weekend. Using the available number of physicians, hours spent in CMRT, and cost per provider manhour, he estimated WHMC loses \$100,521.60 in provider time each year. Additionally, using the heuristic that a provider visit averages 20 minutes, he concluded a provider could average 24 appointments per day. Therefore, he suggested WHMC could increase patient visits by 8,880 per year if CMRT were moved to the weekend.¹⁴

A special WHMC Productivity and Accessibility study, directed by the Vice Commander and conducted by the Assistant Administrator of Financial Programs, was conducted in October 1988. Applying computer assisted statistical analysis to hospital workload data, it was reported that between 1986 and 1988 there was a 22.4% decrease in the number of clinician visits per clinician FTE. By isolating individual causal factors it was determined that 13% of the decrease could be explained by "other clinician duties"; e.g. research, education, Commander's Call and CMRT. Unfortunately, CMRT was not solely separately.¹⁵

Interestingly, WHMC is not the only military medical center concerned about the impact of readiness requirements on its facility. Major Richard McAdam, a student with the U.S. Army-Baylor University Graduate Program in Health Care Administration, conducted a study to determine the impact of medical readiness programs on the FY 87 resource utilization at Tripler Army Medical Center (TAMC), Hawaii. He reported that

readiness programs at TAMC consumed a total of 58,444 man-hours or 29 man-years during FY 87. A significant 41.5% of those man-hours were consumed in readiness training. The total cost for all readiness programs, including training, was \$15,638. This results figure did not include student or instructor salaries. He noted this amount was only a small percentage of the total TAMC operating budget. Additionally, McAdam calculated an opportunity cost of 130 MCCUs (this is the Army's workload measurement unit similar to the HCU) or the equivalent of a forfeiture of \$20,408 in supply and money.¹⁶

It is very unlikely the medical readiness training requirements will disappear and it is common knowledge among those of us who have worked in USAF MTFs that the demand for peacetime medical care for Air Force beneficiaries is increasing. It is also unlikely that funding for readiness training will increase. In a plan, prepared by the Office of the Assistant Secretary for Defense for Health Affairs, outlining how the military will be ready for war by 1992, the following statement was made: (Restraining Forces include:) "...finite fiscal resources; and a steadily growing demand by military retirees, highly politicized, for expanded CONUS health services even at the expense of medical readiness efforts."¹⁷

Further accentuating the dilemma hospital commanders face, is the advent of DRGs in the Military Medical Healthcare System. Kelliher states that DRGs will require proactive management in the form of well-defined performance expectations. He suggests this will be

require a radical shift in the concept of managing productivity, the performance, and cost at most health care institutions.¹⁸

Unfortunately, it is difficult to quantify the benefit received from CMRT. According to Anderson and Newell, the results of a cost-benefit ratio, applied to readiness training, would not allow us to sacrifice health care productivity for a contingency that may never occur. However, they contend readiness training produces nonmonetary results. These include "sharpened life support skills; enhanced sense of mission; positive unit morale and esprit de corps; increased self-confidence and self-image; and improved personal adaptability and versatility regarding environment, use of equipment, and working conditions." It is in this regard, medical readiness initiatives and concepts should be analyzed with cost-effectiveness at the forefront, not program cost-benefit.¹⁹

It should be made clear that executive management at WHMC believes that readiness training is necessary. The fact that there is a concern about the impact of CMRT on the organization does not indicate an effort to rid WHMC of this training. On the contrary, it reflects the spirit of proactive management as stated by Kelliher. Indeed, the need for executive management at WHMC to determine the impact CMRT has on its facility is evident.

Research Methodology

The first step in the analysis of the stated problem was to review the available literature and identify all the sources of information that will be used in this study. Literature in the

professional and scientific journals specifically pertaining to the Air Force CMRT program and its impact on productivity and/or resource utilization simply does not exist. However, several references have been made in the literature review to articles that have a collateral or ancillary relationship to the problem analysis. Additionally, there have been articles written in military journals addressing the general topic of medical readiness. Specific reference to these articles were Health Care aforementioned in the introduction to give a brief historical perspective to CMRT in the Air Force and to present some of the issues associated with it.

The components of CMRT were identified by reviewing AFR 160-25, Medical Readiness Planning and Training; the local lesson plan for CMRT; and by personally attending the two day program.

The Medical Expense and Performance Reporting System (MEPRS) provided the majority of the productivity and expense data. This data was reported under the Uniform Chart of Accounts (UCA) code "FIA". This code is used to track expenses for "Readiness training conducted locally."²⁰ Personal interviews and historical records were used extensively to validate and supplement the MEPRS data. The following clinics and ancillary departments were chosen for the productivity analysis:

- * Internal Medicine
- * Pediatrics
- * General Surgery
- * Obstetrics & Gynecology (OB/GYN)
- * Primary Care

Griff * Pharmacy an opportunity cost as the cost of committing
 a res * Clinical Pathology (Laboratory) from other potential uses
 or op * Diagnostic Radiology (X-Ray) tribute any opportunity cost to

They were chosen because executive management is specifically interested in accessibility of these areas. the two days he or she

would In the Military Medical Healthcare System (MMHS) productivity is simply measured by a particular output produced. For the purposes of this study, outpatient visits (OPVs) and Health Care Units (HCUs) were used as the output or productivity measures for Internal Medicine, Pediatrics, General Surgery, OB/GYN and Primary Care. Weighted Procedure Values (WPVs) were used as productivity measures for the Pharmacy and X-ray. Lastly, College of American Pathology (CAP) values were used as the productivity measure for the Laboratory. the report also provides it on a year-to-date

base. The productivity data collected from MEPRS was only available for FY 87 and FY 88. It was broken down by quarter, therefore, eight quarters of data were used in the analysis. As mentioned previously, CMRT is curtailed during the months of July and August every year. Fortunately, these two months fall within the fourth quarter of the fiscal year. This fostered a convenient design for statistical applications.

* of Providers Avg Total Opt
 As It is assumed that since CMRT is curtailed during the same (by type) quarter each year, the provider and support staff that would otherwise be out in the field training, would instead be in the Medical Center providing for health care. It is also assumed that all personnel receive CMRT training annually. Therefore, it is intuitive that there is an opportunity cost of lost productivity.

Griffith defines an opportunity cost as "the cost of committing a resource and thereby eliminating it from other potential uses or opportunities."²¹ However, to attribute any opportunity cost to CMRT, a final assumption must be made; the provider would be scheduled for patients and generating HCUs the two days he or she would otherwise be in the field training. Given the above terms of assumptions, an opportunity cost in OPVs and HCUs could be calculated.

The Directorate of Resource Management prepares a monthly report called the Outpatient Productivity Summary. This report provides information by clinic, type of provider, and individual provider on total number of visits, average daily visits, and provider mandays. In addition to providing this information for a specific month, the report also provides it on a year-to-date basis. Using the September FY 87 and FY 88 reports, the specific clinic information on provider type and number assigned and average visits per day by provider type was collected. The September reports were chosen because they provide cumulative averages for the entire fiscal year. Opportunity costs were calculated by using the following formula:

$$\begin{matrix} \# \text{ of Providers} & & \text{Avg} & & \text{Total} & & \text{Oppt} \\ \text{Assigned} & \times & \text{Visits/Day} & = & \text{Visits/day} & \times & \text{2 days} & = & \text{Cost} \\ \text{(by type)} & & & & & & & & \end{matrix}$$

Total visits per day were multiplied by two, which represents the two days the provider spends in CMRT. The sum of the opportunity cost by provider type was then calculated for each clinic to provide total opportunity cost in OPVs for FY 87 and FY 88. The

researcher felt this method of calculating opportunity costs for OPVs was superior over using total WHMC clinic averages or the Provider Requirements Integrated Specialty Model (PRISM) standard; a generic standard used by DOD against which a provider's productivity is measured. The Outpatient Productivity Summary gives a more accurate reflection of actual productivity in terms of OPVs at WHMC.

A Health Care Unit is calculated by multiplying OPVs by a predetermined HCU weighted factor.²² To determine the opportunity cost in HCUs, the following formula was used:

$$\text{Social Sci. Oppt Cost} \times \frac{\text{OPV}}{\text{HCU WGT}} = \frac{\text{HCU}}{\text{Oppt Cost}}$$

As alluded to previously, one may or may not be able to attribute an opportunity cost to CMRT. What if the provider, given the choice of attending CMRT, decides to use the two days, normally used for this activity, for administrative time, leave or TDY? In other words, does CMRT really affect productivity or does the same level of productivity continue at WHMC regardless of CMRT?

If CMRT had an effect on health care productivity, it might be reflected in the difference in the various productivity measures in the fourth quarter of every fiscal year, since it is in this quarter that CMRT is curtailed. Based on this assumption, the following hypotheses were tested:

...into consideration any interaction between two independent variables.²⁴ For this analysis, to isolate the main effect of CMRT, a Two-Factor Repeated Measures ANOVA was conducted to

1. "There is a significant difference in the number of OPVs during the quarters of the fiscal year in which CMRT is held and the quarters in which CMRT is curtailed."

2. "There is a significant difference in the number of WPVs during the quarters of the fiscal year in which CMRT is held and the quarters in which CMRT is curtailed."

3. "There is a significant difference in the number of HCUs during the quarters of the fiscal year in which CMRT is held and the quarters in which CMRT is curtailed."

Statistical calculations were performed using a computer program available at WHMC called the Statistical Package for the Social Sciences (SPSS). Quarters 1 - 3 and quarters 5 - 7 were coded as "CMRT". These quarters represent those in which CMRT were held. Quarters 4 and 8 were coded as "NCMRT"; the quarters in which there was a curtailment of CMRT.

The goal in the statistical analysis was to compare productivity measures between CMRT and NCMRT quarters. Keppel and Saufley state that when one determines any given main effect, which represents the effects of one independent variable averaged over the levels of the other, one may overlook the effects of a second independent variable, in this case, differences that may be due to the different fiscal years.²³ Therefore, according to Keppel and Saufley, a two-factor design would be appropriate in order to take into consideration any interaction between two independent variables.²⁴ For this analysis, to isolate the main effect of CMRT, a Two-Factor Repeated Measures ANOVA was conducted to

determine if there is an interaction between the independent variables of the CMRT program and time. In the words of Keppel and Saufley "[it will] determine whether the average effect of either independent variable - the main effects - are representative or descriptive of the simple main effects of that variable." If the average effects are not representative, one must concentrate on the interpretation of the significant interaction. If they are representative, the analysis will be on the average effects of the two independent variables in terms of the main effect.²⁵

One cannot ignore the fact that there may be confounding factors such as leave and TDY that could contribute to any differences realized in productivity. The MEPRS system also collects data on Non-Available Full Time Equivalent (NAFTES). Non-Available FTEs reflect time spent away from primary duties for things such as leave, TDY and even PCS processing. Time spent in CMRT is not counted as NAFTE in the MEPRS system. It is counted as an Available FTE under the "FIA" account, therefore NAFTEs would not be influenced by CMRT. Examining the differences in NAFTEs for CMRT and NCMRT would help determine if effects on productivity were due to the program alone or variances in FTEs due to other factors. The Two-Factor Repeated Measures ANOVA was also applied to this data, once again, to take into consideration yearly fluctuations. All statistical tests will be considered significant if the alpha level is less than .05.

Four objectives were established in order to determine the effect CMRT has on resource utilization:

known as a PRIME BSEF team) from Reese AFB, Texas was deployed to Camp Rixington to

1. Identify the total non-personnel and personnel costs associated with CMRT at WHMC.
2. Determine the cost per student trained.
3. Determine the opportunity cost, resulting from CMRT, in potential reimbursements.
4. Determine the total cost savings for CMRT realized by WHMC due to alternative procurement methods for supplies, equipment and labor.

The following elements of expense were identified for the personnel and non-personnel costs associated with CMRT:

1. Medical Supplies
2. Medical Equipment
3. Non-medical Supplies
4. Salaries

Medical supply, medical equipment, and non-medical supply data was extracted from MEPRS and the "Activity Issue/Turn-in Summary Report for FIA". The later report is prepared by the Logistics Directorate. Salary expense data was obtained from Medical Expense and Performance Module (MEPM) audit trail documents. An expense that was incurred during the fourth quarter of FY 88 but was not yet in effect. Given this fact, an opportunity cost in potential reimbursements was determined to further put into perspective the renovation of Camp Rissington. These costs were assigned to the Department of Facilities Management and were obtained through the MEPRS data provides information on cost per HCU for each clinic by Camp Rissington PRIME BEEF Deployment Plan.²⁶ The Medical Center did not incur a major salary expense for this renovation due to the fact that a Civil Engineering team (also known as a PRIME BEEF team) from Reese AFB, Texas was deployed to Camp Rissington to

perform the renovations as part of a training exercise. However, the PRIME BEEF team was augmented by eight military personnel from the San Antonio Real Property Maintenance Agency (SARPMA). Their salaries were calculated by using a military "shop rate" of \$7.50 per hour and are included in the salary expense for CMRT for the fourth quarter FY 88. Hours of work were calculated based on eight hours of "production time" per day for 11 days.²⁷ The PRIME BEEF team was also augmented by CMRT staff. Their salaries are accounted for under the "FIA" account in the MEPM data.

Once the expenses attributed to CMRT were totaled, the cost per student trained by fiscal year was calculated by using the following simple formula:

$$\frac{\text{Total Expense}}{\text{\# Students Trained}} = \text{Cost/Student}$$

Lastly, the expense data was given to CMRT staff for review and validation.

During FY 87 and 88, the budgets for Air Force MTFs were based on the number of HCUs the facility generated and the previous years' expenses plus a percentage for inflation --- DRGs were not yet in effect. Given this fact, an opportunity cost in potential reimbursements was determined to further put into perspective the impact CMRT has or could have had on resource utilization. The

MEPRS data provides information on cost per HCU for each clinic by fiscal year quarter. Using this data, and earlier calculations for the opportunity costs of HCUs, the opportunity costs for potential reimbursements was determined. The following formula was applied:

was contacted by HCU they provided Cost/ Potential
 Oppt Cost x HCU = Reimb. The San
 Antonio Real Property Agency (SARMA) would have performed the work

One of the most impressive discoveries of this research is the fact that the Directorate of Medical Readiness has saved thousands of dollars through innovative thinking and alternative methods of procurement for supplies, material and labor. For this reason, the researcher felt that determining the approximate cost savings would be a significant aspect of resource utilization PRIME worthy of reporting.

The CMRT staff has procured hundreds of items through the local Defense Reutilization and Marketing Office (DRMO). These items were identified through documentation kept on file at the training site. The specific documents included the DD Form 1348-1, "DOD Single-line Release/Receipt Document" and the DRMO Form 103, "Screeners Tally Request to Freeze Excess/Surplus Property". These forms provided the date, the number, and the value of the items procured. They were available for FY 88 and FY 89 only. Items procured from DRMO before FY 88 were identified by a report prepared by the CMRT staff entitled "Defense Reutilization and Marketing Office Items."²⁸ This report provided the number and value of the items. The date the item was procured was not provided, therefore the CMRT staff was asked to estimate the year the item was procured.

A major renovation project was conducted at Camp Rissington from 12-23 September 1988. Wooden frames and tents were replaced by permanent pavilions and hutments. This project would have been cost prohibitive, however, a PRIME BEEF team from Reese AFB, Texas

was contacted and they provided "free labor" for WHMC. The San Antonio Real Property Agency (SARPMA) would have performed the work otherwise. This would have resulted in a labor cost charged to the Medical Center based on "shop rates" determined by SARPMA and assigned to work performed at WHMC. There are specific shop rates for electrical and structural work performed, equipment operations, and supervisory personnel. These shop rates are used when civilian personnel from SARPMA perform the work. The Camp Rissington PRIME BEEF Deployment Plan designated the number of electricians, carpenters, equipment operators, and supervisory personnel that were on the PRIME BEEF team. Given eight hours of production time per day for ten days and the SARPMA shop rates, the savings in labor cost was calculated. An assumption is made that if SARPMA did perform the work, they would have used all civilians.

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³ Murphy A. Chesney, "Air Force Initiatives Stretch Resources," U.S. Medicine 23.1-2 (1987): 33.

⁴ C.T. Yarrington, "Medical Readiness," Military Medicine 3.150 (1985): 119.

⁵ John J. Cleary, "Organizing Medical Manpower to Staff Deployable Medical Systems in Wartime," Fellowship Paper, American College of Hospital Administrators, Chicago, 1983, 4.

⁶ Yarrington 119.

⁷ United States, Wilford Hall USAF Medical Center/SGX, Information Sheet, Camp Rissington, November 26, 1985.

⁸ United States, Wilford Hall USAF Medical Center/SGPA, Fact Sheet, Wilford Hall USAF Medical Center, 1988.

⁹ United States, Wilford Hall USAF Medical Center/SGM, Commander's Quarterly Statistical Summary, 1st Quarter FY 87, 88, 89.

¹⁰ United States, WHMC/SGPA.

¹¹ United States, AFR 160-25, 32.

¹² William J. Gavett and Alvin I. Mushlin, "Calculating the Costs of Training in Primary Care," Medical Care 24.4 (1986): 306.

¹³ United States, Headquarters Air Force Office of Management Support/SGSB, Memorandum to HQ USAF/SG, "Readiness and Its Impact on Medical Productivity," February 2, 1988.

¹⁴ Robert J. Mason, AF Form 1000, Suggestion No. LAC 870406, "Provider Productivity Time Versus CMRT," April 28, 1987.

¹⁵ United States, Wilford Hall USAF Medical Center/SGMB, Camp Report to the Vice Commander, "Special Study WHMC Productivity and Accessibility 1986-1988," October 5, 1988. Medical Management WHMC,

Personnel ¹⁶ Richard G. McAdam, "A Study to Determine the Impact of Medical Readiness Programs on FY 1987 Resource Utilization at Tripler Army Medical Center," GRP, Baylor University, 1988, 56-61.

¹⁷ "Readiness Plan Contingent on Adequate Funds," U.S. Medicine 24.7-8 (1988): 17.

¹⁸ Matthew E. Kelliher, "Managing Productivity, Performance, and the Cost of Services," Healthcare Financial Management (Sept. 1985): 23.

¹⁹ Carl L. Newell and George K. Anderson, "Medical Readiness Beyond Cost-Benefit Ratios," USAF Medical Service Digest, (Fall/Winter 1986): 15.

²⁰ United States, Headquarters United States Air Force/SGHC, Manager's Guide to the Medical Expense and Performance System and the Health Care Unit, n.d., n.p..

²¹ John R. Griffith, The Well-Managed Community Hospital (Michigan: Health Administration Press, 1987) 272.

²² United States, Headquarters United States Air Force/SGHC, Manager's atch 3.

²³ Geoffrey Keppel and William H. Saufley, Jr., Introduction to Design and Analysis (San Francisco: W.H. Freeman & Co, 1980)

214.

Components of CMST

²⁴ Keppel 205.

Air Force Regulation (AFR) 160-25, Medical Readiness Planning

²⁵ Keppel 232.

and Training, provides the basic guidance for Air Force MTFs in conducting a CMST program. Interestingly, according to Captain John Wells, Assistant Surgeon General, Readiness Training, the United States, Wilford Hall USAF Medical Center/SGLF, Camp Rissington PRIME BEEF Deployment Plan, n.d., n.p..

²⁷ Capt Stuart E. Smith, Chief, Facilities Management WHMC, program recommended in the latest revision of AFR 160-25 was modeled after the WHMC program. Appendix B describes the Personal Interview, 9 March 1989.

²⁸ Wilford Hall USAF Medical Center/SGX, "Report on Defense Reutilization and Marketing Office Items," n.d. It varied slightly for health care providers. Their schedule included specific lectures on trauma management and various wartime type injuries. It should be noted that on 1 January 1989, the entire program was changed to reflect more hands-on training versus lecture. This was the form of CMST that the researcher participated in as part of this study. Nonetheless, the program as it was structured during the study period and the current program, reflects efficient use of the trainees' time. Both programs' training sessions lasted approximately 14 hours the first day and approximately 12 and one half hours on the second day. In total, each student is accounted for approximately 36 hours in CMST training. This includes the time spent sleeping in the field. The 36 hours is credited in the NEPM reports under the 'FIA' account as a salary expense.

On non-instructional duty days, the CMST staff appear to be more than adequately employed. Much of their time is spent

CHAPTER II

DISCUSSION

Components of CMRT

Air Force Regulation (AFR) 160-25, Medical Readiness Planning and Training, provides the basic guidance for Air Force MTFs in conducting a CMRT program. Interestingly, according to Captain John Wells, Assistant Administrator, Readiness Training, the program recommended in the latest revision of AFR 160-25 was modeled after the WHMC CMRT program.¹ Appendix B describes the basic program that was followed during FY 87 and FY 88. It varied slightly for health care providers. Their schedule included specific lectures on trauma management and various wartime type injuries. It should be noted that on 1 January 1989, the entire program was changed to reflect more hands-on training versus lecture. This was the form of CMRT that the researcher participated in as part of this study. Nonetheless, the program as it was structured during the study period and the current program, reflects efficient use of the trainees' time. Both programs' training sessions lasted approximately 14 hours the first day and approximately 12 and one half hours on the second day. In total, each student is accounted for approximately 36 hours in CMRT training. This includes the time spent sleeping in the field. The 36 hours is credited in the MEPM reports under the "FIA" account as a salary expense.

On non-instructional duty days, the CMRT staff appear to be more than adequately employed. Much of their time is spent

maintaining the field site, preparing for classes, and performing routine administrative functions. Most of the CMRT staff schedule annual leave during the months CMRT is curtailed. Appendix C lists more specifically the duties of the CMRT staff during non-instructional days.

AFR 160-25 does not state which days of the week the training should be conducted. This is left to the discretion of each MTF. Wilford Hall chooses to conduct its training on Thursdays and Fridays. When the original program was developed, it was felt that if it was conducted on a weekend, morale would be adversely affected, thus, degrading the training utility. This was a conscious decision made by executive management knowing that productivity could be affected.²

Effect of CMRT on Health Care Productivity

Logic dictates that if a provider averages X number of OPVs per duty day, but on any given duty day is not scheduled for patients, potentially X number of patient visits are lost. This basically is the concept of the opportunity cost in lost OPVs when applied to those providers attending CMRT for 2 days. Table 1 shows the opportunity cost in lost OPVs for FY 87 and FY 88 for each clinic in the study group. The data reflects that Medical Corps Residents (MCR) average fewer OPVs per day. This is because MCRs are given longer appointment slots. When a MCR is not in the clinic seeing a patient, he or she is on the ward seeing patients.³

Table 1 - continued

Opportunity Cost in OPVs General Surgery

Internal Medicine Clinic						
PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
	MC	8	12.14	194.24	10	8.37
MCR	69	7.03	970.14	69	6.24	861.12
TOT			1164.38			1028.52

Pediatric Clinic						
PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
	MC	6	14.57	174.84	8	19.32
MCR	20	9.12	182.40	23	15.91	731.86
NP	3	12.06	72.36	3	11.22	67.32
TOT			429.60			1108.30

PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
	MC	24	19.20	925.92	17	18.85
PA	17	22.47	707.98	12	23.97	575.28
NP	1	13.31	26.42	1	13.31	26.42
NC	3	8.44	25.34	3	6.37	38.22
TOT			1775.66			1280.82

MC = Medical Corps MCR = Medical Corps Resident
 NP = Nurse Practitioner NC = Nurse Corps

TOTAL FY 87 = 4369.26

TOTAL FY 88 = 4940.20

Table 1 - continued total opportunity cost in OPVs for the five
clinics in the study group General Surgery FY 88 the total

PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
MC	5	7.84	78.40	5	7.81	78.10
MCR	35	5.37	375.90	35	4.48	313.60
TOT			454.30			391.60

HCU's produced. The opportunity cost in lost HCU's for each clinic

PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
MC	9	14.15	254.70	10	13.44	268.80
MCR	20	12.70	508.00	19	11.71	444.98
NP	6	21.36	256.32	6	19.34	232.08
NC	4	14.50	116.00	3	30.85	185.10
TOT			1135.02			1130.96

Primary Care Clinic

PROV	FY 87			FY 88		
	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (x 2day)	# ASSGN	AVG VISITS/DAY	TOTAL VISITS (X 2day)
MC	24	19.29	925.92	17	18.85	640.90
PA	17	23.47	797.98	12	23.97	575.28
NP	1	13.21	26.42	1	13.21	26.42
NC	3	4.44	26.64	3	6.37	38.22
TOT			1776.96			1280.82

TOTAL FY 87 = 4960.26

TOTAL FY 88 = 4940.20

Table For FY 87, the total opportunity cost in OPVs for the five clinics in the study group was 4,960. In FY 88 the total opportunity cost for the same clinics was 4,940. The opportunity cost for each fiscal year represents an average of .543 percent of total OPVs for all clinics reported at WHMC for each respective year (in FY 87 there were 920,191 OPVs and in FY 88 there were 903,867 OPVs).⁴

An MTFs productivity is sometimes quantified in terms of total HCUs produced. The opportunity cost in lost HCUs for each clinic in the study group is presented in table 2. In total, there was an opportunity cost of 106.4 HCUs in FY 87 and 103.1 HCUs in FY 88.

The significance of the HCU in this analysis becomes more apparent later on in this chapter during the discussion of resource utilization.

Clinic	OPVs	%	HCU
Int Med	1099	.032	22.6
Peds	1108	.017	18.8
Gen Surg	392	.038	11.0
OB/GYN	1131	.031	23.8
Prim Care	1261	.021	26.9
Total			103.1

Aside from the obvious opportunity costs described above, the question still remains on whether there is a significant difference in the various productivity measures for CMRT and NCMRT. For this analysis, the five clinics are considered a separate population because they share similar productivity measures; OPVs and HCUs. Pharmacy and X-Ray share WPVs as their productivity measure and are considered a separate population. Unfortunately, the Laboratory is the only department within the study groups that uses CAP values as a measure of productivity, therefore we can only evaluate their

Table 2

Opportunity Cost in HCUs

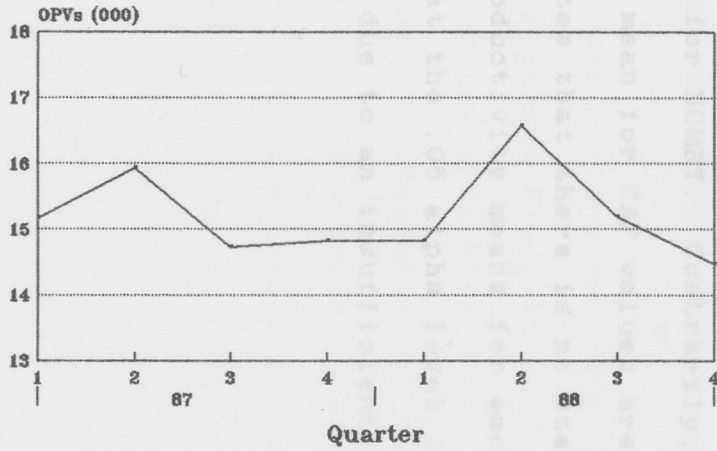
<u>FY 87</u>					
<u>Clinic</u>	<u>Lost</u>		<u>HCU</u>	<u>=</u>	<u>HCUs</u>
	<u>OPVs</u>	<u>x</u>	<u>WGT</u>		
Int Med	1164		.022		25.6
Peds	430		.017		7.3
Gen Surg	454		.028		12.7
OB/GYN	1135		.021		23.8
Prim Care	1777		.021		37.0
Total					106.4

<u>FY 88</u>					
<u>Clinic</u>	<u>Lost</u>		<u>HCU</u>	<u>=</u>	<u>HCUs</u>
	<u>OPVs</u>	<u>x</u>	<u>WGT</u>		
Int Med	1029		.022		22.6
Peds	1108		.017		18.8
Gen Surg	392		.028		11.0
OB/GYN	1131		.021		23.8
Prim Care	1281		.021		26.9
Total					103.1

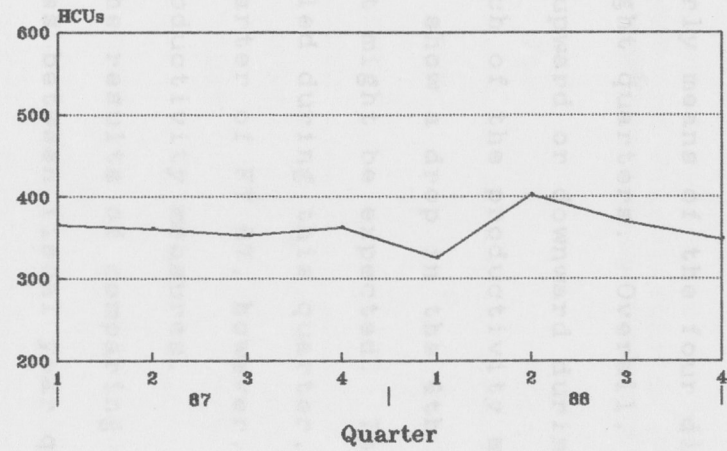
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Fig. 1. Productivity Means by Fiscal Year Quarters

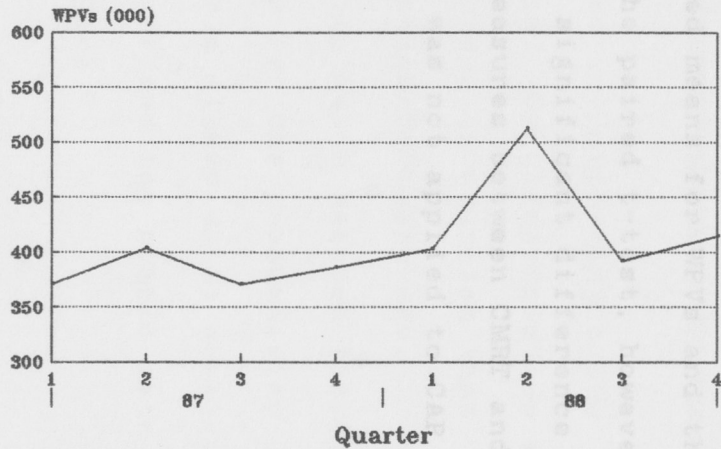
Outpatient Visits (FY 87 & FY 88)



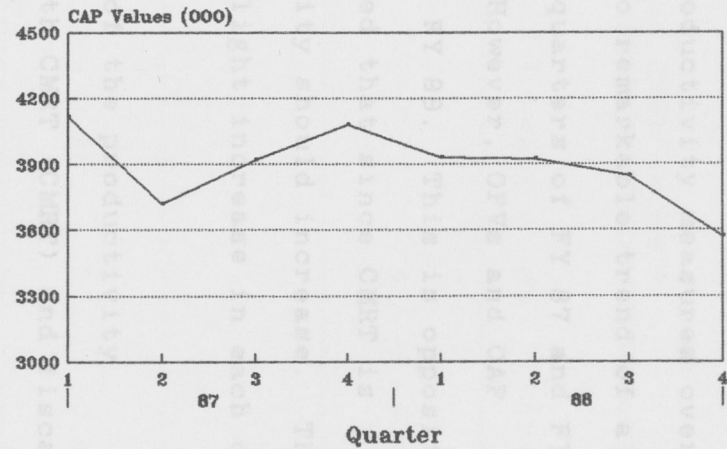
Health Care Units (FY 87 & FY 88)



Weighted Procedure Values (FY 87 & FY 88)



CAP Values (FY 87 & FY 88)



data with descriptive statistics. Figure 1 presents the quarterly means of the four different productivity measures over the eight quarters. Overall, there is no remarkable trend of a spike upward or downward during the 4th quarters of FY 87 and FY 88 for each of the productivity measures. However, OPVs and CAP values show a drop in the 4th quarter of FY 88. This is opposite of what might be expected. It is believed that since CMRT is curtailed during this quarter, productivity should increase. The 4th quarter of FY 87, however, shows a slight increase in each of the productivity measures.

The results of comparing the means of the productivity measures between fiscal year quarters with CMRT (CMRT) and fiscal year quarters without CMRT (NCMRT) are presented in table 3. The grouped means for OPVs and HCU's indicate that productivity is higher for NCMRT. Contrarily, the grouped means for WPVs and the single mean for CAP values are lower. The paired t-test, however, indicates that there is no statistically significant difference in the productivity means for each of the measures between CMRT and NCMRT at the .05 alpha level (the t-test was not applied to CAP values due to an insufficient n size).

Table 4 presents a table of means for the productivity measures except for CAP values. This table allows us to examine the main effects (the column and row means) and the simple main effects (the means in the body of the table).

Table 3

Comparison of Productivity Measures Between Fiscal Year Quarters with CMRT and Fiscal Year Quarters with no CMRT (NCMRT)

Prod Meas	Ind Var	n	Mean	Std Dev of Diff	t-value	df	Prob
OPVs	CMRT	5	15,405	2200	-0.77	4	0.48
	NCMRT		14,645				
HCUs	CMRT	5	363	27	-0.61	4	0.57
	NCMRT		355				
WPVs	CMRT	2	347,529	10,770	6.93	1	0.09
	NCMRT		400,338				
CAP	CMRT	1	3,229,522	CANNOT CALCULATE DUE TO INSUFFICIENT n			
	NCMRT		3,823,541				

We can further validate these results by performing a Two Factor Repeated Measures ANOVA to the data. By doing this, we are isolating the main effect and testing for any interaction that there may be. Specifically, we are concerned if there are significant differences in the productivity means between fiscal years. Table 4 presents a table of means for the productivity measures except for CAP values. This table allows us to examine the main effects (the column and row means) and the simple main effects (the means in the body of the table).⁵

The first productivity measure examined, OPVs, show that the pattern of two simple main effects are the same; OPVs are lower for NCMRT for both FY 87 and FY 88. This is interesting because we might expect that NCMRT would have higher productivity measures. This can be explained by referring back to figure 1. We will see that the second quarters of both FY 87 and FY 88 show significant increases in OPVs. This appears to have had the effect

Table 4

Table of Means

OPVs			
	CMRT	NCMRT	Mean
FY 87	15,278	14,821	15,050
FY 88	15,531	14,468	15,000
Mean	15,405	14,645	

HCUs			
	CMRT	NCMRT	Mean
FY 87	359	362	361
FY 88	366	348	357
Mean	363	355	

WPVs			
	CMRT	NCMRT	Mean
FY 87	259,322	386,139	322,731
FY 88	435,735	414,537	425,136
Mean	347,529	400,338	

The first productivity measure examined, OPVs, show that the pattern of two simple main effects are the same; OPVs are lower for NCMRT for both FY 87 and FY 88. This is interesting because we might expect that NCMRT would have higher productivity measures. This can be explained by referring back to figure 1. We will see that the second quarters of both FY 87 and FY 88 show significant increases in OPVs. This appears to have had the effect

of weighting the mean of CMRT higher. Nonetheless, there does not appear to be an interaction. This is confirmed statistically by the results of the Two-factor Repeated Measures ANOVA presented in table 5. The test was applied to the effect of CMRT (this gives the same result as the Paired t-test and is included for comparison purposes), the effect of the different fiscal years (Year), and the interaction effect (Year by CMRT). In each case, statistical significance is not reached at the .05 alpha level.

The table of means for HCUs indicates that there might be an interaction present. In FY 87, there are more HCUs generated during NCMRT, however, just the opposite occurs during FY 88. Since OPVs drive the number of HCUs generated, it would be expected that the trends would be identical. This is not necessarily true, however, since OPVs are multiplied by a HCU weighted factor which determines the number of HCUs. The weighted factors differ for each speciality, therefore it is believed variances in OPVs within each speciality for each fiscal year caused these contradictory trends. The results of the Two-factor Repeated Measures ANOVA show that the difference between fiscal years and the interaction are not significant at the .05 alpha level.

The last of the productivity measures in which the ANOVA was applied, WPVs, reveal consistent results with the previous measures. Once again, the table of means indicated that an interaction may have been present, however, it was statistically not significant.

Table 5 is important that various confounding factors, which may
Two-factor Repeated Measures ANOVA for Productivity Measures CMRT

and NCMRT, are addressed. There is an assumption that the summer months normally have associated with them an increase in the amount of leave. Additionally, this is a transition period for many who are being reassigned to CMRT duty stations or who are joining the organization. The element (r.01 MEPRS c.94 and NAFTE (Non-available Full-Year by equivalent), accounts for these activities.

OPVs		
Ind. Var.	F	Prob
CMRT	.60	.48
Year	.01	.94
Year by CMRT	.53	.51

The Two-factor Repeated Measures ANOVA results in table 5 show that there is no consistent difference in NAFTEs between CMRT and NCMRT. There was, however, a significant interaction. The table of means presented in table 7 shows that in 1987 NAFTEs increase during NCMRT and decrease during CMRT. This indicates the interaction.

The inconsistent levels of NAFTE with respect to CMRT make it unlikely that leave, etc, could have masked any CMRT effects both years.

Table 6

WPVs		
Ind. Var.	F	Prob
CMRT	48.09	.09
Year	2.17	.38
Year by CMRT	4.97	.27

Year by CMRT	6.61	.05
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It is important that various confounding factors, which may contribute to any effect on the productivity measures during CMRT and NCMRT, are addressed. There is an assumption that the summer months normally have associated with them an increase in the amount of leave. Additionally, it is a transition period for many who are being reassigned to other duty stations or who are joining the organization. The data element from MEPRS called NAFTE (Non-available Full-time Equivalent), accounts for these activities.

The Two-factor Repeated Measures ANOVA results in table 6 show that there is no consistent difference in NAFTEs between CMRT and NCMRT. There was, however, a significant interaction. The table of means presented in table 7 shows that in FY 87 NAFTEs increase during NCMRT and decrease during FY 88. This indicates the interaction.

The inconsistent levels of NAFTE with respect to CMRT make it unlikely that leave, etc, could have masked any CMRT effects both years.

Table 6

Two-factor Repeated Measures ANOVA for NAFTEs

Ind. Var.	F	Prob
CMRT	1.42	.29
Year	34.34	.002
Year by CMRT	6.61	.05

Table 7 the MEPRS reports, in which this data was extracted, rely
 Table of Means for NAFTES

	CMRT	NCMRT	Mean
FY 87	2,851	3,242	3,047
FY 88	4,637	3,706	4,172
Mean	3,744	3,474	

Statistical analysis indicates that productivity remained at a somewhat constant level during the quarters CMRT was held and the quarters in which it was curtailed regardless of leave, TDY, or other absences from work. An interview the researcher had with Dr. John Downs, Chief Internal Medicine Resident from 1987-1988 and presently a staff physician in the Department of Internal Medicine, may help to explain this. He stated that patients may be displaced but they are seldom just not seen, especially if they are being followed for a particular problem. In other words, other providers will take up the slack or the patient is scheduled when the provider comes back from leave, TDY or CMRT.⁶

It is not to say, that an experimental design with more power, such as increasing the number of departments or including additional fiscal years would not reveal different results. Also, the possibility of measurement error, especially when dealing with MEPRS data, should be taken into consideration when evaluating these results. Additionally, a study conducted at Tripler United States Army Medical Center, reported that MEPRS data at that organization significantly understated readiness expenditures.⁷

Most of the MEPRS reports, in which this data was extracted, rely on "self reported" information within the departments. So not only could there be measurement error but measurement bias.

Effect of CMRT on Resource Utilization

As stated in Chapter I, there were four objectives established in determining the effect CMRT has on resource utilization. The first objective was to determine the total non-personnel and personnel costs associated with CMRT. Table 8 lists the expenses attributed to UCA code "FIA" -- Readiness Training Conducted Locally. For WHMC, this represents CMRT expenses.

Table 8

Quarterly Expenses for FY 87 & FY 88 by Element of Expense

Quarter	ELEMENT OF EXPENSE (\$\$\$)				Tot Exp per Qtr
	Med. Sup.	Med. Eqpmt.	Non-Med Supplies	Salaries	
87-1	345	12,174	12,948	420,457	445,924
87-2	243	0	2,070	425,170	427,483
87-3	864	10,715	11,770	520,214	543,563
87-4	213	0	1,881	263,363	265,457
Subtotal	1,665	22,889	28,669	1,629,204	1,682,427
88-1	869	0	1,162	414,387	416,418
88-2	1,823	0	2,135	492,294	496,252
88-3	693	0	1,701	621,667	624,061
88-4	635	789	33,442	316,784	351,650
Subtotal	4,020	789	38,440	1,845,132	1,888,381
Grand Total	5,685	23,678	67,109	3,474,336	3,570,808

The "Activity Issue/Turn-in Summary Report" listed the names of the specific items procured. Medical Supplies included items such as splints, bandages, cervical collars, IV fluids and their accessories. These items are used during first-aid demonstrations and mass casualty exercises. The term "medical equipment" is misleading. The items listed under medical equipment were office equipment, CB Radios, and a Public Address System. Non-medical supplies included items such as office supplies, moulage for mass casualty exercises, batteries, garden hoses, field jackets, and construction material. The fourth quarter of FY 88 reflects the material used in the renovation of Camp Rissington.

The salary expense is basically a "sunk cost". Cleverly defines a sunk cost as a cost that is unavoidable -- it is unaffected by the decision under consideration.⁶ The salary expense includes the salaries of the CMRT staff and of the students who are training for the two days. It also includes a salary expense of \$5,280 for the SARPMA personnel who assisted in the CAMP Rissington renovation. Their salaries were not a sunk cost. The total salary expense represents 97 percent of the total expense attributed to CMRT for FY 87 and FY 88.

The second objective was to determine the cost per student trained. Table 9 gives the cost per student trained by fiscal year and shows the average for the two years.

Table 9
Cost Per Student Trained

Fiscal Year	Students Trained	Expense	Cost/Student
1987	3780	\$1,682,427	\$445
1988	5148	\$1,888,381	\$367
FY 87&88	8928	\$3,570,808	\$400

The fourth objective was to determine the opportunity cost, resulting from CMRT, in potential reimbursements. Table 10 gives the opportunity costs in potential reimbursements by clinic for the two fiscal years.

Like the opportunity cost in OPVs discussed earlier, this too is a 'what if' cost. The assumption is that all the providers would be in the clinic seeing patients when not in CMRT. The other assumption is that, before DRGs, the reimbursement system was based strictly on previous workload and no other factors external to the organization which would influence WPMC's reimbursement.

The final objective in determining the effect of CMRT on resource utilization was to determine the total cost savings

Table 10 by WHMC due to alternative reimbursement methods for
Opportunity Cost in Potential Reimbursements

<u>FY 87</u>									
Clinic	Lost OPVs	x	HCU WGT	=	HCUs	x	Cost/ HCU	=	Potential Reimb.
Int Med	1,164		.022		25.6		9,177		234,931
Peds	430		.017		7.3		3,557		25,966
Gen Surg	454		.028		12.7		5,113		64,935
OB/GYN	1,135		.021		23.8		2,291		54,526
Prim Care	1,777		.021		37.0		2,438		90,206
Total									\$470,564

<u>FY 88</u>									
Clinic	Lost OPVs	x	HCU WGT	=	HCUs	x	Cost/ HCU	=	Potential Reimb.
Int Med	1,029		.022		22.6		4,896		110,650
Peds	1,108		.017		18.8		7,910		148,708
Gen Surg	392		.028		11.0		5,803		63,833
OB/GYN	1,131		.021		23.8		2,799		66,616
Prim Care	1,281		.021		26.9		2,925		78,683
Total									\$468,490
Grand Total FY 87 & FY 88									\$939,054

Like the opportunity cost in OPVs discussed earlier, this too is a "what if" cost. The assumption is that all the providers would be in the clinics seeing patients when not in CMRT. The other assumption is that, before DRGs, the reimbursement system was based strictly on previous workload and no other factors external to the organization which would influence WHMC's reimbursement.

The final objective in determining the effect of CMRT on resource utilization was to determine the total cost savings

benefited by WHMC due to alternative procurement methods for supplies, equipment, and labor. Undoubtedly, expenses attributed to CMRT would be remarkably higher if it were not for the innovation and cost consciousness of the CMRT staff. Since FY 85, WHMC had procured, at no cost, approximately \$153,157 worth of supplies and equipment from the area Defense Reutilization and Marketing Office (DRMO). The CMRT staff make periodic trips to DRMO to see if any of the items are of value to the CMRT program. They do this before they make any major purchase requests. Appendix 4 gives a description of the specific items procured from 1985 to March of 1989.

In September of 1988, Camp Rissington underwent major renovations. Instead of having SARPMA personnel perform the work, an arrangement was made to have the PRIME BEEF team from Reese AFB, Texas do the work as part of their training. The only cost to WHMC was for material (\$30,701) and the labor for the few individuals from SARPMA who augmented the team (\$5,280). There was no billeting expense because the team slept at the site and the travel expense (TDY) was covered by Air Training Command (ATC) Headquarters. An estimated \$28,649.28 was saved in salaries. Table 11 gives the calculations that were conducted to arrive at that figure.

Table 11

Cost Savings Calculations for Renovations

Speciality	# Personnel	Hour/day	# days	Shop Rate	Total
Carpenter	3	8	11	\$24.33	\$6,423.12
Electrician	2	8	11	\$27.42	\$4,825.92
Equipment Ops	5	8	11	\$23.46	\$10,322.40
Supervisor	3	8	11	\$26.81	\$7,077.84
Total Savings					\$28,649.28

Additionally, it is estimated that WHMC saves \$10,000 annually in replacement costs for the GP Medium tents that were once used.⁹

In total, there has been a savings of at least \$181,807 since FY 85. This figure understates the total cost savings because there have been numerous "self help" projects conducted by the CMRT staff that are not accounted for in this study.

ENDNOTES

SUMMARY

- ¹ John J. Wells, Assistant Administrator Medical Readiness Training, personal interview, 5 June 1989.
- ² Wells.
- ³ John Downs, Staff Physician, Department of Internal Medicine, WHMC, personal interview, 14 June 1989.
- ⁴ United States, Wilford Hall USAF Medical Center/SGM, Commanders Quarterly Statistical Summary, Fourth Quarter FY 87, 88.
- ⁵ Keppel 233.
- ⁶ Downs.
- ⁷ McAdam 56-61.
- ⁸ John J. Cleverley, Essentials of Health Care Finance (Rockville: Aspen, 1986) 200.
- ⁹ United States, Wilford Hall USAF Medical Center/SGLF, Camp Rissington PRIME BEEF Deployment Plan, n.d., n.p..
- The Medical Readiness Training Section of WHMC's directorate of Medical Readiness operate a very professional, highly efficient CMRT program. Nonetheless, the fact that the program is conducted during two weekdays, results in an opportunity cost of OPVs, HCU's, and potential reimbursements. For FY 87 and FY 88, there was an opportunity cost of 9,900 OPVs, 210 HCU's and \$939,054 in potential reimbursements lost from the five clinics in the study group. It is important to keep in mind that these opportunity costs can be

CHAPTER III

SUMMARY

This study was an attempt to provide a systematic approach to quantifying the effect CMRT has on health care productivity and resource utilization at WHMC. It has been made clear that medical readiness is a high interest item in the Department of Defense and Congress. Evidence of this is reflected in a quote from a House of Representatives Appropriations Committee report. It states:

" A trained, ready and prepared military medical system is a top priority item in any discussion of readiness of our military system. Without a means to care for our fighting forces, the United States loses its credibility with the American people, our adversaries, the military commander, and most importantly, the troops themselves."¹

Therefore, the intent was not to audit the program for purposes of questioning its usefulness or justifying its demise, but, to provide information to executive management to assist them in controlling shrinking health care resources.

The Medical Readiness Training Section of WHMC's directorate of Medical Readiness operate a very professional, highly efficient CMRT program. Nonetheless, the fact that the program is conducted during two weekdays, results in an opportunity cost of OPVs, HCUs, and potential reimbursements. For FY 87 and FY 88, there was an opportunity cost of 9,900 OPVs, 210 HCUs and \$939,054 in potential reimbursements just from the five clinics in the study group. It is important to keep in mind that these opportunity costs can be

attributed to CMRT assuming that all the providers would have been in the clinic seeing the average number of patients for his/her specialty and no other absences from duty would have been substituted. When one looks at the statistical analysis of the differences between productivity measures during the months when CMRT is held (CMRT) and the months it is curtailed (NCMRT), a more subdued picture of the CMRT program effect on productivity is presented. The results of the Paired t-test and the Two-Factor Repeated Measures ANOVA showed no significant difference between the number of OPVs, HCUs, and WPVs for CMRT and NCMRT at the .05 alpha level. Confounding factors, such as leave, TDY, and PCS processing [represented by Non-Available Full-Time Equivalents (NAFTes)] were taken into consideration. Unfortunately, it was difficult to make any inference as to what influence NAFTes had on the productivity measures due to the disparity between the two fiscal years. In FY 87 there was a higher number of NAFTes for NCMRT and in FY 88 there was a lower number of NAFTes for NCMRT. The inconsistent levels of NAFTes with respect to CMRT make it unlikely that leave, etc, could have masked any CMRT effects both years. It may be inferred that in FY 87 and FY 88 the departments in the study group maintained a somewhat constant level of productivity regardless of the CMRT program or any other absences from duty. Therefore, a tentative conclusion would be that there is no statistically significant measurable effect of CMRT on health care productivity. CAP values for the laboratory had to be evaluated descriptively. The mean CAP values for CMRT were 3,229,522 versus 3,823,541 for

NCMRT. This is a difference of 594,019 or 15% more in an era of for NCMRT. resources and increased concern with accessibility into the . The total cost for CMRT during FY 87 and FY 88 was \$3,570,808. Approximately 97 percent of this cost can be attributed to the need salaries of the students and staff. The other three percent represents supplies and equipment utilized for CMRT. The average cost per student trained for the two fiscal years was \$400.

In addition to being very efficient and professional, the CMRT staff is very cost conscious and innovative in their ways of procuring supplies, equipment and labor. Since 1985, they have saved approximately \$153,157 in supplies and equipment by procuring these items from the Defense Reutilization and Marketing Office (DRMO). Renovations on the training site performed by a PRIME BEEF team from Reese AFB, Texas, saved WHMC an additional \$28,649 in labor costs. The permanent facility designed by the CMRT staff and built by the PRIME BEEF team, is estimated to save WHMC \$10,000 annually in tent replacement costs. Lastly, there have been numerous "self-help" projects conducted at Camp Rissington that have not been quantified, therefore, the total cost savings of \$181,807 is an understatement.

The critics of the Air Force CMRT program, those who say "we lose too much productivity" or "it costs too much", the researcher believes, are individuals who have lost sight of the single most important mission of the Air Force Medical Service. That mission is to provide the medical support needed to maintain the highest degree of combat readiness and effectiveness of the Air Force. For some, it may be difficult to accept the costs involved in training

for a contingency that may never occur, especially in an era of shrinking resources and increased concern with accessibility into the peacetime system. Therefore, it becomes imperative to keep the wartime mission in perspective when evaluating the effect readiness programs have on any peacetime mission.

1. Ancillary Services -- Pharmacy, Clinical Pathology, and Diagnostic Radiology.

2. CAP Value -- A weighted procedure for pathological services as defined by the American College of Pathology.

3. Continuing Medical Readiness Training (CMRT) -- Mandatory annual training for all military medical personnel. The purpose of this training is to train military medical personnel for their wartime mission.

ENDNOTES

¹ National Defense University, "Integrating the Civilian Health Care System into Medical Mobilization Planning,"

research report, Industrial College of the United States, 1986, 1.

4. Full-Time Equivalent (FTE) -- One FTE is equivalent to 168 hours of time.

5. Health Care Provider -- Any physician, physician's assistant, nurse or nurse practitioner who generates an OPV.

6. Health Care Unit (HCU) -- A medical workload measurement tool developed by the Department of Defense in which a weighted factor is applied against outpatient visits to compute the HCU output of an activity.

7. Medical Expense and Performance Reporting System (MEPRS) -- A Department of Defense system for expense, manpower and performance accounting and reporting by Medical Treatment Facility.

8. Non-Available Full-Time Equivalent (NAFTE) -- The total number of hours per month that a person was not available to a work center in support of an established work center divided by 168 hours.

Activities in this category include: leave, hospitalization, Permanent Change of Station (PCS) processing, Professional Military

APPENDIX A

Definitions

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8. **Non-Available Full-Time Equivalent (NAFTE)** -- The total number of hours per month that a person was not available to a work center in support of an established work center divided by 168 hours. Activities in this category include: leave, hospitalization, Permanent Change of Station (PCS) processing, Professional Military

Education (PME), charge of quarters, parades and formations, details, AWOL, Permissive TDY, Commander's Calls, and medical and dental appointments.

9. **Opportunity Costs** -- The value of the variable of interest sacrificed due to the resource that produces that variable being committed to another activity.

10. **Outpatient Visit (OPV)** -- An outpatient visit is when a patient visits an outpatient clinic and receives documented care that includes and examination, evaluation, diagnosis, and subsequent treatment.

11. **Productivity** -- Output as measured in, Outpatient Visits (OPVs), Weighted Procedure Values (WPVs), CAP Values, and HCUs.

12. **Pure Costs** -- Those costs eliminated if the program is cancelled (Gavett 306).

13. **Weighted Procedure Value (WPV)** -- Workload measurement used for Radiology and Pharmacy services.

Day 1

0630-0700	Sign-in and Gear Issue
0730-0800	Field Sanitation Lecture & Demonstration
0800-1100	First Aid Practical
1200-1245	Lunch
1445-1545	Map and Compass Lecture
1645-1800	Field Communications Exercise
1830-2030	Nuclear, Biological, & Chemical (NBC)
2030-2100	Debrief
0700-0800	Threat/Concepts Briefing
0900-0930	Patient Transportation
1030-1130	Combat Psychiatry
1130-1200	Lunch
1200-1300	Ballistics Lecture
1300-1500	Patient Decontamination
1500-1530	Mask Confidence Chamber
1530-1830	Mass Casualty Exercise
1830-1900	Debrief and Gear Turn-in

APPENDIX B

Basic CMRT Program

During Non-Instructional Days

Day 1

0630-0700	Sign-in and Gear Issue
0700-0730	Commander's Briefing
0730-0800	Field Sanitation Lecture & Demonstration
0800-0900	First Aid Lecture
0900-1100	First Aid Practical
1100-1200	Triage Lecture
1200-1245	Lunch
1245-1445	Triage Practical
1445-1545	Map and Compass Lecture
1545-1645	Perimeter Defense/Field Communications
1645-1800	Field Communications Exercise
1800-1830	Supper
1830-2030	Nuclear, Biological, & Chemical (NBC)
2030-2100	Warfare Briefing
	Debrief

Day 2

0600-0700	Breakfast
0700-0800	Threat/Concepts Briefing
0800-0900	Litter Obstacle Course
0900-0930	Patient Transportation
0930-1030	NBC Agents
1030-1130	Combat Psychiatry
1130-1200	Lunch
1200-1300	Ballistics Lecture
1300-1500	Patient Decontamination
1500-1530	Mask Confidence Chamber
1530-1830	Mass Casualty Exercise
1830-1900	Debrief and Gear Turn-in

APPENDIX C

Defense Reutilization Duties of CMRT Staff (DRMO) Items
 During Non-Instructional Days

Air Conditioners		Mannequin
Battle Dress Uniforms	- Clean hutments	Metal Pails
Battle Dress Uniform Caps		Microwave Oven
Brass Lamps	- Inspect gear	Mixer/Amplifier
Camouflage Netting		Movie Screen
Canopies	- Sanitize and refill showers	Pajamas
Canteens		Plastic Bottles
Canteen Covers	and hand washers	Plate Glass
Chairs		Portable Buildings
Chemical Suits	- Review & analyze critiques	Portable Radios
Coffee Pot		PRC-10 Radio
Color Television	- Train new instructors	Set-up Box
Copier Machines		Sleeping Bags
Cots	- Prepare paperwork for classes	Tools
Defibrillation Machine		Truck Ambulance
Desks	- Maintain map & compass lanes	Video Recorder
Fan		Weed Eaters
Fatigue Uniforms	- Sanitize canteens and cups	Yellow Camouflage Paint
Field Jackets		
Field Jacket Liners	- Police enhutment areas	
File Cabinet		
Helmets, Steel	- Police main assembly areas	
Immersion Heaters		
Ladders	- Maintain Litter Obstacle Course	
Masks, Chemical		
Wallets	- Order/pick-up supplies & Equip.	
	- Develop new course material	
	- Work on self-help construction	
	- Screen/pick-up items at DRMO	

APPENDIX D

Defense Reutilization & Marketing Office (DRMO) Items

Articles and Periodicals

Air Conditioners	Mannequin
Battle Dress Uniforms	Metal Pails
Battle Dress Uniform Caps	Microwave Oven
Brass Lamps	Mixer/Amplifier
Camouflage Netting	Movie Screen
Canopies	Office Tables
Canteens	Pajamas
Canteen Covers	Partitions
Chairs	Plate Glass
Chemical Suits	Ponchos
Coffee Pot	Portable Buildings
Color Television	Portable Radios
Copier Machine	PRC-10 Radio
Cots	Screen/Curtains
Defibrillation Machine	Set-up Box
Desks	Shelving
Fan	Sleeping Bags
Fatigue Uniforms	Sleeping Mats
Field Jackets	Tools
Field Jacket Liners	Tropical Boots
File Cabinet	Truck Ambulance
Helmets, Steel	Video Cassette Recorder
Immersion Heaters	Weed Eaters
Ladders	Wind Screen
Masks, Chemical	Yellow Camouflage Paint
Mallets	

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