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VHA ISSUE BRIEF

Issue Title: Evaluation of possible Agent Orange contamination of C-123 aircraft as a concern for adverse health effects

Date of Report: August 1, 2011

Brief Statement of Issue: Concern has been raised by some Veterans of possible Agent Orange exposure and adverse health effects as a result of flying in C-123 aircraft that were previously used for Agent Orange spray missions in Vietnam. After Vietnam a number of C-123 were given to Air National Guard units and used for a variety of missions. Several Veterans have filed for Agent Orange associated benefits that have subsequently been denied.

Environmental fate and bioavailability of Agent Orange and its associated dioxin (TCDD)

Agent Orange, when formulated as an herbicide spray, dries within minutes of being sprayed or exposed to air. Studies have shown that TCDD, the toxicant component of Agent Orange, is virtually insoluble in water. In other words, an individual's perspiration would not dissolve any residual TCDD that might be found on any surface of a plane and allow it to be absorbed into their skin. After Agent Orange dries no TCDD absorption can be detected after skin contact with dried TCDD. This means that TCDD is no longer bio-available (cannot cross the skin and be absorbed). The principal processes that control the fate of TCDD deposited on surfaces include absorption, photo-degradation and volatilization.

Photo-degradation: Several studies have found that photo-degradation (ultraviolet light) is the most significant factor in removing TCDD from the environment. In full sun the half-life of TCDD is less than 6 hours. A half-life of 7 to 10 hours was observed when ultraviolet light intensities were lower. Photo-degradation continued even in deep shade, with more than 90% of TCDD degraded after 7 days.

Volatilization: The atmospheric half-life of TCDD in the vapor phase has been shown to be on the order of 1.0 hour and experimental studies have shown the atmospheric lifetime of TCDD in the vapor phase to be about 3 days.

Absorption: The chemical composition of TCDD causes rapid and irreversible absorption by most absorbable surfaces. Once TCDD binds to a surface it can no longer be absorbed through the skin.

Conclusions: Even though residual Agent Orange may be detected in C-123 aircraft by laboratory techniques years after Agent Orange use, it must be remembered that there is no bio-availability of TCDD in these aircraft. The potential for exposure to Agent Orange and TCDD and subsequent development of any adverse health effects from flying in potentially contaminated C-123 aircraft years after the Vietnam War is essentially zero.

Contact for Further Information: Terry J. Walters, MD MPH; Director, Environmental Agents Service, Environmental Health Strategic Healthcare Group