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Health Effects, Respirator Use and Biomonitoring Results Among New York City Firefighters Responding to the World Trade Center (WTC) Disaster B September, 2001

Background: Thousands of firefighters responding to the WTC collapse were exposed to a myriad of chemical and physical hazards, although limited initial environmental data were collected. This study characterizes firefighter exposures and health effects.

Methods: A sample of 400 firefighters was selected to represent those responding during the collapse (group-1), within 48 hours but after the collapse (group-2), on days 3-7 (group-3) and not responding (group-4). From October 2-6, 2001, firefighters completed a self-administered questionnaire regarding health effects and respirator use, and provided blood and urine samples which were analyzed for metals, cyanide, hydrocarbons, biphenyls, dioxins and volatile organic compounds by CDC/NCEH using NHANES protocols.

Results: Of 363 firefighters (participation rate=80%), 150 were group-1, 141 group-2, 28 group-3 and 44 group-4. Symptom rates for group-1+2, group-3 and group-4 were: skin 44%, 18%, 7%, eye 71%, 46%, 7% and respiratory 75%, 46%, 9%, respectively. Prevalence Rate Ratios (PRR), group-1+2 vs group-4 were: skin 6.40 (95% Confidence interval [CI]=2.13-19.23), eye 10.38 (95% CI=3.47-31.03) and respiratory 8.28 (95% CI=3.24-21.12). Group-3 PRRs were statistically intermediate; 95% CI all excluded 1.0. Reported respirator use was "rarely/not at all" (vs. "mostly") by 87% of those in group-1+2 present on day-1 compared with 67% in groups 1-3 still present during week-2. Although biological monitoring results were within normal limits, results differed significantly by exposure groups.

Conclusions: This evaluation of firefighters demonstrates a relationship between time of arrival and skin, eye, and respiratory symptoms. Further investigation is needed to direct both long-term follow-up and preventive measures for protecting responders to future disasters.

Keywords: World Trade Center, biomonitoring, respirators, metals, terrorism, firefighters