

NECOEM Reporter

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**NECOEM
MaAOHN
Annual
Conference
December 4 - 5,
2008
Challenges in
OEM:
Making a
Difference**

Closed head injuries in OH, Occupational dermatology, ankle and foot trauma in OH, climate change and public health with Director of ATSDR Howard Frumkin, DOT update with Natalie Hartenbaum, use of EMG studies in OM, musculoskeletal management in sports vs occ, injuries with Thomas Gill, MD, Medical Director Boston Red Sox, MRO update, MRSA update, legal/cultural issues with emerging immigrant workforce, workers comp issues, identifying patient deception, incident command, chemical exposures and Parkinson's Disease, ergonomics and computers, OSA screening for DOT, rehab of neck pain, forensic handwriting analysis, short documentary on children and lead, awards, exhibits, reception, annual meetings of NECOEM and MaAOHN and much more

How to Reduce Cardiovascular Mortality in Your Fire Department

Joint NECOEM/OEMAC Mini-Conference

Jonathon Mittelman, MD, MPH

A blustery day early this fall in the bucolic setting of Old Sturbridge Village in Western Mass saw some 80 physicians, nurses and firefighters attending a joint NECOEM-OEMAC Conference on "How to Reduce Cardiovascular Mortality in Your Fire Department."

The morning conference saw several presentations: Stefanos Kales MD, MPH, of the Harvard School of Public Health presented the State-of-the-Art in Assessing Risk in

Firefighters. Information from his talk and over a decade of research by his group is summarized in an accompanying article

Thomas Hales MD, MPH, of NIOSH discussed Practical Application of the NFPA 1582 Standard. Bruce Jacobsen PT, discussed fitness programs and strategies to implement fitness programs into fire departments. Chief Ronald Samul presented on the success of the New London Fire Department in implementing



their fitness program. Finally, Providence Fire Fighter Bonnie Benson and her trainer discussed the Firefighter Combat

(Continued on page 2)

CARDIOVASCULAR DISEASE IN FIREFIGHTERS: AN UPDATE

Stefanos N. Kales MD, MPH, FACP, FACOEM

There are more than one million Americans serving as firefighters. Roughly, 70% are volunteers, while 30% work as career firefighters. This article concisely reviews current knowledge regarding firefighters and cardiovascular disease. Cardiovascular events

(primarily due to coronary heart disease (CHD)) account for about 45% of on-duty deaths among firefighters, while the corresponding figures for police officers, construction laborers and all occupations combined are 22%, 10% and 15%, respectively.

(Continued on page 3)



Joint Conference (Continued from page 1)

Challenge, representing the pinnacle of Firefighter fitness.



Dr. Thomas Hales, Senior Epidemiologist at NIOSH, discussed the NFPA 1582 Standard. The Standard is a consensus-based document developed with public input and open meetings over the course of a 5-step process. The Standard's format includes its main Body, which includes the 'requirements' and an Appendix, which is 'for informational purposes only.' The Standard itself is voluntary; NFPA is not a regulatory body.

Reviewing the essential job tasks of firefighters, which include wearing 60 pounds of personal protective equipment (PPE) while carrying some 40 pounds of tools, climbing ladders, advancing water-filled hose lines and dragging victims, Dr. Hales showed that these activities required up to a Maximal Oxygen Consumption of 44 ml/kg/min, or 12.5 METS.

While the Standard's text gives only broad outlines for Candidate Evaluation, the Annex is much more detailed, reflecting the broader scope of consensus opinion. There is clearly no unanimity in recommendations for resting EKGs and chest x-rays. The Annual Member evaluation recommends a resting EKG which the Annex A supports as 'reasonable' but 'not been shown to be useful'.

However, a sub-maximal stress test as clinically indicated is recommended; additionally a Diagnostic

Stress Test should be performed for:

- Firefighters with a positive submax ST
- Angina
- Males >45 and Females >55 with ≥ 2 CAD risk factors:

- Total cholesterol >240
 - Stage 1 or greater hypertension (sys >140 or dias >90)
 - Smoking
 - Diabetes Mellitus
- Family History of MI or Sudden Cardiac Death (1st Deg Relative <60yrs)

Noting that the Standard has 2 categories for disqualifying conditions: 'A' Precluding and 'B' Possibly precluding, the presence of CAD (Angina, MI, angioplasty or CABG) is considered a Category A condition for Candidates; but for Members, other items must be taken into consideration.

Members with CAD can perform firefighting duties without restrictions only if:

- No angina
- No stenosis of major coronary artery (>70% lumen)
- Normal LVEF
- Exercise tolerance >12 METS during EST
- No exercise induced angina
- No ischemia or arrhythmias during EST (imaging)
- No persistent or modifiable Risk Factor for plaque rupture (tobacco, HBP, Cholesterol >180, LDL >100, HgbA1c >7)

Hypertension is disqualifying to Candidates only if end-organ damage is present. For Members, those with uncontrolled hypertension (>180/100) and/or end-organ damage are disqualified.

Bruce Jacobsen, a Physical Therapist from St. Raphael's Occupational Medicine Program, presented recommendations for implementing fitness programs in fire departments.

He discussed the assessment of aerobic fitness, muscular fitness

and flexibility. Body musculature is assessed both for strength and endurance. He discussed methods of implementing programs, noting the challenges posed in various settings.



Chief Ronald Samul presented the success of the fitness program that has been developed for the New London Fire Department. A key to that program's success is that it is done at each of the fire houses and during on-duty time.

In summary, the day's conference successfully covered the most pressing issue facing the Fire Service today: how to reduce cardiovascular mortality in the Fire Service:

First, follow the principles of Primary Prevention: encourage a healthy life style, including Mediterranean diet, regular exercise, weight loss if needed and smoking cessation.

Then, Secondary Prevention: implement a Medical Program for your Fire Department. Screen for hypertension, looking for LVH and CAD. Use exercise stress tests to ensure that members can achieve the required METS (12) without developing symptoms of CAD. Make recommendations for restrictions from strenuous duty when individuals at high risk are identified.

These are both areas where Fire Service Chiefs and Occupational

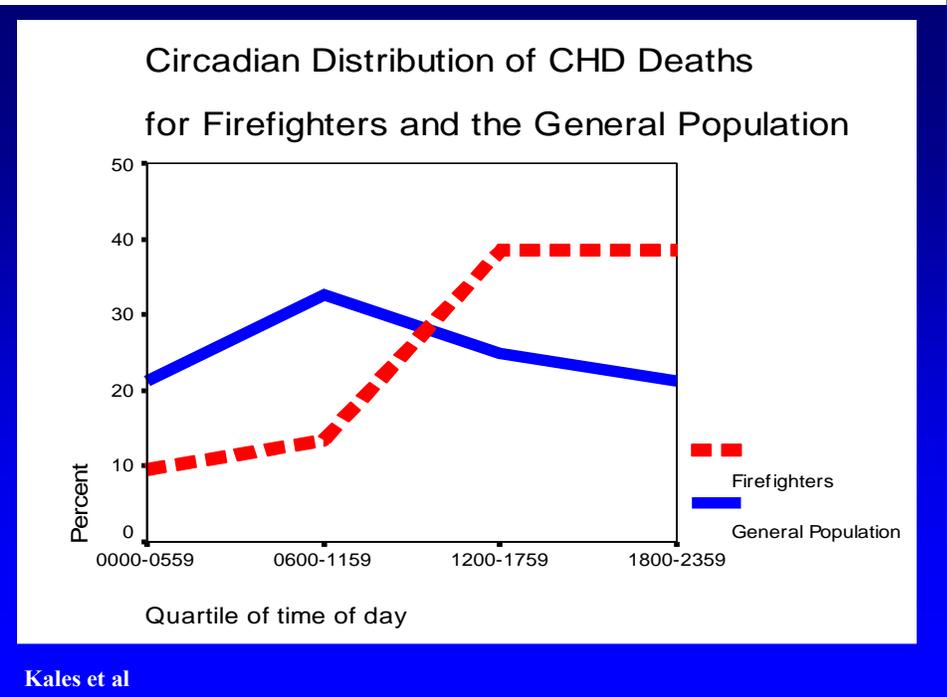
(Continued on page 5)

Cardiovascular Update (Continued from page 1)

When fatal and non-fatal outcomes are combined, on-duty cardiovascular disease affects about 1 in every 1000 firefighters per year.

Typically, firefighters’ work involves long stretches of relative inactivity, spiked with unpredictable bursts of stress and potential danger. The latter produce adrenergic surges and higher demands on the cardiovascular system. Surprisingly, however, definitive evidence of increased lifetime cardiovascular mortality among firefighters is lacking. Most likely, this is explained by the “healthy worker effect”, producing lower than expected morbidity/mortality due to the relative exclusion of persons with baseline disease and disability from the cohort.

Nonetheless, scientific studies have documented that various types of strenuous situations can trigger acute cardiovascular events in persons with underlying disease (e.g. exercise, snow shoveling, episodes of anger and watching sports events). In this regard, our team has demonstrated elevated relative risks for fatal and non-fatal, cardiovascular disease outcomes in firefighters during the performance of specific emergency duties as compared to non-emergency situations



(Table 1). For example, although fire suppression (mitigating and extinguishing fires) represents only 1-5% of annual professional time among firefighters, fire suppression accounts for over 30% of on-duty CHD deaths. Thus, the relative risk of on-duty events during fire suppression is 10-100 times higher than that of non-emergency duties. Other evidence that emergency duties can precipitate cardiovascular fatalities comes from the circadian dis-

tribution of on-duty heart disease deaths in firefighters. Rather than following the typical pattern seen in the general population, 67-77% of on-duty cardiac deaths among firefighters occur between noon and midnight as do most alarms, dispatches and emergencies (Figure).

Occupational factors likely to contribute to increased cardiovascular disease risk among firefighters are summarized in Table 2. A particularly intriguing area of future research will be to examine the role of sleep disruption (by shift work, alarms during sleep, second jobs and sleep disorders, especially sleep apnea) in elevating the risks of metabolic syndrome and cardiovascular disease among firefighters.

As would be expected, on-duty cardiovascular events and heart disease retirements in firefighters occur primarily in firefighters with underlying disease (either known or previously subclinical) and excess cardiovascular risk factors (Table 3). Among those experiencing fatal and non-fatal on-duty coronary heart disease events, we have found that 31 %

Type of Duty	Kales et al 2003 (relative risk of CHD death)	Holder et al 2006 (relative risk of heart event leading to retirement)	Kales et al 2007 (relative risk of CHD death)
Fire suppression – OR** (95% CI)	64.1 (7.4-556)	51 (12-223)	53 (40-72)
Physical training – OR** (95% CI)	7.6 (1.8-31.3)	0.68 (0.2-2.7)	5.2 (3.6-7.5)
Alarm response – OR** (95% CI)	5.6 (1.1-28.8)	6.4 (2.5-17)	7.4 (5.1-11)
Alarm return –OR (95% CI)	3.4 (0.8-14.7)	0.37 (0.07-1.8)	5.8 (4.1-8.1)
EMS and other non-fire emergencies – OR** (95% CI)	1.7 (0.5-5.9)	0.75 (0.3-1.8)	1.3 (0.9-2.0)
Firehouse and other non-emergency activities – OR** (95% CI)	1.0	1.0	1.0

Table One. Duty Specific Risks of Heart Disease, Kales et al

(Continued on page 4)

Cardiovascular Update (Continued from page 3) and 18 %, respectively, were working with previously diagnosed coronary heart disease, peripheral vascular disease and/or cerebrovascular disease. Additionally, the prevalences of smoking (24-40%), hypertension (49-78%), obesity (41-61%) and diabetes mellitus (14-21%) were all significantly higher than among active control firefighters. A prospective study by Glueck et al showed similar results for these risk factors, as well as finding higher mean baseline total and LDL cholesterol in those who were later documented to have CHD. Consistent with the above, we have found that the risk of heart disease fatalities and disability retirements increases with age.

With regard to case fatality (i.e. whether an on-duty event results in death or non-fatal disability), smoking, hypertension and prior CHD are strong independent predictors of fatality. Each independently increases the odds of death about four-fold. CHD fatalities are twice as likely to have had previous evidence of myocardial damage (74%) compared to 35% of those surviving events.

Another important public health/policy aspect of cardiovascular disease among firefighters relates to special legislative provisions that legally “presume” job-related risks of cardiovascular disease. More than 35 states (including MA, ME, NH, VT and CT) have passed laws entitling firefighters with heart disease to receive publicly funded death and/or disability awards. In general, this type of benefit legislation creates the legal presumption that the affected worker’s disease is causally related to firefighting even in the presence of other obvious risk factors. The Hometown Heroes Survivor Benefits Act provides federal aid to the families of firefighters, police officers, and EMS workers who die of on-duty heart attack or stroke. Thought lead-

Table 2. Occupational Risk Factors for Cardiovascular Disease

Irregular physical exertion
Smoke (gaseous and particulate) exposure
Unhealthy diet, shift work and other sleep disruption
Noise exposure
Posttraumatic Stress
High job demand and low decisional control

ers in occupational medicine and the fire service should advocate that some of the public monies dedicated to these benefits be invested proactively in prevention programs that would ultimately reduce firefighters’ cardiovascular morbidity and mortality.

In this regard, research from the general population and from firefighters supports several preventive strategies. First, we know that a healthy diet, avoiding excess weight and engaging in regular aerobic exercise have positive effects on modifiable cardiovascular risks such as blood pressure, lipid and glucose metabolism, abdominal obesity, inflammation and exercise tolerance. Given that the large majority of current firefighters are overweight and one-third to 40% are obese, large gains could be realized. Promoting improved sleep hygiene can have complimentary beneficial effects in preventing/improving the metabolic syndrome.

Next, other risk reduction measures need to be vigorously promoted. Smoking should be prohibited among new hires and strong incentives for smoking cessation should be offered to incumbent firefighters who continue to smoke. Our studies have also shown that both lipids and

hypertension are inadequately treated among firefighters. Given firefighters’ cardiovascular risks, treating physicians should be more proactive. With regard to hypertension, it is important to note that the majority of incident cardiovascular disease events occur in emergency responders who are initially pre-hypertensive or only mildly hypertensive and whose average pre-morbid blood pressures are in the range in which many physicians would hesitate to prescribe medications (140-146/88-92). Additionally, findings that 56% of CHD firefighting fatalities had evidence of left ventricular hypertrophy (LVH) at autopsy suggest chronically uncontrolled hypertension. LVH increases the risk of arrhythmia and is a strong independent predictor of mortality, yet it can be reversible with appropriate treatment.

We have proposed that blood pressure standards for firefighters be re-considered. Briefly, those with stage 2 blood pressure (>/ = 160/100 mm Hg) should be restricted from strenuous duties until better control is achieved and investigations for end-organ damage such as echocardiogram to look for LVH have been done. For firefighters with stage 1 hypertension (140-159/90-99 mm Hg), time-limited work clearances should be provided along the lines of recent changes in rules for federally-regulated professional drivers. It is crucial that firefighters with inadequate blood pressure control are not encouraged (as they are by the current guidelines allowing blood pressures of up to 159-179/90-99 mm Hg) to believe that their blood pressure is “under control.”

There is one more primary preventive strategy that may not be self-evident, but the correlation of influenza activity and CHD mortality in the general population and a rela-

tive excess of CHD deaths among firefighters during winter provide an additional reason for firefighters to receive annual influenza vaccination.

Based on the overwhelming relative risks of on-duty death and disability among firefighters with CHD, most persons with known CHD or other atherosclerotic endpoints should be restricted from participating in emergency duties. Some primary care physicians and cardiologists either fail to inquire about occupation or do not consider or appreciate the unique cardiovascular demands of firefighting. Therefore, all fire departments should have clear return to work procedures that require clearance by an experienced occupational physician after any significant illness. If firefighters with known atherosclerotic disease were restricted from emergencies, it would likely decrease cardiovascular mortality in the fire service by at least 25-30%. Further risk stratification of firefighters without a history of atherosclerotic disease should include maximal exercise tolerance testing (ETT) for all firefighters starting at the age of 45. In firefighters with additional risk factors beyond age, periodic ETTs should start earlier. We believe that ETT results should

Table 3. Relative risk of cardiovascular outcome by risk factor

	On-Duty CHD Fatalities	Non-CHD Cardiovascular Retirements OR (95% CI)	CHD Retirements OR (95% CI)
Age ≥ 45 years old	18 (8.5- 40)	26 (13 – 51)	63 (35 – 111)
Current Smoking	8.6 (4.2-17)	2.5 (1.2 – 5.1)	3.9 (2.5 - 6.2)
Hypertension	12 (5.8 – 25)	11 (6.1 – 20)	5.4 (3.7 - 7.9)
Diabetes Mellitus	10.2 (3.7 – 28)	7.7 (2.9 – 20)	13 (6.1 - 28)
Cholesterol >= 5.18 mmol/L (200 mg/dl)	4.4 (1.5 – 13)	1.1 (0.51 – 2.24)	2.4 (1.6 – 3.6)
Prior Diagnosis of CHD	35 (9.5 -128)	NA	30 (9.1 – 96)
Obesity, BMI >=30	3.1 (1.5- 6.6)	3.6 (2.0 – 6.4)	1.4 (0.96 – 1.93)

Kales et al

be examined not only for the presence/absence of ischemia, but also for blood pressure response and exercise capacity. The National Fire Protection Association has suggested 12 METS as the minimum capacity required for safe firefighting. Prospective studies are underway to better refine these criteria. Likewise, the utility of other non-invasive tests (e.g. coronary artery calcium and carotid intima-media thickness) are being examined. In conclusion, our understanding of cardiovascular disease among firefighters has significantly improved. Preventive measures already proven in the general population should be applied in a more aggressive fashion to this

public safety profession that is exposed to increased risks of acute heart disease events while performing emergency duties.

Dr. Kales is the Medical Director of Employee & Industrial Medicine at Cambridge Health Alliance and an Assistant Professor at Harvard University. He can be reached at skales@challiance.org

Figure. (from Kales SN, Soteriades ES, Christoudias SG, Christiani DC. Firefighters and on duty deaths from coronary heart disease: a case control study. Environ Health 2003;2:14)

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Joint Conference (Continued from page 2)

Medicine Physicians can work together to develop programs that best serve their departments.

Many thanks to Dianne Plantamura for organizing and putting on this program!

Jon Mittelman is the Medical Director, Dominion Nuclear of Connecticut (Millstone Station), Occupational Medicine Physician at Middlesex Hospital Occupational Medicine, Advanced Disaster Life Support Instructor, and Safety Officer at Old Lyme Fire Department, Old Lyme, CT.



October 2008

Legislative Trends. This is a listing of bills that were introduced in the Rhode Island Assembly in this year's session. None of these bills passed, or were even taken up for that matter. While they may never become law, they do reflect trends and concerns in this State.

S 2148 removes **arborists** from the list of employers that do not have to provide workers comp insurance. This appears to be an outfall from the case reported here in the last issue where an employer tries to

evade the costs of severe facial injury by chainsaw to an employee. Held for study.

S 2298 clarifies employee's **right to choose** their treating physician for work injury. RI is a patient choice state. This bill clarifies that the first urgent treatment is not necessarily the first treating physician and that the first treating clinician may refer for specialty care. An employee may switch to a provider within the insurer's or employer's PPO or PPN. Held for study.

S2299 raises from 75% to 85% the base rate used to calculate **payment to employees** out of work for a work injury. The AMA *Guides* percent impairment under this bill will not be used to calculate wage replacement at MMI if an employee cannot return to full duty but has partial capacity. Instead, 75% of base will be paid to the employee and the Court is re-

quired to take into consideration employee's efforts to look for work. Held for study.

S2558 prohibits private contractors working on public works projects from defining their employees as "**independent contractors.**" This has been a major loophole in the protection of workers on bridges, highways, tunnels and other large public works project. Held for study.

S2765 excludes **illegal immigrants** for coverage for work injuries. This bill was introduced in both the House and Senate for the governor after two severe injuries were sustained by illegal workers. This was reported to you in the last issue. Our governor's pandering to xenophobia appears to be withering a bit as he deals with more pressing issues of lost jobs and a huge deficit. Hearing is scheduled.

Submitted by Steve McCloy, MD



The NH State Legislature passed SB 501, which was signed by Governor Lynch on June 26th, 2008, which states that for Worker's Compensation Permanent Impairment Ratings Determinations, instead of

utilizing the most recent AMA Guidelines to Permanent Impairment (the prior statute), the current statute is as follows:

MMI prior to January 1, 2008--utilize the AMA Guides 5th Edition
MMI from January 1-June 25, 2008--utilize AMA Guides 6th Edition
MMI from June 26 onward--utilize AMA Guides 5th Edition

The bill also established a 3 member commission to review the effects/

impact (monetary) of the AMA Guides 6th Edition. The New Hampshire Medical Society is monitoring this committee work closely, and I have volunteered to testify in front of the committee. Please feel free to contact Janet Monahan or Palmer Jones at the NHMS at 603-224-1909. The committee is supposed to have its work completed by November 1st.

*Submitted by:
Stuart J. Glassman, MD
Granite Psychiatry, PLLC*

What's New at ACOEM? Check Out:

- **Distance learning:** <http://www.acoem.org/distancelearning.aspx>
- **On-site courses:** <http://www.acoem.org/courses.aspx>
- **New on-line bookstore:** <https://webportal.acoem.org/Purchase/SearchCatalog.aspx>

What's New at NECOEM? Check Out:

- **Two new podcast episodes,** www.necoem.org
- **Additions to the library:** References for effectiveness and cost effectiveness studies for health promotion programs in the fire service, for viewing and purchasing NFPA 1582, and more from the 9/27/08 Joint NECOEM/OEMAC mini-conference. www.necoem.org



According to the Division of HealthCare Finance and Policy, a “proposal” for a significant increase in Workers’ Compensation rates is imminent. A period of thirty-five days for public comment would follow. **That would place the necessary public hearings sometime in mid-November and implementation of new rates in December 2008.** Additionally, the Workers’ Compensation Advisory Council may advocate for a permanent mechanism for rate reviews going forward. The struggle for reasonable rates and access to care for injured workers should not have to be such an uphill battle in the future.

All NECOEM members and other interested parties should make a sincere effort to testify at the hearings (in person or in writing) and help push this issue “over the top”.

Submitted by Robert Naparstek, MD

Thank you Dr. Sandra Stratford!

Dr. Stratford will be leaving the NECOEM Board of Directors this year at the end of her term. As you can see by her biographical lineage, she will not be idle! We thank Sandy for her leadership, involvement and energy these past years, especially for her commitment in organizing many of our very successful dinner meetings and conferences. Her expertise has enriched this organization and we wish her well.

Bio – Sandra Stratford, MD, MSc, Chief Medical Officer Global Health Resources. Sandra Stratford, MD, MSc assumed the position of Raytheon’s Chief Medical Officer on July 19, 2007, assuming responsibility for the management of all health-related risks for the Enterprise, including occupational medicine, international health management and business support, preventive health programming and crisis management.

Dr. Stratford was formerly a Medical Director and Consultant for Occupational & Environmental Health Network (OEHN) in Waltham, MA, where she was responsible for providing clinical, case management, policy development and health advisory services to a variety of clinics, industries and business environments in Boston and vicinity. In addition, she partnered with management, human resources and legal professionals on disability management strategy and health and wellness initiatives.

Prior to joining OEHN, Dr. Stratford served as Regional Medical Director for IBM Corporation’s Northeast regional manufacturing and development operation in New York, where she managed forty medical, safety and industrial hygiene professionals in providing integrated occupational health services for four manufacturing sites with 26,000 employees. She also served as medical director for IBM’s global programs and processes unit. She started her career in occupational health as senior physician and assistant medical director for Exxon Chemical Company in Linden, NJ and practiced internal medicine in Philadelphia, PA.

Dr. Stratford received her Medical Doctorate from the Hahnemann University School of Medicine. She received a Bachelor of Science Degree in Biology from Yale University. She completed her occupational medicine residency at Mount Sinai Medical Center in New York where she received a Master’s Degree in Community Medicine. She completed her internal medicine residency at the Albert Einstein Medical Center in Philadelphia.

Dr. Stratford is a board-certified specialist in occupational medicine and a certified Medical Review Officer. She is a member of the American College of Occupational and Environmental Medicine, the American College of Physicians, the American Medical Association and a past Board Member with the New England College of Occupational and Environmental Medicine.



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NECOEM

NECOEM is a not-for-profit, regional component society of the American College of Occupational and Environmental Medicine, the pre-eminent organization of occupational and environmental physicians, associate and affiliate clinicians.

NECOEM has over 200 physician, associate and affiliate members and is dedicated to preventing and treating occupational injuries and illnesses. NECOEM provides continuing medical education for its members and other clinicians in order to enhance the care that they provide to men and women in the workplace. NECOEM is an advocate for workplace safety, occupational health research, raising public awareness of occupational and environmental health issues, providing guidance on public health policy, and recognizing outstanding achievement by individuals in occupational and environmental health.

The editorial board welcomes letters to the editor. Write or email to NECOEM at the above address. The editor reserves the right to edit letters for publication purposes.

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Clinical Practice Skills – Occupational Contact Dermatitis, Mild Traumatic Brain Injury, Foot and Ankle Injuries, Demystifying EMG, Current Concepts Common Shoulder and Knee Injuries, Commercial Driver Medical Certification

Climate Change and Public Health: the Role of Environmental and Occupational Health, Howard Frumkin, MD, MPH, DrPH, Director, National Center for Environmental Health, ATSDR, CDC

The William B. Patterson Memorial Lecture: Excellence in OEM

Nursing – Identifying Patient Deception in OH, Navigating Workers Compensation, Incident Command: Critical Role Played by OH Professional

Physicians - MRO New Developments, MRSA Challenges, Cultural Competence and Legal Issues with Emerging Immigrant Workforce

Clinical Research Updates – Chemical Exposures and Risk of Parkinson's Disease, Ergonomics, Upper Extremity Disorders among Computer Users, Obstructive Sleep Apnea Screening at DOT Exams

Case Management – Rehab of Neck Pain: Evidence and Practice, Management Strategies for Challenging OH Cases