

park to measure area NO₂ and O₃ ambient air concentrations. The air monitoring data collected at the nearest urban station for the study time frame was obtained from USEPA's AIRS database. Time-activity data of participants were recorded in five-minute intervals. Statistical methods were employed to analyze the personal and area exposure concentration data along with USEPA fixed-site air monitoring data for NO₂ and O₃.

Results: Week 1 and 2, NO₂ and O₃ average weekly personal concentrations (AWPC) were below the EPA NAAQS. For Week 3, while 65% of NO₂ measurements were above NAAQS, all O₃ measurements were below NAAQS. For Week 4, 31% NO₂ and 13% O₃ measurements were above NAAQS. For Week 5 and 6, 22% and 37% of NO₂ measurements were above NAAQS, respectively. However, O₃ measurements were all below NAAQS for Week 5 and 6.

Conclusions: Current NO₂ NAAQS may not be effectively protecting underserve populations within urban areas as indicated by, personal NO₂ measurements obtained for Weeks 3, 4, 5 and 6.

41. A Compartmental Model of MRSA Transmission among Healthcare Workers in a Nursing Home

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Objectives: This study looked to: 1. Identify Methicillin Resistant *Staphylococcus aureus* (MRSA) reservoirs within nursing homes, and 2. Characterize physical processes by which MRSA is transmitted by developing a compartmental model.

Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) is a ubiquitous pathogen in healthcare settings and poses a health risk to patients and workers. MRSA is transmitted through direct contact and indirect contact, where indirect contact means that MRSA moves from an infectious person to a susceptible person through an intermediate object. MRSA persists as an occupational health concern despite recommendations for hand-hygiene and personal protective equipment; this may be due to lack of compliance with infection control practices, or inefficiency of the interventions. The physical

processes by which MRSA is transmitted are not well characterized, but this knowledge is required to select effective interventions.

Methods: A literature review was used to identify case series' involving MRSA transmission amongst healthcare workers (HCWs) in nursing homes, and to understand the physical processes affecting the emission and transportation of MRSA and similar infectious agents.

Results: The literature review identified several important MRSA reservoirs, including: infected, colonized, and susceptible persons, and porous and non-porous surfaces. MRSA moves between these reservoirs as a result of human activity, including touching and manipulating contaminated human tissues and objects. A common scenario in a nursing home involves a colonized HCW attending a susceptible, immune-compromised patient. MRSA can be transferred to the susceptible patient through several pathways, including: clothing-hand-patient, surface-hand-patient, HCW-patient, and clothing-patient. The compartmental model developed graphically represents the MRSA reservoirs and transmission processes.

Conclusions: Modeling the transmission of infectious diseases, such as MRSA, can help to identify points of intervention to prevent exposure and infection. Future work will simulate the compartmental model to quantify infection risks to workers, and evaluate the effectiveness of controls.

42. Near-Roadway Exposure to Air Pollutants: A Pilot Study

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Objective: Pedestrians with close proximity to roadways may experience increased exposure to traffic-related air pollution from vehicle emissions. The goal of this study was to estimate personal exposure to traffic-related air pollutants for use in epidemiological studies of the health benefits and risks of active transportation participants (i.e. walkers, joggers, cyclists) and near-road occupations (i.e. construction, mail carrier, police officers).

Methods: Personal air pollution exposure data were collected while riding 5 specific cycling

routes that started and ended at the School of Public Health at University of Illinois at Chicago during morning commutes in the fall of 2012. In addition, these rides were recorded with a GPS enabled video camera. Measured pollutants included fine particle matter (PM_{2.5}) measured with a MIE Personal Data RAM for real-time measurements and PEM samplers with high volume SKC Leland pumps for integrated PM_{2.5}; and carbon monoxide (CO) measured with an Easy Log USB-CO electrochemical sensor.

Results: Camera malfunction prevented measuring vehicle counts on all but two rides. These two rides showed that the bicycle passed or was passed by 9–17 cars per minute and 0.5–1.5 trucks per minute passed the cyclist. PM_{2.5} concentrations averaged 104 µg/m³ (range: 53.7–135 µg/m³), but CO concentrations were negligible possibly due to equipment limitations from wind turbulence.

Conclusions: In general, our findings suggest air pollutants from near-road exposure to vehicle traffic are substantially higher than background measurements. In addition, our findings suggest heterogeneity of exposure measurements with varying Chicago landscapes (i.e. proximity to lakefront, highway, urban-structures). Further study is required to evaluate the exposure to near-roadway air pollutants throughout varying city landscapes.

43. Evaluation of an Injury Prevention Program at a Power Generation Company

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Background: Injuries in the workplace can harm workers and negatively affect a company's production. The Utilities sector has a high injury rate in comparison to other industries. Many of these injuries can be attributed to improper body mechanics. The intervention program works to target improper body mechanics at a metropolitan power generation company with the goal of reducing the company's injury rate. If effective, this intervention could be applied to other companies to reduce injury rates within the Utilities sector.

Objective: The current project examines the effectiveness of an intervention program by comparing injury rates and confidence intervals among work crews with and without intervention.

Methods: The program was tested on 13 out of 20 crews. The program was implemented randomly over a period of six years. Interviews were used to ascertain when training was initiated and how training was implemented. Injury data was analyzed for both recordable and total (recordable plus non-recordable) injuries. The effectiveness of the intervention was examined using a mixed regression model. The model tested the relationship of the intervention to the subsequent rate of annual decline in injury rates, which were compared to the Utility sector trends reported by the U.S. Bureau of Labor Statistics.

Results: Overall, there was a borderline significant decline in total injury rates post intervention. Total injury rates declined on average by 110% per year ($p=0.067$). Recordable injury rates showed no significant difference post intervention, with injury rates increased on average by 9.7% per year ($p=0.278$).

Conclusions: Preliminary data suggest the intervention program is an effective means of reducing injuries among utility workers. However, implementation over a longer period of time would yield more definitive information.

44. USEPA's National Air Toxics Assessment: Emissions and Cancer Risk Analysis in Illinois and Cook County

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Objective: The USEPA's National-Scale Air Toxics Assessment (NATA) is an ongoing comprehensive evaluation of 178 Clean Air Act toxics in the US. NATA includes national emissions data from outdoor sources, estimations of ambient exposure concentrations, human exposures, and characterization of public health risk due to inhalation. This study is designed to characterize emissions estimates and cancer risks developed by the 2005 NATA in the state

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