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MEDICAL REHABILITATION PROGRAM:
II. EFFECTS ON BASIC TRAINING GRADUATION RATES

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Medical Rehabilitation Program:
II. Effects on Basic Training Graduation Rates

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Summary

Problem.

It was observed that recruits who attrited from basic training for medical reasons often experienced musculoskeletal injuries. A review of the treatment and management of medically impaired recruits at the Recruit Training Command, San Diego, suggested modifications to the traditional procedures that would improve the medical care and morale of these recruits. A Medical Rehabilitation Program (MRP) developed to improve medical care for the injured or ill recruits, and in particular, musculoskeletal injuries was implemented in March 1989. It was predicted that the MRP would decrease attrition among the medically impaired recruits.

Objective.

The primary objective was to examine the effect of the MRP on attrition from basic training. The effectiveness of the MRP was evaluated in terms of the overall change in graduation rate from basic training, and the change in unproductive training days.

Approach.

The graduation rate for the MRP was compared with the graduation rate for a comparable group of medically impaired recruits who began basic training during 1988. Determination of the graduation rate for the MRP was based on 661 recruits referred during the first 8 months of the program. The graduation rate for calendar year 1988 (CY88) was based on 948 recruits that included recruits referred to the Medical Hold Company (n=748), and recruits referred to Naval Hospital, San Diego (NHSD; n=200) for more acute health problems or diagnostic procedures.

Results.

A 42.2% improvement in the graduation rate from 23.8% for CY88 to 66.0% for the MRP was observed. After allowing for sampling error, the minimum estimated improvement was 32.5%. Estimated cost savings based on the number of unproductive training days range from \$418K to \$574K per 10,000 recruits trained per year. Estimated cost savings range from \$331K to \$487K per 10,000 recruits trained per year after adjustment for projected annual costs for implementing the program.

Conclusions.

The MRP significantly increased the graduation rate for medically impaired recruits. The potential cost savings can be substantial even when estimated conservatively. Additional long term benefits to the Navy may result from improved morale and reductions in delayed graduation time for some medically impaired recruits. Implementation of future programs would benefit from further research to identify the contributions of individual elements of the MRP to the positive outcomes observed in this study.

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Introduction

Over the calendar years from 1987 to 1989, an average of 1176 recruits were discharged each year at the Recruit Training Command (RTC), San Diego as a result of medical problems. The financial loss in actual training costs, as well as projected losses of potentially productive service members, can be substantial. Consequently, methods of reducing the rate of medical attrition from basic training have the potential to achieve major savings for the military. The Medical Rehabilitation Program (MRP) was implemented at the Recruit Training Command, San Diego to provide improved health care for medically impaired recruits. It was expected that the program would improve the graduation rate for these recruits. This report describes the effects of the MRP on attrition by comparing graduation rates for recruits in the MRP with recruits referred with medical problems during the year prior to implementation of the program.

Program Background.

Observations of the traditional procedures for patient management and health care delivery of illness and injuries during basic training suggested that the training experience for medically impaired recruits could be improved by modifying these traditional procedures. The MRP was developed to implement the proposed changes (Bischoff, in preparation). One potentially productive area for modification was the treatment of musculoskeletal injuries. It was judged that improved management of musculoskeletal problems would be valuable since many of the recruits lost from training for medical reasons had musculoskeletal injuries. This informal observation was reasonable because epidemiologic data indicate that musculoskeletal injuries and infectious respiratory disease are the most common types of health problems in basic training (Jones, Manikowski, Harris, Dziados, & Norton, 1988), just as they are in the general U.S. population of the same age (National Center for Health Statistics, Dawson, & Adams, 1987). Most infectious diseases resolve themselves naturally or with a simple regimen of antibiotic treatment requiring little day-to-day monitoring from medical personnel. In contrast, musculoskeletal injuries can linger and recur if not treated properly by the assignment of appropriate rehabilitation procedures and clinical monitoring of progress. The traditional procedure for diagnosis and treatment of musculoskeletal problems at RTC, San Diego consisted of medical examination at the RTC clinic with referral to Naval Hospital, San Diego (NHSD) for x-rays and casts, with the

subsequent transfer of the recruit to a non-training company while the injury resolved. Physical therapy programs were ill-defined or completely lacking, and rehabilitative medical care was limited.

Another potential modification of the traditional approach was suggested by observations of low morale and motivation in the medically impaired recruits. Recruits with significant health problems were taken out of the regular training program and admitted to the Medical Hold Company while they "waited" for their illness or injury to resolve. Progress toward graduation was delayed, and boredom was high because the recruits did not continue their training program during this recuperation period. Morale also appeared to be affected by the fact that the medically impaired recruits were housed with recruits who had behavioral or legal problems. It appeared that exposure to recruits with negative attitudes toward the service and poor morale was contagious. Recruits with no adjustment problems prior to their illness or injury often developed such problems when constantly exposed to the predominantly negative attitudes and behaviors of the other recruits they encountered on a daily basis.

Program Structure.

The MRP was composed of four major elements designed to improve upon traditional care in ways that would reduce the problems described above. First, medical care for the recruits with musculoskeletal problems was expanded to provide individualized rehabilitative treatment plans based on guidelines from physical therapy and sports medicine. Second, medically impaired recruits were provided separate quarters to isolate them from the recruits with behavioral or legal problems. Third, recruits were permitted to continue their academic training while assigned to the MRP. Attending academic classes was expected to reduce the psychological problems of being "setback," and allowed many medically impaired recruits to graduate on schedule with their original training company. Fourth, procedures were implemented to permit the medically impaired recruits to leave basic training at this time if they chose. A more detailed description of the program is presented in Bischoff (in preparation).

Program Implementation.

The formal organizational mechanism for implementing the MRP within the Recruit Training Command was the establishment of a Medical Rehabilitation Company (MRC). Medically impaired recruits were assigned to this company while undergoing treatment. The

MRC was led by a Company Commander who was responsible for maintaining discipline and military bearing within the company but who, otherwise, had the same duties as the company commander of a regular training company. Medical care was provided by a physician, physical therapist, and corpsman assigned to the MRP. The recruits' participation in physical therapy was monitored, and weekly physical examinations by the physician evaluated progress toward recovery. Once the injury or illness resolved, the recruit returned to the regular basic training program, usually with his original company.

Program Admission.

Recruits referred to the MRP for evaluation were accepted into the Medical Rehabilitation Company if they met two criteria. One, the recruit had to have a medical problem which would not disqualify him from service if successfully treated; and two, he had to express a commitment to complete basic training. Recruits meeting these criteria joined the company at the MRP while they received medical treatment. Recruits not accepted into the MRC were treated medically, but were transferred to an appropriate company as soon as possible.

Program Evaluation.

The present report describes the effect of the MRP on basic training graduation rates for medically impaired recruits. This effect is evaluated by comparing the graduation rate for recruits in the MRP to the graduation rate for recruits referred to the Medical Hold Company during calendar year 1988 (CY88). The Medical Hold Company was the organizational unit responsible for medically impaired recruits prior to implementation of the MRP. The comparison of graduation rates contrasts the new procedures implemented by the MRP with the traditional procedures in place with the Medical Hold Company.

Method

Medical Rehabilitation Program.

All MRP participants were male recruits in training at RTC, San Diego. Recruits referred to the MRP for treatment were identified from a log maintained at the MRP facility. Upon arrival at the Medical Rehabilitation Program facility for evaluation, each recruit's name, social security number, date of arrival, prior training company number, last training day, and medical diagnosis were entered in the log. Each entry was updated when the recruit transferred from the

MRP by adding the recruit's date of departure, his current day in training, and the company where he transferred. Log information was extracted for all recruits referred to the MRP from March 1, 1989 to October 31, 1989, the first eight months of program implementation. The evaluation of the MRP presented in this report is based on findings from this time period. Graduation and attrition status for these recruits was obtained from computer files maintained by the training command.

During this eight month period, 661 recruits were referred to the MRP for evaluation, 493 (74.6%) of whom were accepted into the Medical Rehabilitation Company. Although the MRP focused on musculoskeletal problems, the recruits who entered the MRC included all ill or injured recruits who expressed a commitment to complete basic training (Bischoff, in preparation). Recruits not admitted to the MRC included recruits who decided to leave the Navy, and recruits with medical problems (many of which existed prior to entry) that disqualified the recruit from service. Recruits not admitted to the MRC were given medical care as needed, but were transferred to other special companies for further processing as soon as possible.

1988 Baseline Data.

Attrition rates for ill and injured recruits during CY88 were estimated by combining data extracted from recruit training records with attrition data from archival personnel and training files. Training company rosters were used to identify recruits who transferred from a regular training company to any non-training company. Information extracted from these rosters included the recruit's name, his social security number, the date of transfer, and the special company where he transferred.

Transfer information was extracted from 308 of 312 rosters for the CY88 training companies and identified 5043 recruits who transferred from a regular training company. An analysis sample of 4802 recruits resulted because of incomplete information for the transfer company (n=180) or graduation status (n=61).

Transfers occurred for a variety of reasons (e.g., medical problems, remedial training, behavioral or attitudinal problems), and a classification schema was developed to group the non-training companies according to the problems with which each dealt. A comparison of graduation rates for five groups of recruits classified according to this schema is presented in Appendix A to demonstrate that coding of critical groups had reasonable accuracy. The

comparison provides a qualitative verification of the accuracy of the data extracted for CY88 by showing that observed attrition rates for different types of transfers correspond to what would be expected given knowledge of the reasons for those transfers.

Although the rosters provided data on transfers for reasons other than medical problems (e.g., remedial training, behavioral, motivational, or legal problems), only recruits transferred because of a medical problem are considered in this report. Medical injury or illness resulted in transfers to one of three non-training companies. One, recruits with medical problems that disqualified them for service were transferred to the Medical Survey Company to begin discharge procedures. Two, recruits with medical problems which made it impossible to continue with training, but which, once resolved, would not disqualify the recruit from service, were transferred to the Medical Hold Company while the injury or illness resolved. Three, recruits with acute medical problems or illnesses/injury requiring diagnostic procedures not available at the Recruit Training Command clinic were sent to NHSD.

The MRP graduation rate was compared to the CY88 graduation rate based on a group that included recruits transferred to either the Medical Hold Company (n=748) or to NHSD (n=200). The combination of these two groups provided the best approximation to recruits referred to the MRP that could be determined from the CY88 data. The Medical Hold Company was the organizational equivalent to the MRC for referring the medically impaired recruits prior to implementation of the MRP. The decision to include recruits initially sent to NHSD was based on observations that such recruits frequently returned to MRP after discharge. These recruits remained at MRP while they completed their recovery or awaited reassignment to a training company.

Information on graduation status from basic training was obtained from the Inpatient Follow-up Data System (IFDS: Garland et al., 1987) and the NITRAS Student Master File (MIISA, 1989). The IFDS combines demographic, service record, training, and health record information into one database for all Navy personnel. The NITRAS file maintains an historical record of training courses undertaken by Navy personnel, and includes information for delays and interruptions to the scheduled training, completion and failure of courses, and discharge from the Navy for basic training recruits.

Results

Program Attrition Effect.

The effect of the MRP on attrition can be examined by comparing graduation rates for different groups (see Table 1). Comparing all recruits referred to the MRP with the combined CY88 Medical Hold Company and NHSD group provides the best overall comparison of the effect of the MRP on attrition. For this comparison, a 42.2% improvement in graduation rate is observed for the MRP (66.0% vs. 23.8% graduation rate).

As evident from Table 1, the decision to estimate CY88 rates by combining recruits referred to the Medical Hold Company and recruits referred to NHSD increased the estimated graduation rate for CY88. This decision may result in an underestimate of the overall effect of MRP, because if the Medical Hold Company graduation rate of 18% were used in the computations, the program implementation would have increased graduation by 48% (66.0% vs. 18.0% graduation rate).

Table 1
Graduation Rates for MRP and Comparison with
1988 Graduation Rate

	N	Attrite	Per Cent Graduate	Comparison to 1988 Rate z	sig	95% Confidence Interval
1988 Baseline Data						
Medical Hold Company	748	82.0%	18.0%	---	---	23.9% - 29.9%*
NHSD Transfers	200	54.5%	45.5%	---	---	
Total	948	76.2%	23.8%	---	---	
1989 MRP						
Admitted to MRC	493	28.2%	71.8%	-17.58	<.001	
Not admitted to MRC	168	51.2%	48.8%	-6.68	<.001	
Total	661	34.0%	66.0%	-16.78	<.001	62.4% - 69.6%

* Based on adjusted graduation rate of 26.9%. See text page 11.

Effect of Sampling Error.

As is the case with any statistical estimates, the preceding values are subject to sampling error and are influenced by assumptions made in the definitions of the groups compared. Additional analyses were conducted to estimate the sensitivity of the program evaluation to these factors with the objective of providing a plausible lower limit to the program effect.

The estimated graduation rate for the MRP in 1989 is subject to sampling error, and given the sample size and the observed graduation rate, there is a 95% probability that the true value for the graduation rate was between 62.4% and 69.6%. The lower of these two boundary values provides a conservative, statistically defensible estimate of the true graduation rate.

The estimated graduation rate for 1988 is affected by sampling error and by the assumption regarding disposition of recruits transferred to NHSD. Taking the latter point first, suppose recruits who went to NHSD subsequently met one of two fates. In one case, the medical problem was diagnosed as disqualifying for further service and the recruit was transferred to the Medical Survey Company and discharged. In the other case, the recruit recovered fully, was transferred to the Medical Hold Company, and subsequently graduated. Under this scenario, only recruits who went to NHSD and later graduated ($n=91$) would return to the Medical Hold Company. In this case, the graduation rate for the Medical Hold Company would be 26.9% (226 of 839). The effect of sampling variability on this value indicates that a range of possible true graduation rates for the CY88 Medical Hold Company would be 23.9% to 29.9%.

Combining the lowest reasonable estimate of the true graduation rate for MRP (62.4%) with the highest reasonable estimate of the graduation rate for the Medical Hold Company (29.9%) yields a conservative estimate of the MRP effect. This estimated effect of 32.5% is substantially less than the original estimate of 42.2%, but still highly statistically significant ($z=17.25$, $p < .001$).

Estimated Savings.

The MRP reduction in attrition was translated into estimated costs savings by determining the effect of the program in reducing unproductive training days. Unproductive training days were defined as either days of training for recruits who did not successfully complete basic training or days of delay in graduation relative to the regular training schedule for recruits who

did complete basic training. The savings expressed per 10,000 recruits trained were estimated following the steps described below.

Referral Rate. Data were extracted from IFDS for 24,165 recruits who trained at RTC, San Diego during CY88. Direct referrals to the Medical Hold Company (748 recruits) represented 3.1% of the total CY88 cohort. Adding recruits transferred to NHSD (200 recruits), the percentage of medically impaired recruits increased to 3.9%. The midpoint of this range of values (3.5%) is very close to the referral rate of 3.4% (661 of 19,194) recruits entering RTC, San Diego for CY89 during the 8-month MRP evaluation period. Based on these figures, 3.4% was adopted as a reasonable estimate of the referral rate for the type of medical problems treated in the MRP. This referral rate represents 340 recruits for every 10,000 recruits trained.

Program Attrition Effect per 10,000 Recruits. Given a referral of 340 recruits, the 42.2% reduction in attrition through implementation of the MRP allowed an additional 143 recruits per 10,000 recruits to graduate. For the conservative estimate of a 32.5% reduction in attrition, an additional 110 recruits per 10,000 recruits entering training would graduate.

Unproductive Training Days from Attrition. For CY88 the difference between the date of arrival at RTC, San Diego and the date of discharge was computed for attrites to determine the number of unproductive training days. The average CY88 Medical Hold Company attrite was at RTC, San Diego 45.8 days prior to discharge. The implementation of the MRP had little effect on this length of stay as the comparable figure during the CY89 evaluation period was 43.0 days. The CY88 figure is the better estimate of training days saved because it represents the typical case under the old program. Using this figure, the estimated number of unproductive days of training eliminated by reducing attrition was 6,549 days (45.8 days per recruit for 42.2% of 340 recruits) for every 10,000 recruits trained.

Unproductive Training Days for Graduates. The MRP also saved training time by increasing the efficiency of training for recruits who had medical problems, but subsequently graduated. These savings were achieved by permitting recruits to continue academic training during their period of medical recovery. If these recruits recovered rapidly enough to graduate with their original training company, then the MRP reduced the length of their training by the number of days they were in the MRP. To determine the number of recruits who graduated with their original training company, information for the day-of-training for their arrival at the MRP

was combined with their length of stay in the the MRP. Based on this computation, 80% of the recruits left the MRP in time to graduate with their original training company. For this group of recruits, the average stay in the MRP was 20.3 days. If a comparable savings had occurred for the 23.8% of recruits who graduated under the old program, the result would have been 1,320 training days saved (20.3 days saved for 65 recruits, i.e., 80% of 23.8% of 340).

Dollar Value of Reducing Unproductive Training Days. The estimated direct training cost for a recruit is \$73 per day (NETPMSA, 1988). At this rate, the dollar value of reducing attrition by 42.2% was \$478,077 (6,549 days at \$73 per day) per 10,000 recruits entering training. The dollar value of increased efficiency in training graduates was \$96,360 (1,320 days at \$73 per day) per 10,000 recruits entering training. The total dollar value of the MRP, therefore, was \$574,437 for every 10,000 recruits trained. This figure represents an annual savings of \$1,388,127 when estimated from the 24,165 recruits trained at RTC, San Diego during CY88.

Discussion

The evidence indicates that the MRP was an effective means of reducing attrition in recruits with treatable medical problems. The introduction of this program in 1989 substantially increased the graduation rate 42.2% among recruits with treatable illness or injury relative to the rate for medically impaired recruits in 1988. The total estimated savings associated with the introduction of the MRP were substantial. Based on the total reduction of unproductive training days, the program saved \$574,437 for every 10,000 recruits trained. Applying this figure to the 24,165 recruits trained at RTC, San Diego during CY88, the estimated annual savings from the program is \$1,388,127.

The above figures represent the best available estimate of expected savings provided by the MRP for a typical year at RTC, San Diego. The strength of the program can be seen by considering an alternative estimate based on more conservative assumptions about the effect of the program. A conservative estimate of the reduction in attrition would be provided by assuming the reduction in attrition was 32.5% rather than 42.2%. In this case, the savings from reduced attrition would be 111 additional graduates with an associated reduction of 5,084 unproductive training days. At \$73 per training day, this reduction provides a total savings of \$371,132. A conservative estimate of the savings based on the more efficient training of recruits

who would graduate even under the old program can be provided by changing the assumption that these recruits graduate on time if they rejoin their company prior to the scheduled company graduation date. If it is assumed that these recruits must rejoin the company at least two weeks prior to graduation to graduate on time, only 40% of the MRP recruits would meet this criterion. The estimated savings attributable to this reduced set of recruits would be 32 recruits saving 20.3 days of training per recruit for a total of 650 training days. The value of these training days would be \$47,450. When these two conservative estimates of program savings are combined, the total is \$418,582 per 10,000 recruits trained with an annual savings of \$1,011,503 at RTC, San Diego. These alternative computations illustrate that the MRP can produce substantial savings even with relatively stringent assumptions about program effectiveness.

The estimates of program effectiveness are only as good as the data used to derive those estimates. The use of the 1988 Medical Hold Company graduation rates as a baseline for evaluating program effects raises two issues regarding data quality. First, the accuracy of the 1988 transfer data might be questioned. The graduation rates for recruits transferred into different special companies, and for recruits with no recorded transfer (see Appendix A), provide two bases for evaluating the accuracy of these data. Recruits transferred to the Medical Survey Company presumably had untreatable medical problems, so all of these recruits were expected to attrite. The data indicate that 96.1% of these recruits did attrite, and some of the discrepancy between this value and the expected value may be due to erroneous diagnosis at the time of transfer to the Medical Survey Company. The opposite end of the attrition spectrum is represented by recruits who did not transfer from their original training company. All of these recruits were expected to graduate, and the data indicate that 97.1% of them did. The difference between the expected graduation rate and the actual rate (2.9%) may be accounted for by some recruits who remained at RTC after completing basic training to meet a graduation requirement (e.g., physical fitness test), but then subsequently attrite. In combination, these two sets of findings suggest that the transfer data is at least 96% accurate, and it is likely that the accuracy was even higher than this.

A second issue pertaining to data quality is whether the 1988 graduation rate for the Medical Hold Company was representative of the Medical Hold Company of prior years. If the rate was exceptionally low during 1988, the estimated reduction in attrition associated with the

MRP would be too high. This possibility is unlikely, as data from a smaller sample of recruits going through basic training in the summer of 1986 (n=3065) suggest that the 1988 results were representative of pre-MRP trends. The Medical Hold Company graduation rate for this 1986 sample was 29.7% (22 of 74 recruits). This rate did not differ significantly from the CY88 rate. Since the 1986 and 1988 rates were not significantly different ($z = -1.139$, $p > .25$), the 1988 rate is assumed to represent a stable annual graduation rate for the Medical Hold Company.

Although the estimated savings generated by the MRP are substantial, the net benefit from the program depends on the costs incurred to achieve these savings. One element of these costs would be initial start-up costs for the acquisition of physical conditioning and physical therapy equipment. Medical personnel experienced in the implementation of such programs have estimated these costs at \$55,000. A second cost element is the expense of clinical supplies, which has been estimated as high as \$50,000 given the projected patient load in the recruit population. The third major cost in implementing the program would be the cost of staff. Direct salary costs for a board-certified sports physician, a physical therapist, and a corpsman (assuming that all were assigned full-time to the MRP) are estimated to be \$103,584 based on figures in the 1991 Uniformed Services Almanac. Given these estimates, the annual expense for program implementation would be \$208,584 for the first year. Assuming that the physical training and conditioning equipment have a five-year life cycle, the annual cost for program maintenance for each subsequent year would be \$164,584, i.e., \$153,584 plus \$11,000 for equipment replacement. Assuming 24,000 recruits are trained in the typical year, the costs associated with each 10,000 recruits trained would be \$86,910 when the program is implemented and \$68,577 per year thereafter.

Combining the program cost estimates with the savings estimates produces an estimate of the net value of the MRP. For each 10,000 recruits trained, the net benefit of implementing the program is estimated to be \$487,527. The net benefit in subsequent years would be \$505,860 for every 10,000 recruits trained. If the more conservative estimates of savings were substituted in these computations, the figures would be reduced to \$331,672 for the year the program was implemented and \$350,005 per 10,000 recruits trained every year thereafter.

The MRP may produce long-term benefits to the Navy in addition to the short-term gains documented here. Extensive research in organizational psychology has shown that individuals

with high role acceptance during the initial phases of job assimilation express higher job satisfaction and commitment and show better job performance (Graen, 1976). In a longitudinal study of Navy recruits, Farkas (1981) showed that recruits who experienced a delay in their graduation from basic training because of remedial or medical problems were more likely to have negative attitudes at the end of training, and to be discharged prior to completion of their enlistment (14% vs. 10% attrition), than recruits who experienced no delay in their graduation. Thus, to the extent that the MRP reduces the delay in graduation and improves the recruits' role acceptance and attitudes toward the Navy, the program may have long term effects on the recruits' Navy career. Other savings which may accrue that are not included in the current estimates include possible reductions in long-term disability payments through improved treatment of musculoskeletal problems and any reductions in costs associated with early severance from the service.

The MRP implemented in San Diego during 1989 was highly cost effective, even using conservative estimates of savings in training costs. This finding could be augmented by additional research to demonstrate that these effects generalize to other training settings and extend beyond the initial year of program implementation. Additionally, research designs which make it possible to isolate the contribution of each specific program component to overall program effectiveness would be desirable. The initial implementation of the MRP as a total program made it impossible to determine how much each component contributed to program effectiveness in this study. For example, it is not possible to tell how much of the reduction in attrition was produced by changes in the treatment of musculoskeletal problems and how much was produced by changing the organizational environment in which recruits recuperated from illness. Further evaluation of the program is necessary to understand the contributions of the different elements to the gains documented here, and to help refine the program. Overall, the cost-benefit ratio for intervention programs like MRP appears positive even when estimated conservatively.

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Appendix A

Comparison of Graduation Rates for Different Special Training Companies in 1988

Accuracy of 1988 transfer information. Evaluation of graduation rates for MRP would be difficult if the 1988 graduation rates for Medical Hold Company were not representative of these rates in general. To evaluate the accuracy of the transfer data for Medical Hold, graduation rates for five groups of recruits based on the transfer data extracted from the company rosters were examined. Four groups identified recruits who transferred from their original company while the fifth group included all recruits with no recorded transfer. These classifications were used because it identified groups of recruits who had similar problems and who would have followed similar administrative procedures at the Recruit Training Command. The four transfer groups were: 1) Medical Hold Company, 2) the Medical Survey Company, 3) the Academic Remedial Training Company, and 4) all Other Transfers to special companies. The Medical Hold company was composed of recruits with medical conditions which impaired their ability to continue with the physical demands of training. Prior to implementation of the MRP, Medical Hold was the company where injured or ill recruits were placed to recover from their injury. The Medical Survey Company was composed of recruits awaiting discharge for medical conditions which disqualified them from military service, many of which existed prior to entry and which affected the recruit's ability to meet training requirements, or for medical conditions which were determined to be non-rehabilitative. Academic Remedial Training provides specialized education to improve recruits' reading skills. These recruits are taken out of the regular training program for this remedial program, but return to training after successfully meeting reading requirements. When they are returned to training, it is usually to a training company other than the one they left. The fourth group included transfers to all other special companies. These include companies designed to help with other training deficiencies (e.g., failures on the physical training or swimming tests), to resolve legal difficulties, to resolve behavioral and attitudinal problems, or for administrative efficiency to process recruits for discharge. Recruits transferring into these special companies often are experiencing more severe problems than recruits in the previous three

groups. The fifth group included recruits with no recorded transfer from a training company.

Table 1

Distribution of Graduates During 1988
by Types of Company Transfers

<u>Type of Transfer</u>	<u>Total n</u>	<u>Percent Graduate</u>
Medical Hold Company & NHSD	948	23.8%
Medical Survey Company	1049	3.9%
Academic Remedial Training	1036	59.7%
Other Special Companies	1769	13.6%
No Transfer	19,363	97.1%

The relative order of the graduation rates for these groups must be compared, since comparable rates for prior years necessary to make direct comparisons are not available. An examination of the graduation rates suggests a high level of accuracy in the company transfer data. The Medical Survey Company's low graduation rate (3.9%) provides validity for the data because recruits transferred to this company were determined to be medically unqualified for service and were beginning administrative procedures for discharge. The intermediate rate of graduation (59.7%) for recruits in Academic Remedial Training suggests some moderate success for recruits with low reading skills, but no other problems. The graduation rate (97.1%) for the recruits with no recorded company transfers again indicates a high degree of accuracy in the transfer data. The small percentage of recruits (2.9%) who attrited from training without a recorded transfer may represent some minor error in the records, as well as recruits who made it through training, remained at the Recruit Training Command after graduation to complete requirements which were previously waived (e.g., the final physical fitness test or weight standards), but then ultimately failed. The graduation rates seemed acceptable for these groups given the reasons for transfer and the possible small error in the information.

The graduation rate for the Medical Hold Company, therefore, was considered to be a viable comparison group for the MRP.

Determination of 1988 Cohort. A sample of 24,626 recruits beginning training during 1988 at the Recruit Training Command, San Diego were identified by combining information from the archival databases: the Inpatient Follow-up Data System (Garland et al., 1987) and the Student Master File. This sample was reduced for analysis because of incomplete transfer information (n=176) or missing graduation status (n=118). Additionally, all recruits (n=167) from two companies were omitted from the sample because the company rosters did not indicate transfers. Elimination of these 461 recruits represented less than 2% (1.87%) of the total sample, and resulted in an analysis sample of 24,165.

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13. ABSTRACT (Maximum 200 words) A Medical Rehabilitation Program (MRP) to provide treatment and management of relatively severe acute injuries was implemented at the Recruit Training Command, San Diego. The program was designed to modify limitations of prior treatment protocols for musculoskeletal injuries and the psychosocial environment of the medical care setting. The effect of MRP on graduation from basic training was examined by comparing the graduation rate for recruits referred during the first 8 months after MRP implementation with the graduation rate for recruits experiencing similar medical conditions during the prior year. A 42.2% improvement in the graduation rate from 23.8% to 66.0% was observed for the MRP. Estimated cost savings based on the number of unproductive training days range from \$418K to \$574K per 10,000 recruits trained per year. Conservative estimates of cost savings range from \$331K to \$487K per 10,000 recruits trained after adjustment for projected annual costs for implementing the program.				
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