Abstract #: 302 **Presented by: Joanet D. Maysonet Rementeria, Graduate Student**

Occupational Heat Stress: One Step Closer to Chronic Kidney Disease in Outdoor Working Tasks

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Keywords: occupational heat stress, Chronic Kidney Disease (CKD), dehydration, outdoor working tasks

Objective: This research aims to answer if: *Heat stress in the work place, is a variable directly related to the development of chronic kidney disease?*

Methods: For this analysis of association between exposure to occupational heat stress and development of chronic kidney disease, an exhaustive search of scientific literature was conducted, which met the subject of interest in several online databases, such as PubMed and Science Direct.

Results: In overall, the different investigators found out that men were more disadvantaged than women when facing kidney problems, because they are the ones who predominate, usually in tasks of planting and harvesting coffee, cotton, sugar cane, among other activities in Central America countries.

Conclusion: It is an immediate situation that needs attention in many other places where the weather is extremely hot and many workers are exposed to high metabolic demands, which also may ignore the risk of kidney disease to which they are exposed every day.

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Abstract #: 303 **Presented by: Daniel Medina, MS, Graduate Student**

Nanoparticle Leakage Through Staple Punctures in N95 Single Use Filtering Facepiece Respirators

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Keywords: nanoparticles, respirator, protection

Objective: N95 filtering facepiece respirators (FFPR) are widely used where personnel are exposed to aerosolized particles that can produce adverse health effects. Some N95 FFPR attach the head straps by stapling them directly onto to the respirator filter, which creates an open space where leakage of particles can occur. This study evaluates the effect of stapled head straps on respirator efficiency using 5 different N95 FFPR models challenged with 30 to 500 nm polystyrene latex spheres when the stapled head straps are left intact, stretched, and the staple punctures sealed with silicone rubber.

Methods: A polystyrene latex sphere suspension is atomized to form an aerosol cloud. The aerosol is introduced and mixed in the top part of the testing chamber above the respirator test assembly. A Scanning Mobility Particle Sizer is used to measure particle concentration inside and outside the respirator test assembly and this ratio is used to determine respirator efficiency.

Results: N95 FFPR efficiencies differed by model, particle size, and staple condition. There is significant difference between different models of FFPR and among the efficiencies of a single model when the head straps are left intact, stretched, and when the staple puncture is sealed. The lowest efficiencies were observed when head straps were stretched and at the 50 – 60 nm particle sizes. For some FFPRs, efficiencies were below 95%.

Conclusion: The study suggests that nanoparticle concentrations inside N95 FFPRs with stapled head straps (attached to the filter media) are expected to be higher than models with head straps attached using a method that does not puncture the filter.

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