

### The Western States Occupational Network (WestON) - Maximizing Partnerships for Occupational Safety and Health Surveillance in the Western US

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#### Abstract

**Objectives:** The objectives of the WestON meeting are to build capacity among Western states to conduct surveillance of work-related injuries and illnesses; increase epidemiological capacity in occupational health at the state level; develop common priorities for occupational risk assessment, applied epidemiology, worksite interventions and other prevention efforts; and promote scientific collaboration among state-based occupational epidemiologists, NIOSH, and academic colleagues in the West.

**Methods:** Collaborations were formed between NIOSH and partners interested in the goal of increasing occupational safety and health (OSH) surveillance capacity in the western US. Participants included staff from the NIOSH Western States Office (WSO), the Mountain and Plains Education and Research Center (MAPERC) and the Council of State and Territorial Epidemiologists (CSTE). These participants met via monthly conference calls to develop a plan to bring together colleagues from 19 western states for a 1.5 day meeting to learn about OSH issues of importance to each state and the region, network and discuss potential collaborations.

**Results:** This endeavor was successful and the first WestON meeting took place in September, 2008. More than 60 attendees participated in the meeting, including representatives from 18 of the 19 targeted western states; the western ERCs and Agricultural Centers; OSHA; and NIOSH representatives from DSHEFS, DSR, DRDS, OEP, SRL and the Alaska-Pacific Regional Office. Post-meeting evaluation comments from attendees indicated that the meeting provided a much-needed and desired opportunity for networking and initializing important contacts for addressing occupational health and safety needs in the West. Subsequent equally successful WestON meetings have taken place in 2009 and 2010, and a fourth WestON meeting is being planned for September, 2011. In addition, due to the success of these meetings, there is strong interest in developing a similar meeting in the southern US and initial planning for this is in process utilizing the same methods that were used for the WestON meetings.

**Conclusions:** Through identification of and collaboration between interested partners, such as state OSH representatives, ERCs, Agricultural Centers, CSTE and NIOSH, OSH surveillance capacity can be fostered and increased in many states and regions of the US, especially in those that currently have limited capacity and funding.

### Development of In Vitro vs. In Vivo Models to Evaluate Fibrogenic and Carcinogenic Potential of Carbon Nanotubes

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#### Abstract

Carbon Nanotubes (CNT) possess unique physicochemical properties which exhibit different biological effects compared to micro-sized particles. The nano-scale size and dispersion status of the CNT play critical roles in their unique bio-effects. Among the adverse effects reported, CNT have been shown to induce rapid interstitial lung fibrosis and persist in the lung. This raises a human risk concern and brings up a challenge, since information and specific methods are lacking which would allow one to predict the biological activity of these new nanomaterials.

To address this issue, our objective is to determine “Nanoparticle properties and mechanisms causing lung fibrosis” which is a funded NORA project (2008-2012). Published or ongoing research results provide novel findings of unique bio-effects of CNTs and specific nano-research methods which are summarized below: 1) Survanta, a natural lung surfactant, effectively disperses single-walled CNT (SWCNT) or multi-walled CNT (MWCNT) agglomerates into small structures, which are similar in size to aerosolized SWCNT structures. Plus, at the concentration of Survanta used for the dispersion, it showed no toxic effects and did not mask surface activity of particles; 2) dispersed SWCNT or MWCNT exhibited an acute biphasic effect on cells inducing proliferation at low doses and causing toxicity at high doses, while their non-dispersed forms had no significant effects; 3) dispersed SWCNT or MWCNT upregulated collagen expression from cultured lung fibroblasts and lung tissue in a mouse model, whereas their non-dispersed forms showed a significant lesser effect; 4) well known fibrogenic mediators, such as Transforming Growth Factor beta (TGF- $\beta$ 1) or Matrix Metalloproteinase (MMP9), were induced by SWCNT or MWCNT *in vitro*, which is consistent with *in vivo* observation from our and other published reports. These mediators, therefore, could serve as bio-markers to evaluate early events of nanotoxicity; 5) low dose, long term exposure of lung epithelial cells to dispersed SWCNT or MWCNT caused cell transformation towards a tumorigenic phenotype.

The above data from both cell culture and animal models support our proposed hypothesis that physicochemical properties of CNT are key factors in determining their bioactivities, which leads to a novel mechanism of unique nanoparticle-induced lung fibrosis. Present developed *in vitro* models using human lung cells provides a great advantage to study mechanistic detail of nano-toxicity and may represent a potential simple, rapid, less costly, high throughput screening tool to predict the fibrogenic or carcinogenic potential of nanomaterials. This information will be useful for researchers, industry, and governmental regulatory agencies to conduct risk assessment and develop prevention strategies.



# NORA

## SYMPOSIUM 2011

ACHIEVING IMPACT THROUGH RESEARCH AND PARTNERSHIPS

JULY 12-13, 2011  
HYATT REGENCY CINCINNATI  
CINCINNATI, OHIO



# Table of Contents



Welcome.....	3
Award Winners.....	6
Agenda .....	8
RAPID Presentations Agenda .....	10
Abstracts/Poster Session 1 .....	21
Abstracts/Poster Session 2 .....	69
Abstract Author Index.....	117





July 12, 2011

NORA Symposium Attendees

It is my pleasure to welcome you to the 2011 National Occupational Research Agenda (NORA) Symposium: Achieving Impact through Research and Partnerships. This is the seventh NORA Symposium. Like its predecessors, the 7<sup>th</sup> NORA Symposium will showcase excellence in occupational safety and health research, and the application of that research to prevent work-related injury and illness. This year we are focusing on research and partnerships. The sector-based structure of the second decade of NORA has fostered the creation of many exciting partnership opportunities among many diverse organizations.

New partnerships with practitioners have significantly enhanced the NIOSH Research-to-Practice (r2p) initiative, which helps us assure that the products of our research ultimately benefit the health and well-being of workers. These benefits extend as well to workers' families, their communities, businesses, and society as a whole.

In addition to recognizing 15 years of NORA, 2011 also marks the 40<sup>th</sup> anniversary of NIOSH and the Occupational Safety and Health Administration (OSHA) under the Occupational Safety and Health Act of 1970. Please join us Tuesday evening for a reception in commemoration of this important date in history.

Finally, I would like to thank our co-sponsor, the University of Cincinnati, for their efforts in organizing this year's symposium as well as each of our participants and attendees for joining us here in Cincinnati for the 2011 NORA Symposium. I wish each of you a successful Symposium.

John Howard, M.D.  
Director

July 11, 2011

Welcome!

The University of Cincinnati Department of Environmental Health, College of Medicine, and the NIOSH-supported Education and Research Center that brings together faculty and students in the Colleges of Engineering, Medicine and Nursing, welcome you to Cincinnati, the Queen of the West and a wonderful city on a river.

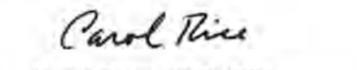
Cincinnati is a center for industry, labor, government and education: an ideal location for a meeting of stakeholders representing the broadest aspects of worker health and safety to discuss achieving impact through research and partnership. Few achievements in workplace improvement result from singular effort; this team science requires partnerships at all levels: concept, research, translation to practice, feedback from practice for improvement in concept. Ultimately, we hope that prevention through design will reduce the number of exposures causing injury and illness in the workplace.

The University of Cincinnati has a long history of research and education in core disciplines of workplace improvement. The College of Engineering initiated the highly regarded concept of co-op education in 1906. The Department of Environmental Health was formed about 80 years ago as an interdisciplinary team of physicians, analytical chemists, toxicologists, industrial hygienists, engineers and librarians to study occupational and environmental health problems in the auto industry. For many years, the UC occupational medicine mini-residency was a recognized mechanism for practicing physicians to enhance skills in this important field during summer and off-campus experience. The Nursing program was started in 1889, and joined UC as its eighth college in 1938. The College of Nursing was one of the first to offer BSN (1916) and MSN (1956) degrees.

Enjoy the world-class art museums while you are here. Visit Music Hall. just to see the hall even if the orchestra is away. Sit in Fountain Square to discuss new ideas with colleagues and watch the locals. Eat some Graeter's ice cream on a hot summer night. (Unfortunately, this is All Star game week, and the Reds participants are in Phoenix.) Cincinnati offers a bridge some of you may have seen in Brooklyn and architecture with a European flavor. Findlay Market is a special place for coffee and browsing.

Wishing you a productive meeting, and a great stay in our city,

  
Shuk-Mei Ho, PhD  
Professor and Chair

  
Carol Rice, PhD, CIH  
Professor and ERC Director