OCCUPATIONAL HEALTH

SPECIAL INTEREST GROUP

President's Message

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While attending a recent conference, I had the opportunity to visit with a Physical Therapist from Brazil. In small groups, we were assigned a task related to the coordination of teams in patient care. As we struggled to articulate the global goals of teams, she astutely reminded us of the International Classification of Functioning, Disability and Health (ICF). By applying this construct, our task was then neatly framed and focused. In 2002, the World Health Organization released the paper, "Towards a Common Language for Functioning, Disability, and Health." The authors of the study penned these words worth repeating and critically important in Occupational Health Physical Therapy; "Studies show that diagnosis alone does not predict service needs, length of hospitalization, level of care, or functional outcomes. Nor is the presence of a disease or disorder an accurate predictor of receipt of disability benefits, work performance, return to work potential, or likelihood of social integration."[1(p4)] Successful interventions directed at the worker and work place focus on **activity**, defined as, "the execution of a task or action by an individual, and on **participation**, involvement in a life situation." It must be understood that impairments of body functions and structure, may play only a small role in the person's ability to participate in work.

Please join us, Friday, February 6 at 8 a.m., at the Combined Sections Meeting in Indianapolis for a lively discussion of applying the ICF model to the work setting. This session will be preceded by the OHSIG membership meeting.

REFERENCE

1. World Health Organization. Towards a common language for functioning, disability, and health. http://who.int/classfications/icf/training/icfbeginngersguide.pdf. Accessed November 25, 2014.

Physical Therapists can Provide Critical Services for the Health and Wellness Along with Injury Prevention for Fire Fighters

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Over the last few decades, on-the-job injuries have become one of the largest costs to employers. According to a study done at UC Davis, injuries and illness are the largest health care costs in America. In 2010, the cost of injury and illness in America was approximately $250 billion. This exceeds the costs for cancer, diabetes, and strokes.[1]

These costs have had a negative impact on health care providers, insurance companies, employers, and employees. The rising cost of health care due to rising group health insurance premiums for employees and rising workers compensation costs have had a major impact on smaller cities. Municipalities, like city fire departments, have had difficulty adjusting their budgets to cover these costs without negatively impacting the benefits offered to firefighters and the potential safety of the communities they serve.

The importance of injury prevention and improved overall health is essential in reducing these out of control costs. Several recent studies have focused on the injuries sustained by firefighters. In 2013, Poplin et al[2] published data that revealed that persons with a VO_2 max less than 43 were 2.2 times more likely to sustain an on-the-job injury than those with a VO_2 max greater than 43. Those with a VO_2 max between 43 and 48 were 1.3 times more likely to have an injury. Their study suggests that increasing firefighter fitness by 1 MET can reduce the risk of injury by 14%.[2]

In 2012, Burgess et al[3] stated that heart disease is the leading cause of firefighter line-of-duty deaths. They studied carotid intima-media thickness (CIMT) and the risk factors predicting increased CIMT and carotid plaque. They found that the low-density lipoprotein cholesterol (LDL-C) of 100 mg/dl or more and high-density lipoprotein were significant independent predictors of increased CIMT. Cardiac risk factors for firefighters may also be reduced by effectively monitoring and decreasing cholesterol levels.[3]

The Cable News Network (CNN) reported in 2014 that more than 70% of domestic firefighters are overweight or obese. Even though the need for firefighters to be fit is obvious, accord-

ing to the CDC their rate of obesity is slightly higher than that of the general population. The CDC also reports that cardiovascular events account for nearly half the deaths of on-duty firefighters and obesity has been linked to an increased risk of job-related disabilities.[4]

In the *Journal of Occupational Medicine*, Brown et al report that the prevalence of overweight and obesity among firefighters exceeds that of the US adult population despite a physically demanding work environment. They also state that obesity among firefighters is associated with markers of poor cardiovascular health, job disability, and injuries. Their findings identified that firefighters with a BMI of 35 kg/m^2 self-reported 19 more days of poor health annually than those firefighters with a BMI of 25kg/m^2.[5]

To address these occupational concerns, the National Fire Protection Agency (NFPA) published updated guidelines for recommended fitness levels for active firefighters in 2011. These recommendations included guidelines for strength, flexibility, and aerobic capacity.[6] In 2013, Intermountain WorkMed started providing annual fitness testing for local fire departments. The following are the results of this testing for the largest fire department in that area for 2013 and 2014.

One hundred twenty-two firefighters from the same department were screened over a two-year period at Intermountain WorkMed. This screening was just one component of their annual, comprehensive work physical. Standardized anthropometric and physiological measurements of height, weight, blood pressure, resting HR, BMI, VO_2 max, and MET levels were measured and calculated for all the firefighters from that department in 2013 and 2014.

Descriptive statistics were performed looking at weight, BMI, VO_2 max, and MET levels (Table 1). The mean age of firefighters testing in 2013 and 2014 was 38.35 and 37.68 years old, respectively.

Firefighters were arbitrarily separated into 3 categories based on MET testing results. The categorical delineations were as follows: moderate risk ≤ 10.5, low risk 10.6-11.99, and no risk ≥ 12. In 2013, 73% of the tested firefighters met the minimum NFPA recommendation of ≥ 12 MET and only 65% in 2014 (Figure 1 and 2).

Single factor ANOVA's were computed to determine any significant differences with a 95% CI for MET, BMI, and VO_2 max measurements between 2013 and 2014. No statistically significant differences were noted between the two years (Tables 2, 3, 4). When a single factor ANOVA analysis was computed for MET levels ≥ 12 with a 95% CI, it was shown that a statistically significant difference occurred between 2013 and 2014 ($P < .047$) (Table 5).

The 2011 NFPA fitness guidelines recommend that active duty firefighters should be able to function at a ≥ 12 MET level. These recommendations are based on the estimated energy expenditure requirements to safely perform essential job duties. Following two years of testing, it was determined by the medical provider, physical therapy staff, and fire department that greater gains in overall fitness levels of firefighters were recommended to meet national guidelines for reducing health risks and line-of-duty injuries.

As part of an ongoing relationship with the fire department, a pilot program has been developed and implemented to improve the overall fitness of the firefighters in this department.

Table 1. Demographics of Firefighters Tested in 2013-2014

	2013	2014
Male	99	94
Female	5	6
Age, y	38.27	37.74
Mean weight (lbs.)	192.41 ± 32.18	195.49 ± 33.35
Mean Height (in.)	70.44	70.63
Mean resting HR	78.24	74.32
Mean BMI	26.79 ±3.74	27.47 ± 3.86
Mean VO_2Max mL/ (kg × min.)	44.10 ± 4.11	43.82 ± 4.22
Mean MET level	12.60 ± 1.17	12.52 ± 1.21

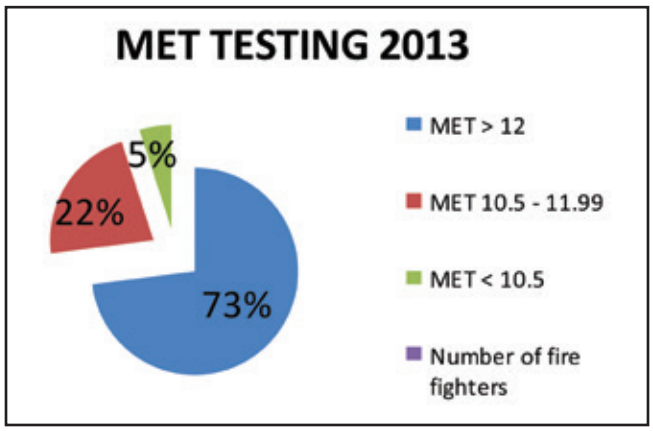

Figure 1. Percentages of MET for 2013.

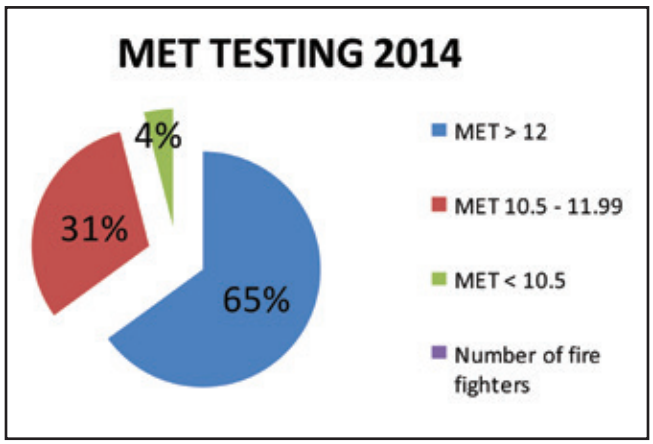

Figure 2. Percentages of MET for 2014.

This program will be implemented and monitored by the physical therapy clinic over the coming year and will be re-evaluated following repeat testing in 2015.

It is the opinions of the authors that Occupational Physical Therapists can be a critical resource for helping increasing the health and well-being of firefighters while in turn reducing injuries and the cost of those injuries on individuals and society. This pilot program will continue efforts to accomplish this by providing fitness testing and by designing personalized work conditioning programs for firefighters.

Table 2. Single ANOVA Statistical Analysis for BMI

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
2013 BMI	104	2786.43	26.79	14.018
2014 BMI	100	2747.25	27.47	14.93

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	23.57	1	23.57	1.63	0.20	3.89
Within Groups	2921.61	202	14.46			
Total	2945.17	203				

Abbreviation: BMI, body mass index

Table 3. Single ANOVA Statistical Analysis for VO2 max

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
2013 VO_2max	104	4586.16	44.09	16.87
2014 VO_2max	100	4382.59	43.82	17.84

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3.76	1	3.77	0.22	0.64	3.89
Within Groups	3503.67	202	17.34			
Total	3507.44	203				

Table 4. Single ANOVA Statistical Analysis for MET

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
2013 MET EQUIV	104	1310.28	12.59	1.38
2014 MET EQUI	100	1252.36	12.52	1.46

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.29	1	0.28	0.20	0.65	3.88
Within Groups	287.08	202	1.42			
Total	287.37	203				

Table 5. Single ANOVA Statistical Analysis for MET ≥ 12

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*		*Average*	*Variance*
2013 MET ≥ 12	35	435.66	12.45	0.09	
2014 MET ≥ 12	35	441.26	12.61	0.13	

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.45	1	0.45	4.08	0.05	3.98
Within Groups	7.46	68	0.11			
Total	7.91	69				

REFERENCES

1. Revisions to the 2010 Census of Fatal Occupational Injuries (CFOI) counts. http://www.bls.gov/iif/oshwc/cfoi_revised10.pdf. Accessed December 10, 2013.
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3. Burgess JL, Kurzius-Spencer M, Gerkin RD, Fleming JL, Peate WF, Allison M. Risk factors for subclinical atherosclerosis in firefighters. *J Occup Environ Med*. 2012;54(3):328-335.
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6. National Fire Protection Association. NFPA 1582: Standard on Comprehensive Occupational Medicine Program for Fire Departments. http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1582. Accessed November 25, 2014.