

**Pre-Placement Functional  
Capacity Evaluations**

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**Interest in measurement of physical strength probably dates to the first humans.**

**Persons with limited strength are more likely to be injured in physically demanding jobs.**

**Strength: Capacity to produce force or torque with voluntary muscle contraction.**

**Voluntary muscle contractions should only be measured by the effort the person is willing to put forth.**

**Simple muscular movements/force exertions: functional muscle group works together to produce observable output.**

**Two primary purposes:**

- 1) worker selection/placement**
- 2) job design**

**Worker selection/placement can reduce harmful physical effects caused by job/worker mismatch given adherence to three principles:**

- 1) Strength measured closely simulates actual high strength elements in a job.**
- 2) Predictive Value: the measure of the test's ability to determine who is at risk of future work related musculoskeletal disorders (MSDs).**
- 3) The training/skills of the ergonomist administering the test.**

**Chaffin (1974): strength testing had appropriate use in worker selection if the three principles were met.**

**MSDs account for 34% of all lost workdays and illnesses ([www.OSHA.gov](http://www.OSHA.gov)).**

**The Veterans Health Administration (VHA) is the largest Federal employer of health care workers in the USA.**

**No other VHA facility has evaluated FCEs to reduce MSDs.**

**Two specific questions:**

- 1) Were the workforce demographics stable to properly evaluate FCE effectiveness?**
- 2) Did FCEs for CTVHCS applicants having 45 lb lifting/carrying functional requirements result in a reduction of job-related MSDs?**

**Study subjects: CTVHCS workers (N=622) with 45 lb minimum lifting/carrying functional requirements entering on duty (EOD) between Feb 1, 1994 - Jan 31, 2000.**

**EODs between Feb 1, 1994 - Jan 31, 1997 (N=291): only pre-placement physical (no FCE testing).**

Workers (N=331) with 45 lb lifting/carrying requirements hired between Feb 1, 1997- Jan 31, 2000: FCE + clinical exam.

Injury case definition: Workers with 45 lb requirement (EOD Feb 1, 1994-Jan 31, 2000), sustaining a lifting/carrying injury, medically evaluated and/or treated, and filing a CA-1.

Historical cohort study: outcomes occurred before investigation began, cohorts created, and their experience assessed from records.

After EOD, each employee was at injury risk for 3 years max.

$$\text{RATE} = \frac{\text{\#injuries}}{\text{time at risk as weeks of work}} \times 10,000$$

Crude rates: basic population characteristics may also differ substantially, particularly age. Statistical adjustment decreases age confounding.

Confounding: variables whose effect is entangled with the effect of other variables.

Adjusted injury rate per 10,000 worker weeks: Male Workers

All Workers combined (n=284)	RN (n=43)	Housekeeping (n=94)	Med Other (n=68)	Food Service (n=44)
Not tested: 6.23	1.64	5.53	11.28	5.4
Tested: 4.2	10.78	2.04	0	3.08

Adjusted injury rate per 10,000 worker weeks: Female Workers

All Workers combined (n=338)	RN (n=167)	Med Other (n=74)	LPN(n=47)
Not tested: 8.08	9.47	11.32	10.26
Tested: 6.34	4.76	4.03	11.45

Injury rates vs. raw injury numbers: worker-weeks at risk estimated for each worker to refine person-time denominator of the rates.

Study demonstrated a reduction in the rate of MSDs for the FCE tested group compared to the FCE non-tested group when all job categories were considered.

Multivariate analysis using negative binomial regression: the appropriate regression tool to determine statistical modeling of rare events. In addition, an economic analysis of the injury data will be done.

This is a study in progress. Other variables listed previously have not been analyzed. Additional decreases in the injury costs considering applicants not recommended for hiring (37).

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