

Program of Instruction

Course Syllabus

Course Title: Firefighter Rehabilitation and Heat Stress Management

Course Duration: 1 - 6 Hours

Program: Firefighting

Course Prerequisites: None

Course Description: This course will provide research data documenting the physical and physiologic stresses of firefighting. Review current recommendations for on-scene rehabilitation, including procedures for medical monitoring used to minimize the detrimental effects of heat stress. Also discussed will be firefighter decontamination tactics for use during rehab to reduce potential carcinogen exposure. Examine strategies for forming outside partnerships and collaborations enabling fire departments to implement effective rehabilitation programs to meet firefighters' needs while recognizing that most departments have limited human and financial resources.

Course Requirements and/or Recommendations: These can be divided into three categories: those completed prior to arriving in class (Pre-Course Work), those completed during class, such as homework assignments and quizzes (Course Work), and requirements completed after class but prior to receiving a certificate of completion. (Post-Course Work)

Summary of Directions

Pre-Course Work: None

Course Work: Attend and participate

Post-Course Work: None

Course Policies:

Safety Policy: Students shall understand and follow all instructions pertaining to operational safety, as stated by instructors or as written in course materials. Instructors and students shall be mindful of safety at all times. Conduct judged to be unsafe shall be grounds for dismissal from the course.

Academic Integrity Policy: IFSI has the responsibility for maintaining academic integrity so as to protect the quality of the education provided through its courses, and to protect those who depend upon our integrity. It is the responsibility of the student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such

infractions. Any violation of the code of conduct is grounds for immediate dismissal from the course.

Course Content:

Module: 1

Title: Firefighter Injury and Deaths

Terminal Learning Objectives:

At the conclusion of this module, the student will explain the magnitude of firefighter line-of-duty deaths and injuries due to cardiovascular events.

Module: 2

Title: Physiologic Stress of Firefighting

Terminal Learning Objectives:

At the conclusion of this module, the student will describe the known physiologic impact of firefighting as it relates to the cardiovascular system.

Module: 3

Title: The Role of On-Scene Rehabilitation

Terminal Learning Objectives:

At the conclusion of this module, the student will explain “best practices” of how to provide on-scene rehab services.

Module: 4

Title: Rehab Drills

Terminal Learning Objectives:

At the conclusion of this module, the student will demonstrate the tasks and skills necessary to provide on-scene rehab services.

Recommended Reading:

Horn, G.P., Petruzzello, S.J., Fahey, G.C., Fernhall, B., Woods, J., Smith, D.L., (2010). The Effects of Fire Fighting and On-Scene Rehabilitation on Hemostasis. University of Illinois Fire Service Institute, Champaign, IL

Horn, G.P., Kerber, S., Fent, K.W., Fernhall, B., Smith, D.L., (2015). Interim Report – Cardiovascular & Chemical Exposure Risks in Modern Firefighting. Illinois Fire Service Institute – IFSI Research, University of Illinois, Champaign, IL.

Kales, S. N., Soteriades, E. S., Christophi, C. A., & Christiani, D. C. (2007). *Emergency Duties and Deaths from Heart Disease among Firefighters in the United States* (The New England Journal of Medicine - Vol. 356 No. 12). Massachusetts: New England Journal of Medicine.

Smith, D.L., DeBlois, J.P., Haller, J.M., Lefferts, W.K., Fehling, P.C. (2015). Effect of Heat Stress and Dehydration on Cardiovascular Function. Skidmore College, First Responder Health & Safety Laboratory, Saratoga Springs, NY.

- Smith, D.L., Fehling, P.C., Liebig, J.P., Steward, N.M. (2010). Sudden Cardiac Events in the Fire Service: Understanding the Cause and Mitigating the Risk. Skidmore College, Health and Exercise Sciences, Saratoga Springs, NY.
- Smith, D.L., Haigh, C.A., (2006). Implementing Effective On-Scene Rehabilitation. *Fire Engineering*. 159(4); 175-188
- Smith, D.L., Haigh, C.A., (December 2015) Incident Scene Rehabilitation: A Leadership Challenge. *Fire Engineering*. 49-55
- Smith, D.L., Horn, G., Goldstein, E., Petruzzello, S.J. (2008). Firefighter Fatality and Injuries: The Role of Heat Stress and PPE. University of Illinois Firefighter Life Safety Research Center, Urbana-Champaign, IL.
- U.S. Fire Administration. (February 2008). Emergency Incident Rehabilitation

Reference List:

- Barr, D.A., Haigh, C.A., Haller, J.M., Smith, D.L., Medical Monitoring During Firefighter Incident Scene Rehabilitation. (2016). *Prehospital Emergency Care*. (Early Online: 1-10)
- Brown, J.B., Bennett, A., Derchak, P.A., DeMarzo, M., Edwards, S. (2006). Health and Safety Guidelines for Firefighter Training: Center for Firefighter Safety Research and Development, Maryland Fire and Rescue Institute, University of Maryland. College Park, MD.
- Citizen Corps -- CERT. (2009). <http://www.citizencorps.gov/cert/about.shtm>
- Espinosa, N and Contreras, M. (2007). *Safety and Performance Implications of Hydration, Core Body Temperature, and Post-Incident Rehabilitation*. Orange County Fire Authority.
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- Fahy, R. F., LeBlanc, P. R., & Molis, J. L. (2009). *Firefighter Fatalities in the United States - 2008*. Retrieved from National Fire Protection Association: <http://www.nfpa.org/assets/files/pdf/osfff.pdf>
- Fent, K.W., Alexander, B., Roberts, J., Robertson, S., Toennis, C., Sammons, D., Bertke, S., Kerber, S., Smith, D.L., Horn, G.P., Contamination of firefighter personal protective equipment and skin and the effectiveness of decontamination procedures. *Journal of Occupational and Environmental Hygiene*. (2017, June).
- Fernhall, B., Fahs, C.A., Horn, G.P., Rowland, T., Smith, D.L., Acute effects of firefighting on cardiac performance. (2011, June 10). *European Journal of Applied Physiology* (112:735-741)
- Haigh, C. A. (2006). *Reducing Fire Ground Injuries due to Heat Stress at Hanover Park Fire Department* (Accession No. 124023/OCLC Record No. 47589881/Call No. 39977). Retrieved from National Fire Academy -- Learning Resource Center: www.usfa.dhs.gov/pdf/efop/efo39977.pdf

- Hanover Park Fire Department. (2007, November 11). *Fire Corps* (Departmental Policy Ch. 100, Section 048). Village of Hanover Park, Illinois: Hanover Park Fire Department.
- Hanover Park Fire Department. (2017, April 19). *Rehabilitation Policy* (Departmental Policy Ch. 200, Section 029). Village of Hanover Park, Illinois: Hanover Park Fire Department
- Horn, G.P., Blevins, S., Fernhall, B., Smith, D.L., (2013, July 22). Core temperature and heart rate response to repeated bouts of firefighting activities., *Ergonomics*
- Horn, G.P., Petruzzello, S.J., Fahey, G.C., Fernhall, B., Woods, J., Smith, D.L., (2010). The Effects of Fire Fighting and On-Scene Rehabilitation on Hemostasis. University of Illinois Fire Service Institute, Champaign, IL
- Horn, G.P., Kerber, S., Fent, K.W., Fernhall, B., Smith, D.L., (2015). Interim Report – Cardiovascular & Chemical Exposure Risks in Modern Firefighting. Illinois Fire Service Institute – IFSI Research, University of Illinois, Champaign, IL.
- Horn, G.P., Gutzmer, S., Fahs, C.A., Petruzzello, S.J., Goldstein, E., Fahey, G.C., Fernhall, B., Smith, D.L., (2010, April 20). Focus on Firefighter Physiology – Physiological Recovery from Firefighting Activities in Rehabilitation and Beyond. *Prehospital Emergency Care* (2011;15:214-225)
- Horn, G.P., Kesler, R.M., Kerber, S., Fent, D.W., Schroeder, T.J., Scott, W.S., Fehling, P.C., Fernhall, B., Smith, D.L., Thermal response to firefighting activities in residential structure fires: impact of job assignment and suppression tactic. *Ergonomics*. (2017, July).
- ICMA. (2010). *Police and Fire Personnel, Salaries, and Expenditures, 2009*. Retrieved from Associated Firefighters of Illinois: <http://www.affi-iaff.org/icma%20survey%20police%20and%20fire%20-%202009.pdf>
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- Korre, M., Smith, D.L., Moffatt, S., Stefanos, K., (2017, July 19). Cardiac Enlargement in U.S. Firefighters – Findings and Recommendations from Non-Invasive Identification of Left Ventricular Hypertrophy/Cardiomegaly in Firefighters. National Fallen Firefighters Foundation
- National Fire Protection Agency. (2003). NFPA 1584: Recommended Practice on the Rehabilitation of Members Operating at Incidents Scene Operations and Training Exercises.
- NVFC: Fire Corps. (2009). <http://www.firecorps.org>
- Smith, D.L., Haigh, C.A., (2006). Implementing Effective On-Scene Rehabilitation. *Fire Engineering*. 159(4); 175-188
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- Smith, D.L., DeBlois, J.P., Haller, J.M., Lefferts, W.K., Fehling, P.C. (2015). Effect of Heat Stress and Dehydration on Cardiovascular Function. Skidmore College, First Responder Health & Safety Laboratory, Saratoga Springs, NY.
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- Smith, D.L., Petruzzello, S.J., Chludzinski, M.A., Reed, J.J., Woods, J.A. (2005). Selected hormonal and immunological response to strenuous live-fire fire fighting drills. *Ergonomics*. 48(1); 55-65
- Smith, D.L., Petruzzello, S.J., Chludzinski, M.A., Reed, J.J., Woods, J.A., (2001). Effects of strenuous live-fire fire fighting drills on hematological, blood chemistry, and psychological measures. *Journal of Thermal Biology*, 26 (4-5), 375-380.
- Smith, D.L., Petruzzello, S.J., Manning, T.S. (2001). The effect of strenuous live-fire drills on cardiovascular and psychological responses of recruit firefighters. *Ergonomics*. 44(3), 244-254.
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- United States Fire Administration. (2009). Firefighter Fatality Retrospective Study. FA220. Federal Emergency Management Agency. National Fire Data Center.

Course Schedule

<u>Event</u>	<u>Duration</u>
Module: 1 - Firefighter Injury and Deaths	1 Hour
Module: 2 - Physiologic Stress of Firefighting	2 Hours
Module: 3 - The Role of On-Scene Rehabilitation	1 Hour
Module: 4 – Rehab Drills	2 Hours
Drill 4.1 – Site Set-up	
Drill 4.2 – Core Cooling Chairs	
Drill 4.3 – Rehab Evolution	