

Performance of N95 Filtering Facepiece Respirators (FFRs) Used by Home Attending Health-care Workers (Pilot Study - Design and Methods)

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Background: Home-attending health-care workers are often exposed to various airborne hazards during care activities. This exposure can put them at a health risk. They often enter the homes environments unprotected or at best use surgical masks or NIOSH-certified N95 facepiece filtering respirators (FFRs). Using the personal respiratory protection equipment may mitigate the problem; however, there is no data that would allow assessing whether existing FFRs can provide an adequate protection to health-care workers during home visits. Generally, workplace protection factor (WPF) is used to determine the protection provided by an FFR to a worker. The WPF is determined as a ratio of the concentration outside of the respirator (C_{out}) to the concentration inside the respirator while worn at a workplace (C_{in}).

Purpose: This study is aimed at evaluating the protection offered by N95-certified FFRs to health-care workers exposed to aerosols while providing care in patients' homes. This study is expected to generate aerosol exposure and respiratory protection data that has not been collected before.

Methods: In this pilot study, we will determine the WPF for two types N95 FFRs that are used by health-care workers during home visits. Additionally, the aerosol particle concentration and size distribution in homes attended by health-care workers will be measured.

A total of 5 home-attending health-care workers serving in the Cincinnati area will be recruited to participate in approximately 20 home visits.

First, each subject who passed the OSHA respirator medical clearance questionnaire and OSHA fit test will be asked to wear the tested FFRs while providing health care to patients. Second, the C_{out} and the C_{in} of the tested N95 FFRs worn by the participants will be measured using a P-Trak condensation particle counter and NanoCheck Aerosol Spectrometer operating in parallel.

The data sets will be used to characterize the aerosols in the tested home environments and calculate the WPF.

The outcomes of this pilot study are expected to lead to establishing a full-scope research program and be the foundation for the development of new effective respiratory protection strategies for health-care workers attending patients in their homes.

Acknowledgement: This study was supported by the National Institute for Occupational Safety and Health Targeted Research Training Program of the University of Cincinnati Education and Research Center Grant #T42/OH008432.

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**University of Cincinnati
16th Annual
Pilot Research Project
Symposium
October 8-9, 2015**



Hosted by: The University of Cincinnati Education and Research Center
Supported by: The National Institute for Occupational Safety and Health.
(NIOSH) Grant #: T42-OH008432

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Produced by Kurt Roberts Department of Environmental Health
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