

Technical Report: Effectiveness of the CF Remedial PT program.

Aim

The goal of this analysis was to determine whether CF Personnel who participate in a mandated remedial PT program are in fact more likely to successfully complete their CF EXPRES test upon subsequent evaluation.

Background

In accordance with DAOD 5023-2, a *CF member who fails to meet the applicable physical fitness standard for reasons within the CF member's control shall be placed in a remedial physical fitness training program and re-evaluated.* As failure to attain Minimal Physical Fitness Standards (MPFS) can limit a member's deployability and eventual employability, it is essential to assess the effectiveness of current mandated remedial measures.

Methods

Study Design

A retrospective cohort study was designed wherein the test results of a representative sample of personnel who failed their CF EXPRES evaluation in fiscal 2008-2009 were analyzed. The independent exposure was a dichotomous variable indicating whether or not the individual attended supervised physical activity sessions at least 3 times per week for at least 6 weeks. The outcome variable was also dichotomous, representing whether the individual passed their CF EXPRES test on the second attempt. Age, gender and any medical condition were modeled both as independent moderators and covariates.

As no individual CF members were being approached for data collection, and no identifying data was obtained from the CF EXPRES Program reporting form (DND 279) (e.g., name, rank, position), this study did not require approval from Defence Research and Development Canada's Human Research Ethics Committee.

Representative bases and wings were identified for participation based on the recommendations of the respective Environmental Physical Fitness Managers. Constraints on sampling were imposed by the fact that CFB Edmonton and CFB Valcartier did not possess sufficient data to be included in the study as well as by the fact that CFSU(O) expressed an inability to participate due to workload.

Data Collection

Following discussions with PSP managers and other staff, the following bases/wings were included in this study

- CFB Halifax (east coast navy base, including fleet and Stadacona)
- CFB Esquimalt (west coast navy base)
- CFB Petawawa (operational army base)
- CFB Kingston (army training base / 1 Wing)
- 8 Wing Trenton (transport wing)
- 12 Wing Shearwater (maritime patrol wing)
- 4 Wing Cold Lake (fighter wing)

PSP personnel from these locations took part in two teleconferences to familiarize themselves with the study and the data collection tool as well as to achieve consensus on a common feasible definition of *participation in remedial PT*. Once the research team was confident that all participants understood the process, an EXCEL spreadsheet was e-mailed directly to the PSP managers (see sample sheets on following page). From their FY 2008-2009 archives, PSP staff were asked to randomly select 40 DND 279 forms for individuals who failed their CF EXPRES on the first attempt and which satisfied the following criteria:

- 20 individuals (no fewer than 5 of either gender) who took part in remedial PT
- 20 individuals (no fewer than 5 of each gender) who did not take part in remedial PT

The data sheet asked them to provide the following information for each case:

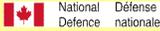
- Whether the individual took part in remedial PT
- Whether the individual eventually passed their CF EXPRES on a subsequent try at least 6 weeks after the initial failure.
- Age and gender of the individual
- Whether the individual answered yes to either of the health screening questions (dealing with limitations of participation in maximal testing or fitness training programs) on the DND 279 form.

They were given three weeks to complete and return the form and encouraged to contact the National Physical Fitness Manager with any questions.

Data Analysis

Data from the 7 locations were merged into a single database using PASW Statistics version 17.0 (SPSS/IBM, Chicago IL). Following data cleaning and verification of missing data with base PSP staff, descriptive analyses were performed including frequencies of all variables. Subsequently a binomial logistic regression model was fitted wherein participation in remedial PT was modeled as a predictor of passing the CF EXPRES test on the second attempt (at block 1). Age (categorized into the 5 brackets used to determine exempt status), gender and medical limitations were forced into the model at block 2 and subsequently removed based on 95% confidence intervals and on non-significance at $p=0.05$.

Instruction sheet sent to participants

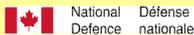



Remedial PT program SitRep.

Thank you for agreeing to assist us in this data collection process.
Please remember that our goal is not to assess the effectiveness of local your delivery of this program, but more generally to better understand the impact of the program as whole, across the CF.

- As previously discussed, we are asking you to consult a total of 40 DND 279 files of individuals who have failed their EXPRES test.
- Within these 40 files, we will be asking for
 - 20 individuals (no fewer than 5 of either gender) who took part in remedial PT
 - 20 individuals (no fewer than 5 of either gender) who did not take part in remedial PT.
- Taking part in remedial PT is defined as
having attended at least 3 sessions per week of supervised physical activity sessions for at least 6 weeks
- For each individual, we will require the following information (to be filled in on the following data sheet)
 - Whether they took part in remedial PT
 - Whether they eventually passed their EXPRES
 - Age bracket
 - Gender
 - Whether they answered YES to either of the health screening questions on the DND279
- Please return your data to Rick McKie, National Physical Fitness Manager, NLT Nov 10, 2009
Feel free to contact Rick with any questions relating to the form or the data collection
 - Mr Rick McKie
 - National Physical Fitness Manager
 - 613-996-6304
 - richard.mckie@forces.gc.ca
- Please click on the "Data sheet" tab at the bottom of this window to access the form

Data sheet completed by participants




Remedial PT program SitRep.

Please fill in the following information for a random sampling of 40 CF personnel who have failed their EXPRES test.
Remember to include 20 ppl who took part in remedial PT and 20 ppl who did not; with at least 5 of each gender in each subgroup of 20

File number	Took part in remedial PT	Passed EXPRES following at least 6 weeks of remedial PT	Age bracket categorised	Gender	Response to health screening question #1 re maximal testing	Response to health screening question #2 re training program
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
...						

Results

Description of Sample

The final sample contained 244 individuals. Tables 1-4 report their age, gender, location as well as the overall pass rate in the post-exposure CF EXPRES evaluation. In all, the dataset contained 56 cases from the Navy, 60 from the Army and 128 from the Air Force (N=244). Over 1/3 of cases were in the 40-49 yrs age bracket. Deliberate over-sampling yielded approximately a 1:2 ratio of females to males. As was intended in the design, approximately half of reported cases passed their CF EXPRES evaluation on the second attempt. Retest times varied from 6 weeks to several months.

Due to a lack of reference data, it is impossible to assess whether this sample is an accurate demographic representation of the overall population of CF personnel who fail the CF EXPRES evaluation. Further analyses did show however that there were no significant differences in terms of age or gender between the two groups (those who took part in remedial PT and those who did not).

Table 1. Age of respondents at time of data collection

Category	Frequency	Percent
17-19 yrs	3	1.2
20-29 yrs	64	26.2
30-39 yrs	64	26.2
40-49 yrs	87	35.7
50-59 yrs	26	10.7

Table 2. Gender of respondents

Gender	Frequency	Percent
Male	160	65.6
Female	84	34.4

Table 3. Location of respondents

Location	Frequency	Percent
Cold Lake	40	16.4
Esquimalt	40	16.4
Halifax	16	6.6
Kingston	20	8.2
Petawawa	40	16.4
Shearwater	40	16.4
Trenton	48	19.7

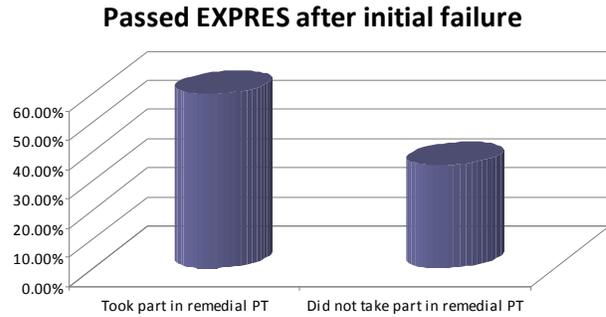
Table 4. Participation in remedial PT

Took part in Remedial	Frequency	Percent
Yes	124	50.8
No	120	49.2

Effects of Remedial PT

In this sample, 59.7% of those who took part in remedial PT passed their EXPRES evaluation on the second attempt compared to 35.5% of those who did not take part in remedial PT (see Figure 1). Binomial logistic regression analyses confirmed that individuals who took part in the mandated remedial PT program were nearly 3 times more likely to pass their CF EXPRES evaluation on the second attempt when compared to those who did not take part in the program (OR:2.75; 95%CI:1.618-4.675; $p < 0.001$; see Table 5)*.

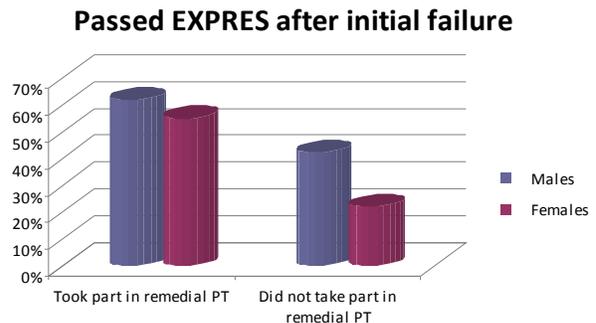
Figure 1. Pass rates of those who took part and did not take part in remedial PT



Overall, individuals who took part in the mandated PSP designed remedial PT program were 2.75 times more likely to pass their CF EXPRES evaluation on the second attempt when compared to those who did not take part in the program.

Since females were deliberately over-sampled in this study to ensure statistical significance in the sub-group analyses, generalizations to the overall CF population (or to the sub-population of CF members who fail their CF EXPRES evaluation) should be made with caution, and in essence be made in a gender-specific manner. As expected, the only significant predictor at block 2 of the logistic regression was gender, indicating that being female roughly halves one's overall odds of passing the CF EXPRES evaluation on the second attempt (OR:0.552; 95%CI:0.314-0.971; $p < 0.05$).

Figure 2. Pass rates of males and females who took part and did not take part in remedial PT



*: A direct comparison of pass rates between those who did and did not participate in remedial PT would appear to indicate that those who participate are 1.68 times more likely to pass on the second attempt (59.7/35.5). However, the binomial logistic regression represents a more robust comparison, taking into account distribution and variance within the groups. This is the analysis which yields the odds ratio of 2.75 with a 95% confidence interval indicating that it is appropriate to reject the null hypothesis. Please see *Data Analysis* section for a detailed explanation of statistical procedures.

Interestingly however, the positive effect of participation in remedial PT is roughly twice as strong for females when compared to their male counterparts. (OR:4.35; 95%CI:1.652-11.428 for females vs OR:2.227; 95%CI:1.176-4.219 for males). In terms of raw percentages, females who took part in remedial PT increased their pass rates from 22% to 55% whereas males who took part in remedial PT increased their pass rates from 42% to 62% (see Figure 2).

Specific analyses by environment showed that those who take their remedial PT on a Navy base increase their odds of passing by a factor of more than 10 times whereas those who take part in remedial PT on an Air Force base increase their chance of passing by a factor of 2.7 (see Table 5). Based on the data received, those who take part in remedial PT on an Army base do not significantly increase their odds of passing the CF EXPRES evaluation on the second attempt (OR:2.174;95%CI:0.577-8.196). Hosmer-Lemeshow tests showed acceptable goodness of fit for all logistic regression models retained.

Table 5. Odds of passing CF EXPRES on second attempt with participation in remedial PT (as compared to non-participation) across environments.

Environment	Odds Ratio	95% confidence interval
Navy	10.5*	2.54-45.45
Army	2.174	0.58-8.20
Air Force	2.69*	1.21-5.98
Combined	2.75*	1.62-4.68

* : significant at a p-value of 0.05 or less

Conclusions

In general, the current remedial PT program is effective in increasing one's ability to pass the CF EXPRES evaluation on the second attempt. Even though females are less likely to pass their CF EXPRES evaluation on the second attempt when compared to their male counterparts, they seem to further benefit from the remedial PT program itself. The increased pass rates with participation are encouraging and support the need for increased participation in mandated remedial PT programs. Despite the fact that personnel who fail their CF EXPRES evaluation are expected to attend remedial PT, most bases had no difficulty finding at least 20 individuals who did not take part in the program. From a policy standpoint, CoC support is essential in the success of such a program.

Despite significant increases in success rates, approximately 38% of males and 45% of females who take part in the remedial PT program continue to be unsuccessful in passing the EXPRES test on subsequent attempts. More detailed studies on the nature and content of the various remedial PT programs may be necessary to further highlight the variable and training mechanisms which contribute to greater success rates.

In the current study, neither age nor medical limitations significantly affected the odds of successfully passing the CF EXPRES test on the second attempt. This being said, there was very little variance in the responses for medical limitations (with the overwhelming majority of cases reporting no limitations) which likely contributed to the lack of significance of this moderating factor. The fact that age did not affect the odds of passing on the second attempt is encouraging, suggesting that the remedial PT program is roughly equally effective for all age groups.

Despite a lower overall pass rate, females were more advantaged by the remedial PT program than their male counterparts.

The fact that no significant effect was found for participation in remedial PT on an army base may be due to the small sample size of this environmental subgroup (60 individuals) as compared to the population represented. Record-keeping, more than lack of persons meeting the criteria appears to be at issue in this case.

As this study is retrospective by design and counted on the data collection and reporting practices already in place at the participating locations, it contains some limitations which should be addressed in the future.

Firstly, there may be a selection bias (particularly for the army) in that the bases that were excluded due to inadequate record-keeping may not necessarily be similar to Petawawa in the way the remedial PT program is administered, hence limiting generalizability and external validity of the findings for the army. For this reason, a standardized and centralized record keeping framework is required to provide effective support to the field in collecting data on programs, attendance and pass rates.

Secondly, no information on the nature and content of the various remedial PT programs across the CF was collected. Now that it can be determined which bases have stronger success rates, further qualitative analyses can be performed in order to identify and transpose best practices to other locations.

Thirdly, the specific element of CF EXPRES which caused the person to fail their test was not addressed in this study. Better record-keeping would allow larger sample sizes in future studies, and enable the researchers to distill the data down to the four components of the test. It is widely accepted that cardiovascular endurance improves at a different rate than does muscular endurance hence possibly affecting how likely a person is to improve from a fail to a pass in 3 months.

Anecdotal evidence obtained in the context of this data collection suggests that some personnel who fail their CF EXPRES evaluation are being diverted to the LFCPFS rather than reattempting the EXPRES after remedial training. Further data collection is required to elucidate this issue and identify means to support local chains of command in respecting DAOD 5023-1 if necessary.

Finally, though remedial PT is the only mandated program which directly addresses fitness levels, DFIT via the local PSP fitness staff does offer several other “optional” programs which also lack empirical evidence to support their efficacy and effectiveness. Prospective case-control or randomized clinical trials should be built into the initial delivery and pilot testing of all programs, including those in health promotion to ensure that CF personnel receive the best preparation and support in improving their health, fitness and operational readiness.

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Date	15 November 2013		

Paragraph to enter into main body of report:

As failure to attain Minimal Physical Fitness Standards (MPFS) can limit a member's deployability and eventually employability, it is essential to assess the effectiveness of current mandated remedial measures. A retrospective case-control study was designed wherein the testing results of a representative sample of personnel who failed their CF EXPRES evaluation in fiscal 2008-2009 were analyzed. Binomial logistic regression analyses confirmed that **individuals who took part in the mandated remedial PT program were nearly 3 times more likely to pass their CF EXPRES evaluation on the second attempt when compared to those who did not take part in the program.** Specific analyses by environment showed that those who took their remedial PT on a Navy base increased their odds of passing by a factor of more than 10 times whereas those who took part in remedial PT on an Air Force wing increased their chance of passing by a factor of 2.7. Based on the data received, those who took part in remedial PT on an Army base did not significantly increase their odds of passing the CF EXPRES evaluation on the second attempt. Though females showed lower pass rates overall, they were more advantaged by participation in remedial PT than their male counterparts. (For further details on the study, please see the technical report at Appendix _?_.)