From:	ORD_STICS@epa.gov
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Subject:	STICS: Clearance Completion: # ORD-005477: Cognitive Function Related to Environmental Exposure to Manganese
Date:	Wednesday, March 12, 2014 4:15:36 PM

The clearance for this Sustainable and Healthy Communities product is complete:

- **Product type, subtype:** Presentations and Technical Summaries, Abstract
- **Product title:** Cognitive Function Related to Environmental Exposure to Manganese
- **Author(s):** Bowler, R,V. Gocheva,E. Schimbor,C. Beseler,M. Colledge,F. Du,H. Roels,G. Bollweg and D. Lobdell
- **Initiator:** Danelle Lobdell,ord/nheerl/ephd/eb
- **ORD Tracking Number:** Tracking # ORD-005477
- **Product Description / Abstract:** Background: The towns of Marietta and East Liverpool (EL), Ohio, have been identified as having elevated manganese (Mn) in air due to industrial pollution. Objectives: To evaluate relationships between environmental Mn (Mn-air) exposure and distance from the source and cognitive function in residents of two Ohio towns. Methods: Data were obtained from an EPA-sponsored study comparing two towns exposed to Mn-air (Marietta and EL). A cross-sectional design was used. The same inclusion/exclusion criteria and procedures were applied in the two towns. A neuropsychological screening test battery was administered to study participants (EL=86, Marietta=100) which included Stroop Color Word Test, Animal Naming, Auditory Consonant Trigrams (ACT) and Rey-O. To estimate Mn-air, U.S.EPA's AERMOD dispersion model was used. Distance from source was calculated based on participants' residential address and air miles from industrial facility emitting Mn-air. A binary logistic regression model controlling for annual household income was used to examine distance from source and neuropsychological outcomes Results: There were no age, sex, or employment status differences between the two towns. Years education was lower in EL (mean (M)=12.9) than Marietta (M=14.6) and years residency in town were higher in EL (M=47.0) than Marietta (M=36.1). EL participants resided closer to the Mn source than Marietta (M=1.12 vs M=4.75 air miles). Mn-air concentrations were higher in EL (M=0.269 µg/m3; range 0.10 to 23.0 µg/m3) than Marietta (M=0.184 µg/m3; range 0.04 to 0.96 µg/m3). There were significant town differences on tests of category fluency, immediate memory, and speed of word reading; the EL group had the lowest scores. Closer distance to the source significantly increased the odds of impairment (<2nd%) on ACT 9' delay [OR=1.26, 95% CI: 1.02-1.55, p=.032], on ACT 18' delay [OR=1.44, 95% CI: 1.11-1.87, p=.006], as well as on Rey-O copy raw score [OR=1.27, 95% CI: 1.01-1.61, p=.043]. Conclusions: Increased risk of impairment in delayed memory with distraction and visuospatial/executive function were related to residing closer to the Mn source. Environmental exposures are low compared to occupational exposures and small positive findings may be possible early effects of Mn. This abstract does not necessarily reflect EPA policy.
- **Tracking and Planning**
  - Task: 2.2.1.6 Lessons learned, best practices and stakeholder feedback from community and tribal participative case studies
  - Product: N/A - Not Applicable
  - Project: 2.2.1: Enhancing Community Public Health
  - Science Question: N/A - Not Applicable

Topic: Improving Human Health and Well-being for Community Sustainability
    - Theme: Forecasting and Assessing Ecological and Community Health
    - Research Program Area: Sustainable and Healthy Communities

- **HISA? ISI? High Profile?:** Not Applicable
- **QA form attached in STICS?:** Not Applicable
- **QAPP Reference:** No additional QAPP Reference
- **Keywords:**
    - manganese
    - air exposure
    - cognitive function
    - environmenal exposure
    - EPHD-13-098

- **Meeting Information:**
    - Meeting Name: Internatioal Neuropsychological Society meeting
    - Meeting Start Date: 02/12/2014
    - Meeting End Date: 02/15/2014

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