

International Symposium on the Air Quality and Health

National Institute of Environmental Health Sciences
National Health Research Institutes

October 17th, 2017

Contents

Schedule	2
Air Pollution and Health: Linking Science with Global Policies.....	6
Nino Künzli, M.D., Ph.D.	
California’s Integrated Approach to Climate Change Mitigation and Air Quality.....	7
John R. Balmes, M.D.	
An Integrated Approach for Assessing Temporal/ Spatial Variations of PM_{2.5} Exposures to Resident	22
Perng-Jy Tsai, Ph.D.	
PM_{2.5} Chemical Characteristics under the Influences of Various Events	30
Chung-Te Lee, Ph.D.	
PM_{2.5} and Its Components, Associations with ER Visits.....	34
Ho Kim, Ph.D.	
Landscape Fires Revisited.....	40
Bin Jalaludin, MPH, MRCP (UK), FAFPHM, Ph.D.	
Inhalation Toxicology of Ambient Particles: Cardiovascular Toxicities and Beyond.....	50
Tsun-Jen Cheng, M.D., Ph.D.	
Environmental Exposure-Disease Relationship in Asthma	55
Shau-Ku Huang, Ph.D.	

Schedule

Date: October 17, 2017

Venue: Room 401, NTUH International Convention Center

08:40~09:00 Registration

09:00~09:15 Opening Remarks

Ying-Wei Wang, M.D., Ph.D.

Director General
Health Promotion Administration
Ministry of Health and Welfare, Taiwan

Hung-Teh Tsai

Director General
Department of Air Quality Protection and Noise Control
Environmental Protection Administration
Executive Yuan, Taiwan

Ing-Kang Ho, Ph.D.

Academician, Academia Sinica, Taiwan
Emeritus Investigator, National Health Research Institutes, Miaoli, Taiwan
Chair Professor Center for Drug Abuse and Addiction & Advisor, Office of
Superintendent, China Medical University Hospital, Taichung, Taiwan

Moderator: Yue-Liang Leon Guo, M.D., Ph.D.

Distinguished Investigator and Director
National Institute of Environmental Health Sciences
National Health Research Institutes, Miaoli
Taiwan

09:15~10:00 Air Pollution and Health: Linking Science with Global Policies

Nino Künzli, M.D., Ph.D.

Deputy Director of Swiss Tropical and Public Health Institute (SwissTPH)
Head of Department of Education and Training (ET)
Dean, Swiss School of Public Health (SSPH+)
Basel, Switzerland

10:00~10:45 California's Integrated Approach to Climate Change Mitigation and Air Quality

John Balmes, M.D.

Director, Joint Medical Program
Vice Division Head, Environmental Health Sciences
Professor of Environmental Health Sciences
University of California, Berkeley
USA

10:45~11:00 Break / Group Photo

Moderator: Yu-Cheng Chen, Ph.D.

Assistant Investigator
National Institute of Environmental Health Sciences
National Health Research Institutes, Miaoli
Taiwan

11:00~11:45 An Integrated Approach for Assessing Temporal/ Spatial Variations of PM_{2.5} Exposures to Resident

Perng-Jy Tsai, Ph.D.
Distinguished Professor
Department of Environmental and Occupational Health Medical College
National Cheng Kung University, Tainan
Taiwan

11:45~12:30 PM_{2.5} Chemical Characteristics under the Influences of Various Events

Chung-Te Lee, Ph.D.
Professor and Chair
Graduate Institute of Environmental Engineering
National Central University, Taoyuan
Taiwan

12:30~13:30 Lunch Break

Moderator: Ming-Tsang Wu, M.D., Ph.D.

Professor, Department of Public Health, College of Health Sciences
Director, Center of Environmental & Occupational Medicine, Kaohsiung Municipal
Hsiao-Kang Hospital
Kaohsiung Medical University, Kaohsiung
Taiwan

13:30~14:15 PM_{2.5} and Its Components, Associations with ER Visits

Ho Kim, Ph.D.
Dean
Graduate School of Public Health
Seoul National University, Seoul
Korea

14:15~15:00 Landscape Fires Revisited

Bin Jalaludin, MPH, MRCP (UK), FAFPHM, Ph.D.
Professor
School of Public Health and Community Medicine
University of Sydney, Sydney
Australia

15:00~15:15 Break

Moderator: Ing-Kang Ho, Ph.D.

Academician, Academia Sinica, Taiwan
Emeritus Investigator, National Health Research Institutes, Miaoli, Taiwan
Chair Professor Center for Drug Abuse and Addiction & Advisor, Office of
Superintendent, China Medical University Hospital, Taichung, Taiwan

15:15~16:00 Inhalation Toxicology of Ambient Particles: Cardiovascular Toxicities and Beyond

Tsun-Jen Cheng, M.D., Ph.D.

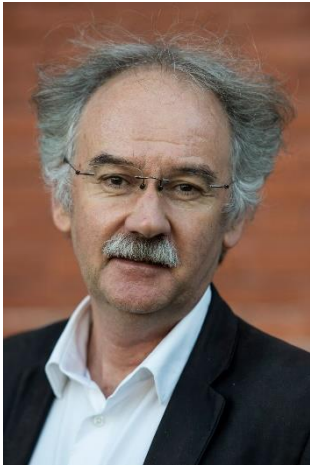
Professor
Institute of Occupational Medicine and Industrial Hygiene
National Taiwan University, Taipei
Taiwan

16:00~16:45 Environmental Exposure-Disease Relationship in Asthma

Shau-Ku Huang, Ph.D.

Distinguished Investigator
National Institute of Environmental Health Sciences
National Health Research Institutes, Miaoli
Taiwan

16:45~17:00 Closing Remarks



9:15 ~10:00, Tuesday, October 17

Air Pollution and Health: Linking Science with Global Policies

Nino Künzli, M.D., Ph.D.

Deputy Director of Swiss Tropical and Public Health Institute (SwissTPH)

Head of Department of Education and Training (ET)

Dean, Swiss School of Public Health (SSPH+)

Basel, Switzerland

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Abstract:

The success of Swiss and international research agendas of the last 30 years have provided unprecedented insights into the effects of ambient air pollution on health of citizens. This evidence is mirrored in policy recommendations of WHO, which got adopted in several regions in the world. However, from a global perspective, an increasing inequity can be observed with cleaner regions seeing further improvements and the most polluted ones experiencing deteriorations. The presentation will give an update on most recent progress and evidence in air pollution and health research. The related health impact will be put into a local and global perspective of research and policy needs.

Profile:

With an MD from the University of Basel and a PhD from University of California Berkeley (USA), Nino Künzli is Deputy Director of the Swiss Tropical and Public Health Institute Basel, Switzerland (www.swisstph.ch) and Professor of Public Health at the University Basel Medical School. He has a 25 year record of research in environmental epidemiology, reflected in some 400 peer reviewed articles, cited > 13'000 times. The main focus is on ambient air pollution and its cardiorespiratory health effects. His air pollution research includes exposure science, epidemiologic research and the integration of both into health impact assessment to serve policy makers.

After the PhD (UC Berkeley) he returned to Basel to continue research in Switzerland. Appointed as Associate Professor to the University of Southern California in Los Angeles we worked with the team of the Southern California Children's Health Study (2002-2005). He received an ICREA Professor position in Barcelona to join the Centre for Research in Environmental Epidemiology (2006-2009).

Künzli regularly serves on national and international advisory committees, including for the E.U. and WHO. He currently serves in the WHO Guideline Development Group for the update of the Air Quality Guidelines. Since 2012, he is the President of the Swiss Federal Commission on Air Hygiene – the clean air advisory board of the Swiss Government. Künzli is Co-Editor-in Chief of the International Journal of Public Health, which is owned by the Swiss School of Public Health (SSPH+) www.ssphplus.ch. Since 2015, Künzli is the dean of SSPH+ - a foundation of eight Swiss Universities.



10:00~10:45, Tuesday, October 17

California's Integrated Approach to Climate Change Mitigation and Air Quality

John R. Balmes, M.D.

Director, Joint Medical Program
Vice Division Head, Environmental Health Sciences
Professor of Environmental Health Sciences
University of California, Berkeley
USA
Email: john.balmes@ucsf.edu

Abstract:

The atmospheric concentration of carbon dioxide (CO₂) and the temperature of the earth's surface have been rising in parallel for decades, with the former recently reaching 400 ppm, consistent with a 1.5° C increase in global warming. Climate change models predict that a "business as usual" approach, i.e., no effort to control CO₂ emissions from combustion of fossil fuels, will result in over 2° C increase in annual average surface temperature by ~2034. With atmospheric warming comes increased air pollution. The concept of a "climate gap" in air quality control captures the decreased effectiveness of regulatory policies to reduce pollution with a hotter climate. Sources of greenhouse gases (GHGs) and climate-forcing aerosols ("black carbon") are the same sources of air pollutants that harm health. California has adopted robust climate change mitigation policies that are also designed to achieve public health co-benefits by improving air quality. These policies include advanced clean car standards, renewable energy, a sustainable communities strategy to limit suburban sprawl, a low carbon fuel standard, and energy efficiency. A market-based mechanism to put a price on CO₂ emissions is the cap-and-trade program that allows capped facilities to trade state-issued GHG emissions allowances. The "cap" limits total GHG emissions from all covered sources, and declines over time to progressively reduce emissions. An alternative approach is a carbon tax. California's leadership on air quality and climate change mitigation is increasingly important given the efforts to slow or even reverse implementation of such policies at the U.S. national level.

Profile:**Education**

1968-1972	B.A., University of Illinois, Urbana
1972-1976	M.D., Mt. Sinai School of Medicine, City University of NY
1976-1979	Resident, Internal Medicine, Mt. Sinai Hospital, New York City
1979-1981	Post-graduate fellow, Pulmonary Medicine, Yale University

Licenses, Certification

1982	California #G48421
1979	American Board of Internal Medicine, 1979
1984	Board Certified, Pulmonary Medicine, 1984

Principal Positions Held

1998-present	Professor of Medicine in Residence, University of California, San Francisco
1992-1998	Associate Professor of Medicine in Residence, University of California, San Francisco
1986-1992	Assistant Professor of Medicine in Residence, University of California, San Francisco
2002-present	Professor of Environmental Health Sciences in Residence, School of Public Health, University of California, Berkeley

Other Positions Held Concurrently

2014-present	Acting Director, UC Berkeley-UCSF Joint Medical Program
2002-present	Director, Northern California Center for Occupational and Environmental Health (COEH) (Acting Director, 2000-2002)
2014-present	Vice Head, Division of Environmental Health Sciences, School of Public Health, UC Berkeley
2008-present	Physician Member, California Air Resources Board
1992-2014	Chief, Division of Occupational and Environmental Medicine, San Francisco General Hospital
1990-2003	Director, Occupational Medicine Residency Program, UCSF
1990-2015	Director, Human Exposure Laboratory, Lung Biology Center, UCSF

Honors and Awards

1976	Alpha Omega Alpha, elected
1980	Fellowship, American Lung Association
1983	Pulmonary Academic Award, NHLBI, 1983-1986
1991	Environmental/Occupational Medicine Academic Award, NIEHS, 1991-1996
1997	Clean Air Research Award, American Lung Association of San Francisco and San Mateo
1999	Clean Air Award, American Lung Association of California
2002	Jean Spencer Felton Award for Excellence in Scientific Writing, Western Occupational and Environmental Medicine Association
2006	Robert A. Kehoe Award for Excellence in Education or Research in Occupational and Environmental Medicine, American College of Occupational and Environmental Medicine
2006	Carl Moyer Award for Scientific Leadership and Technical Excellence, Coalition for Clean Air

- 2010 Rutherford T. Johnstone Award for Significant Contributions to Furthering of Occupational and Environmental Medicine, Western Occupational and Environmental Medicine Association
- 2012 Robert M. Zweig Memorial Award for Outstanding Contributions in Air Pollution Health Effects Research, South Coast Air Quality Management District
- 2016 Public Service Award in Recognition of Outstanding Contributions in Public Health in the area of Respiratory Disease and Medicine, American Thoracic Society
- 2016 John M. Peters Award in Appreciation of a Lifetime of Leadership, Research, and Devoted Service to the Pursuit of Respiratory Health, American Thoracic Society Assembly on Environmental, Occupational and Population Health
- 2017 David Bates Memorial Lecture, 2017 Semiahmoo Annual Conference on Environmental, Occupational, and Population Health, University of Washington/University of British Columbia/Simon Fraser University/Oregon State University

Keywords/Areas of Interest

Occupational and environmental respiratory disease, air pollution, asthma, COPD, airway inflammation, acute cardiovascular effects, gene-environment interactions, exposure-response relationships, air pollution contributions to the metabolic syndrome

Professional Activities

Clinical

- 1986-present Attending Physician, Pulmonary and Critical Care Service, Zuckerberg San Francisco General Hospital (ZSFG); I typically attended 1 month per year in the Medical ICU and 1 month per year on the inpatient Pulmonary Consult Service until 2014. Since then, when I became Director of the UCB-UCSF Joint Medical Program I have stopped attending in the Medical ICU.
- 1998-present Attending Physician, Occupational Medicine Clinic, ZSFG

Summary of Clinical Activities

For the past 18 years, I have been conducting outpatient clinical evaluations of current and former workers with beryllium sensitization from Lawrence Livermore National Laboratory and other Department of Energy (DOE) facilities for the presence of chronic beryllium disease. This activity led to my participation in a DOE-funded effort to develop a national Beryllium BioBank for future genetic epidemiological research.

Professional Organizations

Memberships

- 1980-present American Thoracic Society
- 1981-present American College of Occupational and Environmental Medicine
- 1981-present American College of Chest Physicians
- 1998-present European Respiratory Society

Service to Professional Organizations

2016-present	Ad Hoc Committee on the Occupational Burden of Disease, American Thoracic Society/European Respiratory Society	Member
2015 -present	Ad Hoc Committee on What Constitutes an Adverse Health Effect of Air Pollution, American Thoracic Society/European Respiratory Society	Member
2011-2016	Environmental Health Policy Committee, American Thoracic Society	Member, 2010-2011; Chair, 2011-2015
2004-2010	Publications Policy Committee, American Thoracic Society	Member, 2004-2006; Chair, 2007-2010
1999-2004	Nominating Committee, American Thoracic Society	Member, 1999-2000; Chair, 2001-2004
1997-2008	Health Care Policy Committee, American Thoracic Society	Member, 1997-1998; 2002-2008
1997-1999	Scientific Assembly on Environmental and Occupational Health, American Thoracic Society	Chair
1997-1999	Board of Directors, American Thoracic Society	Member
1998-2002	Ad Hoc Committee on the Occupational Contribution to the Burden of Airway Disease, American Thoracic Society	Chair
2007-2013	Ad Hoc Committee on the Diagnosis and Management of Beryllium Sensitization and Chronic Beryllium Disease	Chair
2007-2010	Ad Hoc Committee on Novel Risk Factors and the Global Burden of Non-smoking COPD	Co-chair
2001-2004	Ad Hoc Committee on the Diagnosis of Asbestos-related Diseases, 2001-2004	Member
2000-2001	Ad Hoc Committee on Legislation re: Compensation of Asbestos-related Diseases, 2000-2001	Member
1988-1997	Program Committee, Scientific Assembly on Environmental and Occupational Health, American Thoracic Society	Member, 1988-1993; Chair 1996-1997
1993- 1997	Committee on Pulmonary and Critical Care Training, American Thoracic Society	Member
1993-1995	Long-Range Planning Committee, Scientific Assembly on Environmental and Occupational Health, American Thoracic Society	Member
1991-1992	Scientific Assembly on Environmental and Occupational Health, American Thoracic Society	Secretary

1991-1992	Ad Hoc Committee on Evaluation of Disability/Impairment in Persons with Asthma, American Thoracic Society	Member
1989-2006	Ad Hoc Committee on the Health Effects of Tremolite, Scientific Assembly on Environmental and Occupational Health, American Thoracic Society	Member, 1989-1990; 2002-2006
1998-2002	California Thoracic Society	Treasurer, 1998-1999; Secretary, 1999-2000; President-elect, 2000-2001; President, 2001-2002
2002-2008	Nominating Committee, California Thoracic Society	Chair, 2002; Member, 2008
1988-1990	Ad Hoc Committee on Occupational Lung Disease, California Thoracic Society	Chair
1988-1989	Ad Hoc Committee on Evaluation of Pulmonary Impairment, California Thoracic Society	Member
1996-1999	Health Care Policy Committee, California Thoracic Society	Member
1994-2004	Network (formerly Section) on Occupational and Environmental Health Steering Committee, American College of Chest Physicians	Member

Service to Professional Publications

1996-2007	Editorial Board: International Journal of Occupational and Environmental Health
2005-2010	Editorial Board: Archives of Environmental and Occupational Health
2013-present	Editorial Board: American Journal of Respiratory and Critical Care Medicine
2015-present	Associate Editor: American Journal of Respiratory and Critical Care Medicine
1988-present	Ad hoc referee: American Journal of Industrial Medicine, American Journal of Medicine, American Journal of Physiology: Lung Cellular and Molecular Physiology, American Journal of Public Health, American Journal of Respiratory and Critical Care Medicine (20 papers in 5 years), Archives of Environmental Health, Archives of Internal Medicine, Arthritis Care and Research, Atmospheric Environment, Cancer Research, Chemosphere, Chest (20 papers in 5 years), Circulation, European Journal of Clinical Investigation, European Respiratory Journal (10 papers in 5 years), Environmental Health, Environmental Health Perspectives (8 papers in 5 years; listed as a 2013 Reviewer of the Year), Environmental Research, Experimental Gerontology, Indoor Air, Inhalation Toxicology, International Journal of Tuberculosis and Lung Disease, Journal of Aerosol Medicine and Pulmonary Drug Delivery, Journal of Allergy

and Clinical Immunology (5 papers in 5 years), Journal of the American Medical Association (3 papers in 5 years), Journal of Applied Physiology, Journal of Chronic Obstructive Pulmonary Disease, Journal of Clinical Pharmacology, Journal of Exposure Science and Environmental Epidemiology, Journal of Laboratory and Clinical Medicine, Journal of Occupational and Environmental Health, Journal of Occupational and Environmental Medicine, Lung, New England Journal of Medicine (3 papers in 5 years), Occupational and Environmental Medicine, Particle and Fiber Toxicology, Pediatric Pulmonology, Preventing Chronic Diseases, Respiration, Respiratory Research, Risk Analysis, Thorax (5 papers in 5 years), Toxicological Sciences

Government and Other Professional Service

- 2004-2012 Member, Steering Committee, California Asthma Partners, Environmental Health Investigations Branch, California Department of Public Health
- 2005-2011 Member, Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel, CASAC, Science Advisory Board, U.S. Environmental Protection Agency (2005-2007; 2010-2011)
- 2004-2011 External peer reviewer, Agency for Toxic Substances and Disease Registry
- 2006-2010 Chair, External Scientific Advisory Committee, Southern California Particle Center, UCLA
- 2006- 2008 Member, National Research Council Committee to Review the NIOSH Respiratory Disease Program
- 2007-2010 Member, Clean Air Scientific Advisory Committee (CASAC) Nitrogen Oxides and Sulfur Oxides Review Panel, CASAC, Science Advisory Board, U.S. Environmental Protection Agency
- 2007-2008 Vice-Chair, Green Chemistry Science Advisory Panel, Department of Toxic Substances Control, Cal/EPA
- 2008-2009 Member, Institute of Medicine Committee for the Review of the NIOSH Research Roadmap on Asbestos and Other Elongated Mineral Particles
- 2008-present Member, California Air Resources Board
- 2009-2010 Member, National Research Council Committee for the Review of the Army's Enhanced Particulate Matter Surveillance Project
- 2009-2015 Member, Scientific Advisory Committee, Multi-Ethnic Study of Atherosclerosis-Air (MESA-Air), University of Washington
- 2010- 2011 Member, Institute of Medicine Committee on the Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan
- 2010-2011 Member, Scientific Advisory Group, Epidemiological Study of Asbestos Exposure in Libby, MT, Mount Sinai School of Medicine
- 2011 Invited participant, NIH Workshop on Health Burden of Indoor Air Pollution on Women and Children in Developing Countries
- 2011-2015 Chair, Scientific Advisory Committee, Center for Clean Air Research (CCAR), University of Washington
- 2011-2015 Member, Scientific Advisory Committee, Southeastern Center for Air Pollution and Epidemiology (SCAPE), Emory University

2012-2013	Member, Institute of Medicine Committee on Review of the Department of Labor's Site Exposure Matrix (SEM) Database
2012	Member, Review Panel for Toxicological Review of Libby Amphibole Asbestos, U.S. EPA
2013	Reviewer, Human Health Risk Assessment for Sulphur Dioxide, Health Canada
2013	Ad hoc member, NIEHS Board of Scientific Counselors, Review of Epidemiology Branch
2013-2014	Contributor, WHO Indoor Air Quality Guidelines: Household Fuel Combustion
2014-present	Member, Clean Air Scientific Advisory Committee (CASAC) Sulfur Oxides Review Panel, Science Advisory Board, U.S. Environmental Protection Agency
2016-present	Member, CASAC PM Review Panel, Science Advisory Board, U.S. Environmental Protection Agency
2015	Reviewer, Department of Defense, U.S. Army Medical Research and Materiel Command, Peer Reviewed Medical Research Program
2016	Member, External Advisory Board, Department of Preventive Medicine Environmental Health Sciences Research Program, Icahn School of Medicine at Mount Sinai
2017	Chair, External Review Committee, Field Studies Branch, Respiratory Health Division, National Institute for Occupational Safety and Health

University and Public Service

University Service

UC system-wide

2000-present	Program Directors' Committee, Northern California Center for Occupational and Environmental Health, UC Berkeley-UC Davis-UCSF	Chair
1998-2015	Northern California Center for Occupational and Environmental Health Continuing Medical Education Committee, UC Berkeley-UC Davis-UCSF	Chair
2005-2014	Research Committee, School of Public Health, UC Berkeley; Chair 2007-2011	Member
2012-2013	MPH Management Committee, School of Public Health, UC Berkeley	Chair
2014-2016	Education Policy and Curriculum Committee, School of Public Health, UC Berkeley	Member
2012,2014	School of Public Health faculty search committees	Member
2015-present	Faculty Advisory Committee, School of Public Health, UC Berkeley	Member
2015-present	Dean's Administrative Council. School of Public Health, UC Berkeley	Member

School of Medicine

1995-present	Ethics Committee, Zuckerberg San Francisco General Hospital	Member
2014-present	PRIME Oversight Committee	Member
2015	Department of Family Medicine ad hoc promotions committee	Member

Departmental Service

2013-2015	Department of Medicine faculty search committees	Chair (2 searches)
2010-2011	Department of Medicine faculty search committee	Member
2011-present	Nina Ireland Fund Executive Committee	Member
1987-present	Residency Advisory Committee, Occupational Medicine Residency Program, UCSF	Member

Public Service (Last 5 years)

2011-present	The American Lung Association of California, the Bay Area Air Quality Management District, and the California Air Resources Board	Media spokesperson
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Summary of Service Activities

I actively advise governmental agencies at local, state, and national levels regarding air pollution health effects, climate change health effects, and occupational health. I serve on multiple advisory committees to both governmental agencies and academic research centers. I regularly review documents for agencies and scientific papers for medical and other scientific journals. I am regularly interviewed by both print and broadcast journalists about air pollution health effects. Because I have a multi-location appointment (UCSF and UC Berkeley), I serve on departmental committees on both campuses. I direct a multi-campus education and research consortium (the Northern California Center for Occupational and Environmental Health; UC Berkeley-UC Davis-UCSF).

Teaching and Mentoring Awards and Nominations

2011	UCSF-UC Berkeley Joint Medical Program Research Mentor of the Year
2014-2015	UC Berkeley School of Public Health Committee on Teaching Excellence
2015-2016	Awardee

Peer Reviewed Publications (Last 3 years)

1. Padula AM, **Balmes JR**, Eisen EA, Mann J, Noth EM, Lurmann FW, Pratt B, Tager IB, Nadeau K, Hammond SK. Ambient polycyclic aromatic hydrocarbons and pulmonary function in children. *J Expo Sci Environ Epidemiol* 2015 May;25(3):295-302.
2. Ortega Hinojosa AM, Davies MM, Jarjour S, Burnett RT, Mann JK, Hughes E, **Balmes JR**, Turner MC, Jerrett M. Developing small-area predictions for smoking and obesity prevalence in the United States for use in Environmental Public Health Tracking. *Environ Res* 2014;134C:435-452.
3. Hew KM, Walker AI, Kohli A, Garcia M, Syed A, McDonald-Hyman C, Noth EM, Mann JK, Pratt B, **Balmes J**, Hammond SK, Eisen EA, Nadeau KC. Childhood exposure to ambient polycyclic aromatic hydrocarbons is linked to epigenetic modifications and impaired systemic immunity in T cells. *Clin Exp Allergy* 2015;45(1):238-48.
4. Thompson L, Yousefi P, Penaloza R, **Balmes J**, Holland N. Genetic modification of the effect of maternal household air pollution exposure on birth weight in Guatemalan newborns. *Reprod Toxicol* 2014;50:19-26.

5. Steinmaus C, Ferreccio C, Yuan Y, Acevedo J, González,F, Perez L, Cortés S, **Balmes JR**, Liaw J, Smith AH. Elevated lung cancer in younger adults and low concentrations of arsenic in water. *Am J Epidemiol* 2014;180(11):1082-7
6. Holland N, Venkat S, Davé V, Wong H, Donde A, **Balmes JR**, Arjomandi M. Ozone inhalation leads to dose-dependent increase of cytogenetic damage in human lymphocytes. *Environ Mol Mutagen* 2015 May;56(4):378-87.
7. Raanan R, Harley KG, **Balmes JR**, Bradman A, Lipsett M, Eskenazi B. Early-life exposure to organophosphate pesticides and pediatric respiratory symptoms in the CHAMACOS cohort. *Environ Health Perspect* 2015;123(2):179-85.
8. Pope D, Diaz E, Smith-Sivertsen T, Lie RT, Bakke P, **Balmes JR**, Smith KR, Bruce NG. Associations of respiratory symptoms and lung function with measured carbon monoxide concentrations among nonsmoking women exposed to household air pollution: the RESPIRE trial, Guatemala. *Environ Health Perspect* 2015;123(4):285-292.
9. Sarfaty M, Bloodhart B, Ewart G, Thurston GD, **Balmes JR**, Guidotti TL, Maibach EW. American Thoracic Society member survey on climate change and health. *Ann Am Thorac Soc* 2015;12(2):274-
10. Bates MN, Crane J, **Balmes JR**, Garrett N. Investigation of hydrogen sulfide exposure and lung function and chronic obstructive pulmonary disease in a geothermal area of New Zealand. *PLoS One* 2015;10(3):e0122062.
11. Reid C, Jerrett M, Petersen M, Pfister G, Morefield P, Tager IB, Raffuse SM, **Balmes J**. Spatiotemporal prediction of fine particulate matter during the 2008 northern California wildfires using machine learning. *Environ Sci Technol* 2015;49(6):3887-96.
12. Arjomandi M, Wong H, Donde A, Frelinger J, Dalton S, Ching W, Power K, **Balmes J**. Exposure to medium and high ambient levels of ozone causes adverse systemic inflammatory and cardiac autonomic effects. *Am J Physiol Heart Circ Physiol* 2015 Jun 15;308(12):H1499-509.
13. Guarnieri M, Diaz E, Pope D, Eisen E, Mann J, Diaz A, Smith K, Smith-Sivertsen T, Bruce N, **Balmes J**. Lung function in rural Guatemalan women before and after a chimney stove intervention to reduce woodsmoke exposure. Results from RESPIRE and CRECER. *Chest* 2015;148(5):1184-1192.
14. Arjomandi M, Pascale L, Tham A, Wong H, Chen C, Tenney R, Stiner R, **Balmes J**, Paquet A. Inflammatory and repair pathways induced in human bronchoalveolar lavage cells with ozone inhalation. *PLoS One* 2015;10(6):e0127283.
15. Raanan RA, Gunier RB, **Balmes JR**, Beltran AJ, Harley KG, Bradman A, Eskenazi B. Decreased lung function in 7-year-old children with early-life organophosphate exposure. *Thorax* 2016 Feb;71(2):148-153.
16. Ware LB, Zhao Z, Koyama T, May AK, Matthay MA, Lurmann FW, **Balmes JR**, Calfee CS. Long-term ozone exposure increases the risk of developing the acute respiratory distress syndrome. *Am J Respir Crit Care Med* 2016;193(10):1143-50.
17. Heinzerling AP, Guarnieri MJ, Mann JK, Diaz JV, Thompson LM, Diaz A, Bruce NG, Smith KR, **Balmes JR**. Lung function in woodsmoke-exposed Guatemalan children following a chimney stove intervention. *Thorax* 2016;71(5):421-428.

18. Neophytou AM, White MJ, Oh SS, Thakur N, Galanter JM, Nishimura KK, Pino-Yanes M, Torgerson DG, Gignoux CR, Eng C, Nguyen EA, Hu D, Mak AC, Kumar R, Seibold MA, Davis A, Farber HJ, Meade K, Avila PC, Serebrisky D, Lenoir MA, Brigino-Buenaventura E, Rodriguez-Cintron W, Bibbins-Domingo K, Thyne SM, Williams LK, Sen S, Gilliland FD, Gauderman WJ, Rodriguez-Santana JR, Lurmann F, **Balmes JR**, Eisen EA, Burchard EG. Air pollution and lung function in minority youth with asthma in the GALA II & SAGE II studies. *Am J Respir Crit Care Med* 2016;193(11):1271-1280.
19. Reid CE, Jerrett M, Tager IB, Petersen ML, Mann JK, **Balmes JR**. Differential respiratory health effects from the 2008 northern California wildfires: A spatiotemporal approach. *Environ Res* 2016;150:227-235.
20. Nishimura KK, Iwanaga K, Oh SS, Pino-Yanes M, Eng C, Keswani A, Roth LA, Nguyen EA, Thyne SM, Farber HJ, Serebrisky D, Meade K, LeNoir MA, Rodriguez-Cintron W, Borrell LN, Bibbins-Domingo K, Lurmann F, Sen S, Rodriguez-Santana JR, Brigino-Buenaventura E, Avila PC, **Balmes JR**, Kumar R, Burchard EG. Early-life ozone exposure associated with asthma without sensitization in Latino children. *J Allergy Clin Immunol* 2016;138(6):1703-1706.e1.
21. Smith KR, Woodward A, Lemke B, Otto M, Chang CJ, Mance AA, **Balmes J**, Kjellstrom T. The last Summer Olympics? Climate change, health, and work outdoors. *Lancet* 2016;388(10045):642-644.
22. Navarro KM, Cisneros R, O'Neill SM, Schweizer D, Larkin NK, **Balmes JR**. Air quality impacts and intake fraction of PM_{2.5} during the 2013 Rim Mega Fire. *Environ Sci Technol* 2016;50(21):11965-11973.
23. Steinmaus C, Ferreccio C, Acevedo J, **Balmes JR**, Liaw J, Troncoso P, Dauphiné DC, Nardone A, Smith AH. High risks of lung disease associated with early-life and moderate lifetime arsenic exposure in northern Chile. *Toxicol Appl Pharmacol* 2016;313:10-315.
24. Sarfaty M, Kreslake J, Ewart G, Guidotti TL, Thurston GD, **Balmes JR**, Maibach EW. Survey of international members of the American Thoracic Society on climate change and health. *Ann Am Thorac Soc* 2016 Oct;13(10):1808-1813.
25. Mortimer K, Ndamala CB, Naunje A, Malava J, Katundu C, Weston W, Havens D, Pope D, Bruce N G, Nyirenda M, Wang D, Crampin A, Grigg J, **Balmes J**, Gordon S. A cleaner burning biomass-fueled cookstove intervention to prevent pneumonia in children under 5 years old in rural Malawi (CAPS): a cluster randomized controlled trial. *Lancet* 2016;389(10065):167-175.
26. Padula AM, Yang W, Carmichael S, Lurmann F, **Balmes J**, Hammond SK, Shaw GM. Air pollution, neighborhood acculturation factors and neural tube defects among Hispanic women in California. *Birth Defects Res A: Clin Mol Teratol* 2017 Apr 3;109(6):403-422.
27. Lawin H, Ayi Fanou L, Hinson V, Wanjiku J, Ukwaja NK, Gordon SB, Fayomi B, **Balmes JR**, Houngbegnon P, Avokpaho E, Sanni A. Exhaled carbon monoxide: a non-invasive biomarker of short-term exposure to outdoor air pollution. *BMC Public Health* 2017 Apr 17;17(1):320.
28. Lee E, Lin J, Noth E, Hammond SK, Nadeau KC, Eisen EA, **Balmes JR**. Traffic-related air pollution and telomere length in children and adolescents living in Fresno, CA: a pilot study. *J Occup Environ Med* May;59(5):446-452.

29. Navarro K, Cisneros R, Noth E, **Balmes J**, Hammond SK. Occupational exposure to polycyclic aromatic hydrocarbons of wildland firefighters at prescribed and wildland fires. *Environ Sci Technol* 2017;51(11):6461-6469.
30. Carty P, Cooper MR, Barr A, Neitzel RL, **Balmes J**, Rempel D. The effects of bit wear on respirable silica dust, noise and productivity: a hammer drill bench study. *Ann Work Expo Health* 2017 Jun 8 [Epub ahead of print].
31. Blount R, Daly KR, Fong S, Chang E, Grieco K, Greene M, Stone S, **Balmes J**, Miller RF, Walzer PD, Huang L. Effects of clinical and environmental factors on bronchoalveolar antibody responses to *Pneumocystis jirovecii*: a prospective cohort study of HIV+ patients. *PLOS One* 2017 12(7):e0180212
32. Nardone A, Ferreccio C, Acevedo J, Enanoria W, Blair A, Smith AH, **Balmes J**, Steinmaus C. The impact of BMI on non-malignant respiratory symptoms and lung function in arsenic exposed adults of Northern Chile. *Environ Res* 2017 Jul 21;158:710-719.
33. Johannson KA, Vittinghoff E, Morisset J, Lee JS, **Balmes J**, Collard HR. Home monitoring improves endpoint efficiency in idiopathic pulmonary fibrosis. *Eur Respir J* 2017;50:1602406.
34. Raanan RA, Gunier RB, **Balmes JR**, Beltran AJ, Harley KG, Bradman A, Eskenazi B. Elemental sulfur use and associations with pediatric lung function and respiratory symptoms in an agricultural community (California, USA). *Environ Health Perspect* 2017 (in press).
35. Blount R, Pascopella, Catanzaro DG, Barry P, English PB, Segal MR, Flood J, Meltzer D, Jones B, **Balmes J**, Nahid P. Traffic-related air pollution is associated with increased mortality during tuberculosis treatment in California. *Environ Health Perspect* 2017 (in press).

Review Articles(Last 3 years)

1. Johannson K, **Balmes J**, Collard H. Air pollution exposure: A novel environmental risk factor for interstitial lung disease? *Chest* 2015;147(4):1161-1167.
2. Assad NA, **Balmes J**, Mehta S, Cheema U, Sood A. Chronic obstructive pulmonary disease secondary to household air pollution. *Semin Respir Crit Care Med* 2015;36(3):408-421.
3. Reid CE, Brauer M, Johnston F, Jerrett M, **Balmes JR**, Elliott CT. Critical review of health Impacts of wildfire smoke exposure. *Environ Health Perspect* 2016;124(9):1334-1343..
4. Bayram H, Bauer AK, Abdalati W, Carlsten C, Pinkerton KE, Thurston GD, **Balmes JR**, Takaro TK. Environment, global climate change, and cardiopulmonary health. *Am J Respir Crit Care Med* 2017;195(6):718-724.
5. Antony VB, Redlich CA, Pinkerton KE, **Balmes J**, Harkema JR. NIEHS: 50 years of advancing science, improving lung health. *Am J Respir Crit Care Med* 2016;194(10):1190-1195.
6. Thurston GD, Kipen H, Annesi-Maesano I, **Balmes J**, Brook RD, Cromar K, De Matteis S, Forastiere F, Forsberg B, Frampton MW, Grigg J, Heederik D, Kelly FJ, Kuenzli N, Laumbach R, Peters A, Rajagopalan ST, Rich D, Ritz B, Samet JM, Sandstrom T, Sigsgaard T, Sunyer J, Brunekreef B. A joint ERS/ATS policy statement: what constitutes an adverse health effect of air pollution? An analytical framework. *Eur Respir J* 2017;49(1). pii: 1600419.

- Celedón JC, Burchard EG, Schraufnagel D, Castillo-Salgado C, Schenker M, **Balmes J**, Neptune E, Cummings KJ, Holguin F, Riekert KA, Wisnivesky JP, Garcia JGN, Roman J, Kittles R, Ortega VE, Redline S, Mathias R, Thomas A, Samet J, Ford JG; American Thoracic Society and the National Heart, Lung, and Blood Institute. An American Thoracic Society/National Heart, Lung, and Blood Institute Workshop Report: addressing respiratory health equality in the United States. *Ann Am Thorac Soc* 2017;14(5):814-826.

Books and Chapter

- Balmes JR**. California's Cap-and-Trade Program. In: Pinkerton KE, Rom WN, eds. *Global Climate Change and Public Health*. NY, NY: Humana Press (Springer-Verlag), 2014.
- Balmes J**. Outdoor air pollution. In: LaDou J, Harrison R, eds. *Current Occupational & Environmental Medicine*, ed. 5. NY, NY: McGraw-Hill, 2014.
- Balmes J**. Occupational lung diseases. In: LaDou J, Harrison R, eds. *Current Occupational & Environmental Medicine*, ed. 5. NY, NY: McGraw-Hill, 2014.
- Balmes J**, Eisner M. Air pollution. In: Broaddus VC, Mason RJ, Ernst JB, King TE, Lazarus SC, Murray JF, Nadel JA, Slutsky AS, Gotway MB, eds. *Textbook of Respiratory Medicine*, ed 6. Philadelphia: Elsevier Saunders, 2015.
- Balmes J**, Speizer F. Environmental lung diseases. In: Kasper D, Loscalzo J, Fauci A, Hauser S, Longo D, Jameson J, eds. *Harrison's Principles of Internal Medicine*, ed. 19. NY, NY: McGraw-Hill, 2015.
- Balmes J**. Indoor biomass burning and health consequences. In: Nadadur S, Hollingsworth J, eds. *Air Pollution and Health Effects*. London: Humana Press (Springer-Verlag), 2015.
- Guarnieri M, Diaz JV, **Balmes JR**. Work, living environment, and health. In: King TE, Wheeler MB, Bindman AB, Fernandez A, Grumbach K, Schillinger D, Villela T, eds. *Medical Management of Vulnerable and Underserved Patients: Principles, Practice, and Populations*. NY, NY: McGraw-Hill, 2017.

Other Publications

- Balmes JR**. Asbestos and lung cancer: what we know. *Am J Respir Crit Care Med* 2013 ; 188:8-9
- Rice MB, Thurston GD, **Balmes JR**, Pinkerton KE. Reply: the largest problem with climate change policy is not a future event. *Am J Respir Crit Care Med* 2014;190:117.
- Pusede SE, Cohen RC, Goldstein AH, Harley RA, **Balmes JR**, Aufhammer M, The mistaken impression that O₃ in the San Joaquin Valley (SJV) is not locally controllable. *Science* (online)
<http://comments.sciencemag.org/content/10.1126/science.345.6202.1233>
- Smith KR, **Balmes JR**, Guarnieri MJ. Cardiovascular risk and events and country income stratum. *N Engl J Med* 2015;372:289.
- Balmes JR**. Exposure to endotoxin in household dust: to wheeze or not to wheeze. *Am J Respir Crit Care Med* 2015;192:1265-1266.
- Balmes J**. Commentary for JOEM Forum – Silicosis: then and now. *J Occup Environ Med* 2017;59:22-223.
- Balmes JR**. AJRCCM: 100-year anniversary. Clearing the air: indoors, outdoors, and at work. *Am J Respir Crit Care Med* 2017;195(9):1100-1103.

8. Sigsgaard T, **Balmes J.** Environmental effects of intensive livestock farming. *Am J Respir Crit Care Med* 2017 Jun 19 [Epub ahead of print]
9. Thurston G, **Balmes J.** We need to "think different" about particulate matter. *Am J Respir Crit Care Med* 2017;196:6-7.

Research Program

For over 36 years, I have been studying the effects of exposures to occupational and environmental agents on respiratory and cardiovascular health. In the UCSF Human Exposure Laboratory, I have been conducting controlled human exposure studies with sampling of respiratory tract lining fluid to characterize acute exposure-response relationships for oxidant pollutant-induced airway inflammation, and more recently, investigation of acute cardiovascular responses. We were the first group to show that experimental exposure to ozone can cause decreased heart rate variability and brief exposures to secondhand tobacco smoke (SHS) can induce increased blood pressure, epithelial injury, and epithelial dysfunction. In follow-up to our earlier pilot work, we are currently funded to determine whether experimental exposure to ozone induces cardiovascular toxicity (decreased heart rate variability, endothelial dysfunction, and a pro-thrombotic state) and whether any of these effects are associated with airway inflammation, systemic oxidative stress, and systemic inflammation. We are also studying potential mechanisms of SHS-induced acute cardiovascular effects, including the use of the innovative technique of endothelial biopsy to obtain tissue for immunocytochemistry.

To study the chronic effects of occupational and environmental agents on respiratory health, I have developed collaborative relationships with epidemiologist colleagues at UCSF (Drs. Paul Blanc and Esteban Burchard) and UC Berkeley [Drs. Ira Tager (retired), Kirk Smith, Allan Smith, and Michael Bates]. With Dr. Blanc, I have collaborated in the analysis of cohort data regarding the effects of occupational exposure to respiratory tract irritants and exposure to SHS on COPD outcomes and the effects of exposure to traffic and air pollutants on asthma outcomes. With Dr. Burchard, I have collaborated to study the impacts of early-life exposure to outdoor air pollution on incidence of asthma and lung function. With Dr. Tager, I have investigated the effects of exposures to air pollutants on growth of lung function and disease severity in children with asthma in Fresno. With Dr. Kirk Smith, I have contributed to the first randomized controlled trial of a chimney stove to prevent pneumonia among infants in Guatemala and co-led a follow-up study on the effects of exposure to biomass smoke on growth of lung function in the cohort children. With Drs. Allan Smith and Craig Steinmaus, I have been investigating the role of ingested arsenic from contaminated drinking water on respiratory health in Chile and Bangladesh. With Dr. Michael Bates, I have been investigating whether chronic environmental exposure to hydrogen sulfide is associated with adverse effects on respiratory health in Rotarura, New Zealand; exposure to sulfurous emissions from the active volcano on the island of Hawaii is causing ill health; and exposure to household air pollution in Nepal is associated adverse cardiopulmonary outcomes.

I have also collaborated with colleagues from UCSF and South Korea to show that exposure to outdoor air pollution is associated with increased risk of exacerbations of idiopathic pulmonary fibrosis. With colleagues from UCSF and Vanderbilt University, I

have collaborated to show that long-term exposure to ambient ozone is associated with increased risk of the acute respiratory distress syndrome.

I am one of the multiple PIs (SK Hammond, G Shaw, JR Balmes) recently awarded a Children's Environmental Health Center (CEHC) grant (NIEHS/EPA) to study the adverse effects of air pollution on children living in the San Joaquin Valley. The Center project that I lead is investigating the potential effects of polycyclic aromatic hydrocarbons on risk of obesity and glucose dysregulation. I have also collaborated with investigators from another CEHC at UC Berkeley (Eskenazi, Bradman, Harley) to study the respiratory effects of early-life exposure to organophosphate pesticides and other environmental contaminants.

My newest collaboration is with colleagues at the Liverpool School of Tropical Medicine (Drs. Kevin Mortimer and Stephen Gordon) on a randomized controlled trial of the efficacy of an advanced cook stove for the prevention of childhood pneumonia in rural Malawi that is funded by UK sources. I have successfully applied for additional NIEHS funding to begin studying the exposure-response relationship between biomass smoke and lung health among adults in the villages participating in the trial.

John R. Balmes, MD Significant Recent Publications

1. Nadeau K, McDonald-Hyman C, Noth EM, Pratt B, Hammond SK, **Balmes J**, Tager I. Ambient air pollution impairs regulatory T-cell function in asthma. *J Allergy Clin Immunol* 2010;126:845-852.

This is the first study to show that exposure to air pollution can cause Treg dysfunction in children and that this effect may be due to hypermethylation of the FOXP3 gene. I assisted in the design of the study, the collection of lung function and asthma symptom data, the interpretation of results, and the writing/editing of the paper

2. Smith KR, McCracken JP, Weber MW, Hubbard A, Jenny A, Thompson L, **Balmes J**, Diaz A, Arana B, Bruce N. RESPIRE: A Randomised Controlled Trial of the impact of reducing household air pollution on childhood pneumonia in Guatemala. *The Lancet* 2011;378(9804):1717-1726.

This is the first randomized controlled trial of an improved chimney stove for the prevention of pneumonia in infants exposed to biomass smoke from indoor cooking. We showed efficacy comparable to vaccination for pneumococcal pneumonia. I read all the chest radiographs, assisted in the interpretation of the results, and assisted in the writing/editing of the manuscript.

3. Guarneri MJ, Diaz JV, Basu C, Diaz A, Pope D, Smith KR, Smith-Sivertsen T, Bruce N, Solomon C, McCracken J, **Balmes JR**. Effects of woodsmoke exposure on airway inflammation in rural Guatemalan women. *PLoS One* 2014;9:e88455.

This is the first study to show that exposure to biomass smoke from indoor cooking can induce airway inflammation using gene expression analyses of induced sputum samples. As senior author, I wrote the grant that funded the study, and provided leadership for design of the study, the analysis of the data, the interpretation of results, and the writing/editing of the paper.

4. Nishimura KK, Galanter JM, Roth LA, Oh SS, Thakur N, Nguyen EA, Thyne S, Farber HJ, Serebrisky D, Kumar R, Brigino-Buenaventura E, Davis A, Lenoir MA, Meade K, Rodriguez-Cintrón W, Avila PC, Borrell LN, Bibbins-Domingo K, Rodriguez-Santana JR, Sen S, Lurmann F, **Balmes JR**, Burchard E. Early life air pollution and asthma risk in minority children: The GALA II and SAGE II Studies. *Am J Respir Crit Care Med* 2013;188(3):309-318.
This is the first study of Latino and African-American children to provide evidence that early-life exposure to traffic-related air pollution increases risk of developing asthma. As co-senior author of this paper with Dr. Burchard (PI of GALA and SAGE), I provided leadership to the multi-center team with regard to this air pollution-asthma incidence analysis. I assisted in the design of the study, the analysis of the data, the interpretation of results, and the writing/editing of the paper.
5. Heinzerling AP,* Guarnieri MJ, Mann JK, Diaz JV, Thompson LM, Diaz A, Bruce NG, Smith KR, **Balmes JR**. Lung function in woodsmoke-exposed Guatemalan children following a chimney stove intervention. *Thorax* 2016;71(5):421-428.
*This is the first longitudinal study of the effect of household air pollution on lung function in children. As senior author, I wrote the grant that funded the study, and provided leadership for design of the study, the analysis of the data, the interpretation of results, and the writing/editing of the paper. *UCSF Pathways to Distinction MSY4*



11:00-11:45, Tuesday, October 17

An Integrated Approach for Assessing Temporal/ Spatial Variations of PM_{2.5} Exposures to Resident

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Abstract

To characterize residents' long-term exposure profiles, both of their spatial and temporal variations should be determined. An integrated approach is proposed for the above purpose by integrating PM_{2.5} concentration data obtained from the Environmental Protection Agency air quality monitoring station (AQMS), one mobile monitoring station (MMS) and one stationary monitoring station (SMS). The SMS (installed beside the AQMS) and MMS were established to measure s of the Shalu area (located in western part Taiwan) simultaneously for one year from fall/2013 to summer/2014. Samplings were conducted during daytime (7:00-10:00 AM) and nighttime (18:00-21:00 PM) on both weekdays and weekends for one month per season. Simple linear regressions were conducted to examine the relationships for data collected from MMS, SMS and AQMS, and the results were used to establish a 10-year PM_{2.5} exposure databanks for residents living in different regions of the Sahku area. Finally, exposure profiles of the above were compared with those simply obtained from the AQMS. The measured annual mean PM_{2.5} concentration obtained from the SMS (27.15 µg/m³), AQMS (20.05 µg/m³), and MMS (29.14 µg/m³) consistently exceeds the EPA PM_{2.5} annual standards (STD_{annual}=15 µg/m³). Good correlations between MMS, SMS and AQMS measured data were found from the present study ($R^2 > 0.86$). Exposure profiles obtained from the integrated approach shows 79.9% in spring, 81.8% in summer, 66.2% in fall, and 83.9% in winter exceeding the EPA PM_{2.5} 24-hr (STD_{24hr}=35 µg/m³). The above values were consistently higher than that of AQMS datasets (18.6%, 5.9%, 16.5%, and 36.5% in spring, summer, fall, and winter, respectively). Therefore, it is concluded that simply using AQMS datasets might cause underestimation for assessing residents' exposures. The approach proposed by the present study would provide a more effective way for establishing a long-term residents' PM_{2.5} exposure databank from the aspects of more accurate details in both spatial and temporal variations.

Profile:

Education

- | | |
|------|----------------------------------------------------------------------------|
| 1981 | B.A., Environmental, National Chung Hsing University Engineering, Taiwan |
| 1985 | M.S. Environmental, National Cheng Kung University Engineering, Taiwan |
| 1995 | Ph.D., Environmental and Occupational Health, University of Minnesota, USA |

Professional Certification

Certified Professional Engineer in Environmental Engineering in Taiwan, 1985 to present ; Certified Professional Engineer in Industrial Safety and Hygiene in Taiwan, 1988 to present

Professional Experience

- | | |
|-----------|--------------------------------------------------------------------------------------------------------------------------------|
| 2013-2015 | Associate Vice President for Academic Affairs, National Cheng Kung University, Taiwan. |
| 2011-2013 | Dean/Professor, School of Public Health/Dept. Occup. Safety & Health, China Medical University, Taiwan. |
| 2009-2011 | Distinguished Professor, Dept. Environ. Occup. Health, College of Medicine, National Cheng Kung University, Taiwan. |
| 2003-2009 | Professor, Dept. Environ. Occup. Health, Medical College, National Cheng Kung University, Taiwan. |
| 2005-2006 | Visiting Research Professor, Dept. Energy, Environmental and Chemical Engineering, Washington University in St. Louis, MO, USA |
| 2000-2003 | Director, Dept. Environ. Occup. Health, Medical College, National Cheng Kung University, Taiwan. |
| 1996-2002 | Lecturer, Associate Professor, Dept. Environ. Occup. Health, College of Medicine, National Cheng Kung University, Taiwan. |
| 1995 | Senior Researcher and Division Head, Exhibition Division, Institute of Occupational Safety and Health (IOSH), Taiwan. |
| 1987-1995 | Senior Expert in Industrial Hygiene, Dept. of Labor Inspection, Council of Labor Affairs, Executive Yuan, Taiwan. |
| 1986-1987 | Industrial Hygiene Inspector, Mining and Industry Inspection Council, Taiwan Provincial Government, Taiwan |
| 1985-1986 | Sanitary Engineer, Taiwan Water Supply Co., Taiwan. |

Professional Activities

Editor-in-Chief

Journal of Occupational Safety and Health, 2011 to present

Editor

Aerosol and Air Quality Research, 2011 to present (SCI Journal)

Safety and Health at Work, 2010 to present

Journal of Safety Research, 2007 to present (SCI Journal)

Industrial Safety Quarterly Journal, 2002 to present

Journal of Occupational Safety and Health, 2001 to 2010

Member, Recommended Exposure Limits for Chemical Substance, Institute of Occupational Safety and Health (IOSH), 2003 to present

Member, Occupational Disease Reviewing Board, Council of Labor Affairs, Executive Yuan, Taiwan. 2003 to present.

Consultant, Environmental Protection Unit, Ministry of Education, Taiwan, 2002 to present

Committee Member, Air Pollution Protection Committee, Tainan County, Chia-Yi City, and Tainan City, 2002 to present

Professional Association Service Activities

Taiwan Occupational Health Association (TOHA)

President Emeritus, 2008-present

President, 2005-2008

Member, 1996-present

Taiwan Occupational Safety Association (TOSA)

Member, 2009 to present

Industrial Safety & Health Association, ROC

Member, 2006-present

Chinese Association for Aerosol Research in Taiwan (CAART)

Member, 1998-present

Taiwan Indoor Air Quality Association

Member, 2007-present

Taiwan Occupational Safety Association

Member, 2008-present

Publications (Last 3 years)

1. Jung, C.-R., Young, L.-H., Hsu, H.-T., Lin, M.-Y., Chen, Y.-C., Hwang, B.-F., **Tsai, P.-J.* (Corresponding author)**, PM2.5 components and outpatient visits for asthma: A time-stratified case-crossover study in a suburban area. *Environmental Pollution*, 2017, 231:1085-1092.
2. Chen, W.-Y., Juang, Y.-J., Hsieh, J.-Y., **Tsai, P.-J.* (Corresponding author)**, Chen C.-P., Estimation of Respiratory Heat Flows in Prediction of Heat Strain among Taiwanese Steel Workers. *International Journal of Biometeorology*, 2017, 61: 115–125.
3. Ham, S., Kim, S., Lee, N., Kim, P., Eom, P., Eom, I., Lee, B., **Tsai, P.-J.**, Lee, K., Yoon, C., Comparison of Data Analysis Procedures for Real-time Nanoparticle Sampling Data Using Classical Regression and ARIMA Models. *Journal of Applied Statistics*, 2017, 44: 685-699. (<https://dx.doi.org/10.6084/m9.figshare.c.3253420.v1>).
4. Ham, S., Lee, N., Eom, I., Lee, B., **Tsai, P.-J.**, Lee, K., Yoon, C., Comparison of Real Time Nanoparticle Monitoring Instruments in the Workplaces. *Safe Health Work*. 2016, 7: 381–388.
5. Park, J., Kang, T., Jin, S., Heo, Y., Kim, K., Lee, K., **Tsai, P.-J.**, Yoon, C., Asphyxiation Incidents by Hydrogen Sulfide at Manure Storage Facilities of Swine Livestock Farms in Korea. *Journal of Agromedicine*, 2016; 21:144-148.
6. Young, L.-H., Li, C.-H., Lin, M.-Y., Hwang, B.-F., Hsu, H.-T., Chen, Y.-C., Jung, C.-R., Chen, K.-C., Cheng, D.-H., Wang, V.-S., Chiang, H.-C., **Tsai, P.-J.* (Corresponding author)**, Field Performance of a Semi-continuous Monitor for Ambient PM2.5 Water-soluble Inorganic Ions and Gases at a Suburban Site. *Atmospheric Environment*, 2016, 144: 376-388.

7. Chen, Y.-C., Kuo, Y.-C., Chen, M.-R., Lin, M.-Y., Wang, Y.-F., Chen, C.-H., Yoon, C., **Tsai, P.-J.* (Corresponding author)**, Reducing PCDD/F emissions from a real-scale iron ore sinter plant by adjusting its sinter raw mix. *Journal of Cleaner Production*. 2016, 112: 1184–1189.
8. Wu, W.T., Lin, Y.-J., Li, C.-Y., **Tsai, P.-J.**, Yang, C.-Y., Liou, S.-H., Wu, T.-N., Pershouse, M.A., Cancer Attributable to Asbestos Exposure in Shipbreaking Workers: A Matched-Cohort Study. *PLoS ONE*, 2015 (<http://dx.doi.org/10.1371/journal.pone.0133128>)
9. Chen, Y.-C., Hsu, C.-K., Wang C. C., **Tsai, P.-J.**, Wang, C.-Y., Chen, M.-R., Lin, M.-Y., Particulate Matter Exposure in a Police Station Located near a Highway. *International Journal of Environmental Research and Public Health*, **2015**, 12(11), 14541-14556. (SCI; Impact factor= 2.063; Rank= 96/221 =43.4%; Environ. Sci.; JCR 2014)
10. Kuo, Y.-C., Chen, Y.-C., Lin, M.-Y., Young, L.i-H., Hsu, H.-T., Liou, S.-H., Wu, T.-N., Wang, L.-C., **Tsai, P.-J.* (Corresponding author)**, Ambient Air Concentrations of PCDD/Fs, Coplanar PCBs, PBDD/Fs, and PBDEs and Their Impacts on Vegetation and Soil. *International Journal of Environmental Science and Technology*, 2015, 12: 2997-3008.
11. Lee, J., Ham, S., Yoon, C., **Tsai, P.-J.**, Optimal Treatment Condition for Changing Characteristics of Naturally Occurring Asbestos. *Aerosol and Air Quality Research*, 2015, 15: 2332–2345.
12. Ham, S., Kim, S., Lee, Naro, Kim P., Eom, I., Lee, K., Yoon, C., Comparison of Nanoparticle Exposure Levels Based on Facility Type—Small-Scale Laboratories, Large-Scale Manufacturing Workplaces, and Unintended Nanoparticle-Emitting Workplaces. *Aerosol and Air Quality Research*, 2015, 15: 1967-1978.
13. Kim, Y., Yoon, C., Ham, S., Park, J., Kim S., Kwon, O., **Tsai, P.-J.**, Emissions of Nanoparticles and Gaseous Material from 3D Printer Operation. *Environmental Science & Technology*, 2015, 49: 12044–12053

Chapters in Book

1. **Tsai P.-J.**, Young, L.-H., Wang, Y.-F. Chen, C.-W., Nanoparticle exposures in occupational environments. In *Bio-interactions of Nanoparticles*; Taylor & Francis Group, Inc. Oxon, UK, p.p. 49–72, 2014.
2. **Tsai P.-J.**, Uang, S.-N., Wang, S.-M., Wu, T.-N., Shih, T.-S. Exposure Assessment in the **Workplace**. In *“Comprehensive Sampling and Sample Preparation”*; Pawliszyn, J., Bayona, J. M., Eds; Elsevier, Academic Press: Oxford, UK, p.p. 163–190, 2012.
3. Lee W.-S., Wang L.-C., Lee W.-J., **Tsai P.-J.**, Chang M.-B., Chang-Chien G.-P., Major Emission **Inventory** of Polychlorinated Di-benzo-*p*-dioxins and Dibenzofurans in Taiwan. In *“Trends in Air Pollution Research”*. Livingstone, J. V. Eds; Nova Science Publishers, Inc. Hauppauge, NY, p.p. 183–233, 2005.

Patents

1. Tsai, **P.-J.**, Lee, W.-J., Air pollution control devices for dust and volatile organic compounds, **Patent** No.: M517014, Date of Patent: Feb. 11, 2016.
2. Lai, C.-Y., **Tsai, P.-J.**, Tang, D.-T., Shih, T.-S., Lee, H.-Y., Lee, W.-Y., Uniform Aerosol Deposit Sampling Device. *Republic of China Patent*, Patent No.: I322866, Date of Patent: Apr. 1, 2010.
3. Lai, C.-Y., **Tsai, P.-J.**, Tang, D.-T., Shih, T.-S., Lee, H.-Y., Lee, W.-Y., Uniform Aerosol Deposit Sampling Device. *United States Patent*, Patent No.: US 7,582,146 B2, Date of Patent: Sep. 1, 2009.

Technique Transference

Tsai, P.-J., Lee, W.-J., Push-Pull Ventilation and Air pollution Control Techniques for the Large Area Spray Painting Process. Titech Co. Ltd (NT\$ 200,000) Dec. 12, 2013.

Awards and Honors

1. Best Research Paper Award for 2014 Taiwan Association for Aerosol Research (TAAR), " Young, L.-H., Lin, Y.-H., Lin, T.-H., **Tsai, P.-J.* (Corresponding author)**, Wang, Y.-F., Hung, S.-M., Tsai, C.-J., Chen, C.-W., Field application of a newly developed personal nanoparticle sampler to selected metalworking operations. *Aerosol and Air Quality Research*, 2013, 13: 849–861."
2. Distinguished Professor, National Cheng Kung University, 2013-2016.
3. Best Paper Award in Industrial Safety and Health Techniques (First prize) for 2nd Workplace Safety and Health Forum, "Developing techniques for health-risk assessment and alarm system for workers exposed to multiple chemical agents", Taichung, Taiwan, June 13rd, 2013.
4. Best Paper Award in Industrial Safety and Health Technique Category in 2012 Industrial Safety and Health Technology Best Paper Competition, "Assessing Long-term Oil Mist Exposures to Workers in a Fastener Manufacturing Industry Using the Bayesian Decision Analysis Technique", Council of Labor Affairs, Executive Yuan, July 4, 2012.
5. Best Paper Award in Industrial Safety and Health Techniques (First prize) for 1st Workplace Safety and Health Forum, "Developing Techniques for Control Banding and Health Risk Assessment for Workplace Chemical exposures", Taichung, Taiwan, May 31st, 2012.
6. Outstanding Research Award, "Correcting the Gas and Particle Partitioning of PCDD/F Congeners in the Flue Gas of an Iron Ore Sinter Plant", College of Medicine, National Cheng Kung University, May 31, 2012.
7. Outstanding Research Award, "Effects of Uniformities of Deposition of Respirable Particles on Filters on Determining Their Quartz Contents by Using the Direct on-Filter Z-ray Diffraction (DOF XRD) method", College of Medicine, National Cheng Kung University, May 31, 2012.
8. Best Paper Award in Industrial Hygiene (First prize) in 2012 International Occupational Hygiene Conference, "Effects of exposure to combustion products of scented candle on social stress-induced cardiopulmonary injury in mice", Taiwan Occupational Hygiene Association. Apr. 27, 2012.

9. Best Paper Award, "Reducing PAH emissions from the iron ore sintering process by optimization its operation operators". Cheng Hsing Medical Research and Teaching Foundation, July 25, 2011.
10. Best Paper Award in Industrial Safety Technique Category (Second prize) in 2011 Industrial Safety and Health Technology Best Paper Competition, "Acid Gas, Acid Aerosol and Chlorine Emissions from Trichlorosilane Burning Processes", Council of Labor Affairs, Executive Yuan, July 5, 2011.
11. Best Paper Award in Industrial Safety and Health Management Technique Category (Second prize) in 2011 Industrial Safety and Health Technology Best Paper Competition, "Implementing a National Occupational Health Control Strategy by Combining a Semi-quantitative Risk Assessment Model and Bayesian Decision Analysis Technique", Council of Labor Affairs, Executive Yuan, July 5, 2011.
12. Best Paper Award in Industrial Health Technique Category in 2011 Industrial Safety and Health Technology Best Paper Competition, "Developing a New Technique for Free Silica Exposure Assessment", Council of Labor Affairs, Executive Yuan, July 5, 2011.
13. Best Reviewer Award (Vol.2, No. 1) of Safety and Health at Work (SH@W), Occupational Safety and Health Research Institute (OSHRI), Korea Occupational Safety and Health Agency (KOSHA), June 14, 2011.
14. Best Paper Award in Industrial Hygiene (First prize) in 2011 International Industrial Hygiene and Occupational Medicine Conference, "Can Acid Values of Cooking Oil be Used as an Index for Assessing Workers' Exposures to PAHs emitted from Cooking Process", Taichung, Taiwan, Apr., 2011.
15. Best Research Award in Health Science, "Reducing PAH emissions from the iron ore sintering process by optimization its operation operators". National Cheng Kung University Medical College, Dec. 31, 2010.
16. Best Paper Award, "Determining Optimal Operation Parameters for Reducing PCDD/F emissions from the iron ore sintering process by Using the Taguchi Experimental Design". Cheng Hsing Medical Research and Teaching Foundation, June 18, 2010.
17. Best Paper Award (First prize) in 2010 Industrial Hygiene and Occupational Medicine Conference, "Gene-Environmental Interaction in Noise-induced Permanent Threshold Shift", Taipei, Taiwan, Mar., 2010.
18. Best Paper Award (Third prize) in 2009 Industrial Safety and Health Technology Best Paper Competition, "Analysis of Current Installation Condition, Energy Consumption and Effectiveness of Local Exhaust Ventilation System Used in Industries in Taiwan", Council of Labor Affairs, Executive Yuan, July, 2009.
19. Distinguished Professor, National Cheng Kung University, 2009-2012.
20. Best Paper Award (First prize) in 2008 Chinese Environmental Engineering Association Conference, "Determining Optimal Operation Parameters for Reducing PCDD/F Emissions (I-TEQ values) from the Iron Ore Sintering Process by Using the Taguchi Experimental Design", Taipei, Taiwan, Nov., 2008.

21. Best Paper Award in International Occupational Hygiene Association (IOHA) 7th International Scientific Conference, "Anti-oxidation Capability and Environmental Factors for Noise Induced Permanent Hearing Loss", Taipei, Taiwan, Feb., 2008.
22. Best Paper Award (Fifth Prize) in 2005 Occupational Health Conference, "Characteristics and Control of Free Silica Emissions from Maintenance Works in Construction Industry", Tainan, Taiwan, April, 2005.
23. Best Paper Award (First Prize) in 2004 Occupational Health Conference, "Emissions of VOCs from Motor Vehicle Engines under Various Driving Conditions", Kaohsiung, Taiwan, April, 2004.
24. Best Paper Award in 2004 Occupational Health Conference, "Characteristics of PAH Emissions from Aircraft Engines", Kaohsiung, Taiwan, April, 2004.
25. Best Paper Award in 2004 Occupational Health Conference, "Characteristics of Free Silica Exposures to Workers in Casting Industries", Kaohsiung, Taiwan, April, 2004.
26. Best Paper Award in 2004 Occupational Health Conference, "Exposure and Health Risk Assessment for PAH Exposures to Steel Industry Workers", Kaohsiung, Taiwan, April, 2004.

Invited Presentations

1. "Challenges and chances from the newly launched environmental monitoring system in Taiwan". International Occupational Health Forum, Beijing, China, Aug 22-23, 2017.
2. "Using a surrogate method for assessing workers' STEL and ceiling exposures to organic solvents during the PM process in a hightech industry" in Special Session of the "Occupational Exposure Limits and Sampling Strategy for Irregular & Intermittent Tasks" (Special Session Speaker), The 31st International Congress on Occupational Health (ICOH), Seoul, May 31-June, 5, 2015.
3. "Current Achievements and Challenges on Occupational Health in Taiwan" (Keynote Speaker)., 2014 Korean Industrial Health Association Conference, Busan, Korea, Oct. 23-24, 2014.
4. "Workplace exposure and health-risk assessment techniques" (Plenary lecture), 2014 Occupational Health Forum, Taichung, Taiwan, Sept. 11, 2014.
5. "Developing a semi-quantitative occupational risk predicting model for chemical exposures and its application to a national chemical exposure databank ". (Keynote Speaker). 2nd International Conference and Exhibition on Occupational Health & Safety, Beijing, China, May 21-22, 2013.
6. "Techniques for Assessing Workers' Nanoparticle Exposures" (Plenary lecture). 27th Environmental Analytical Chemistry Conference, Taoyung, Taiwan. May 3-4, 2013.
7. "Techniques for Assessing Nanoparticle Exposures to Different Regions of the Respiratory Tract" (Invited Speaker). Taiwan-India workshop on Nanotechnology: Environmental, Health and Safety, Taipei, Taiwan. Dec. 13-15, 2012.
8. "Using Bayesian Statistics to Initiate Taiwan Occupational Health Exposure Prevention Strategies" (Keynote Speaker). 2012 International Symposium on Safety Science and Engineering, Beijing, China. Nov. 7-9, 2012.

9. "Techniques for Aerosol Measurement" (Invited Speaker). Occupational Health Risk Control Forum, Beijing Labor Protection Science Research Institute, Beijing, China. Nov. 6-7, 2012.
10. "Occupational Health (OH) Practice and Research in Taiwan" (Invited Speaker). The Capital University of Economics and Business (CUEB), Beijing, China. Nov. 5, 2012.
11. "Initiating a national occupational health exposure prevention strategy through the use of the Bayesian Statistics" (Keynote Speaker). 2012 International Occupational Hygiene Conference, Taiwan Occupational Hygiene Association (TOHA), Kaohsiung, Taiwan. Apr. 27-28, 2012.

11:45 ~12:30, Tuesday, October 17



PM_{2.5} Chemical Characteristics under the Influences of Various Events

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Graduate Institute of Environmental Engineering
National Central University, Taoyuan
Taiwan

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Abstract:

Atmospheric aerosols are ubiquitous due to contributions from all kinds of sources in the world. Particulate matter with an aerodynamic diameter equal to or less than 2.5 μm (PM_{2.5}) draws a great attention due to its role on global temperature change and health effects. In addition to global scale, atmospheric aerosol also affects urban air quality significantly in regional and local scales.

In Taiwan, we have an air quality monitoring network established by Taiwan Environmental Protection Administration (EPA) running for more than 40 years. Time variations of air pollutants and meteorological factors monitored at the site can give us indications of PM_{2.5} source contributions. In the last decade of 20th century, Asian continent became prosperous economically due to industrial development but with the expense of air pollution. Around the same time period, Taiwanese people began to be aware of transboundary transport of air pollution from Asian Mainland. Among events of transboundary transport, Yellow dust transport drew most people's attention. At that time, Taiwan EPA set up an aerosol supersite with various models of automated instrument for measuring aerosol properties. Aerosol characteristics related to various events were found from monitoring data.

Although sources are varied, however, under the dominance of a specific source, aerosol chemical properties often show the source characteristics during the event period. In addition to source contributions, a specific weather pattern or stagnant meteorological conditions can also cause a high PM_{2.5} event. In contrast, urban PM_{2.5} often carries chemical characteristics from contributions of different sources. Receptor model is usually adopted for the collected PM_{2.5} chemical speciation to apportion various source contributions. In order to gain an insight for atmospheric aerosol in influencing air quality, this work reports chemical characteristics of PM_{2.5} collected at different locations and times. The objective is to elaborate variations of PM_{2.5} chemical properties for source apportionment, model validation, health risk assessment, and climate change evaluation.

Profile:

Education

1973-1977	B.E., National Cheng Kung University College of Engineering, Taiwan
1977-1979	M.E., National Taiwan University College of Engineering, Taiwan
1979-1981	M.S.CE., University of Washington College of Engineering, USA
1982-1987	Ph.D., University of North Carolina School of Public Health, USA

Professional Experiences

2017-present	Distinguished Professor and Associate Dean, National Central University Office of Academic Affairs, Taiwan
2014-2017	Distinguished Professor and Director, National Central University Graduate Institute of Environmental Engineering, Taiwan
2011-2015	Chair, Environmental Protection Administration Air Pollution Control Technical Committee, Taiwan
2007-present	Member, Taoyuan City Air Pollution Control Fund, Taiwan
2007-present	Member, New Taipei City Air Pollution Control Fund, Taiwan
2004-2014	Representative, International Aerosol Research Assembly
2004-present	Representative, European Aerosol Research Assembly
2002-present	Honorary President, Taiwan Association of Aerosol Research, Taiwan
2000-2002	President, Taiwan Association of Aerosol Research, Taiwan
1999-2003	Professor and Director, National Central University Graduate Institute of Environmental Engineering, Taiwan
1997-2014	Professor, National Central University Graduate Institute of Environmental Engineering, Taiwan
1996-2000	Vice President, Taiwan Association of Aerosol Research, Taiwan
1994-1996	Secretary General, Taiwan Association of Aerosol Research, Taiwan
1992-1993	Visiting Professor, University of Minnesota Particle Technology Laboratory, USA
1988-1997	Associate Professor, National Central University Graduate Institute of Environmental Engineering, Taiwan

Research Interests

Aerosol chemical characterization, Aerosol source apportionment, Air quality analysis, Long-range transport aerosol, Biomass burning aerosol

Honors & Awards

2014	Who's Who in R.O.C.
2012	Fellow, Taiwan Association of Aerosol Research, Taiwan
2010	The Marquis Who's Who in the World

Publications

1. Pani, S.K., **Lee, C.-T.***, Chou, C.C.K., Shimada, K., Hatakeyama, S., Takami, A., Wang, S.-H., Lin, N.-H. (2017) "Chemical characterization of wintertime aerosols over islands and mountains in East Asia: impacts of the continental Asian outflow," Accepted by Aerosol and Air Quality Research.
2. Chuang, M.-T., Chen, Y.-C., **Lee, C.-T.**, Cheng, C.-H., Tsai, Y.-J., Chang*, S.-Y., Su, Z.-S., (2016) "Apportionment of the sources of high fine particulate matter concentration events in a developing aerotropolis in Taoyuan, Taiwan," Environmental Pollution 214, 273-281.

3. Chuang, M.-T., Fu, J.S.* **Lee, C.-T.**, Lin, N.-H., Gao, Y., Wang, S.-H., Sheu, G.-R., Hsiao, T.-C., Wang, J.-L., Yen, M.-C., Lin, T.-H., Thongboonchoo, N. (2016) "The simulation of long-range transport of BB plume and short-range transport of anthropogenic pollutants to a mountain observatory in East Asia during the 7-SEAS/2010 Dongsha Experiment," *Aerosol and Air Quality Research* 16, 2933-2949.
4. Nguyen, D.L., Kawamura, K., Ono, K., Ram, S.S., Engling, G., **Lee, C.-T.***, Lin, N.-H., Chang, S.-C., Chuang, M.-T., Hsiao, T.-C., Sheu, G.-R., Ou Yang, C.-F., Chi, K.H., Sun, S.-A. (2016) "Comprehensive PM_{2.5} organic molecular composition and stable carbon isotope ratios at Sonla, Vietnam: fingerprint of biomass burning components," *Aerosol and Air Quality Research* 16, 2618-2634.
5. **Lee, C.-T.***, Ram, S.S., Nguyen, D.L., Chou, C.C.-K., Chang, S.-Y., Lin, N.-H., Chang, S.-C., Hsiao, T.-C., Sheu, G.-R., Ou Yang, C.-F., Chi, K.-H., Wang, S.-H., Wu, X.-C. (2016) "Aerosol chemical profile of near-source biomass burning smoke in Sonla, Vietnam during 7-SEAS campaigns in 2012 and 2013," *Aerosol and Air Quality Research* 16, 2603-2617.
6. Chuang, M.-T.* **Lee, C.-T.**, Fu, J.S. Lin, N.-H., Gao, Y., Wang, S.-H., Sheu, G.-R., Hsiao, T.-H., Wang, J.-L., Yen, M.-C., Lin, T.-H., Thongboonchoo, N., Chen, W.-C. (2015) "Simulating the transport and chemical evolution of biomass burning pollutants originating from Southeast Asia during 7-SEAS/2010 Dongsha Experiment," *Atmospheric Environment* 112, 294-305.
7. Chuang, M.-T., **Lee, C.-T.***, Chou, C. C.-K., Lin, N.-H., Sheu, G.-R., Wang, J.-L., Chang, S.-C., Wang, S.-H., Chi, K.-H., Young, C.-Y., Huang, H., Chen, H.-W., Weng, G.-H., Lai, S.-Y., Hsu, S.-P., Chang, Y.-J., Chang, J.-H., Wu, X.-C. (2014) "Carbonaceous aerosols in the air masses transported from Indochina to Taiwan: long-term observation at Mt. Lulin," *Atmospheric Environment* 89, 507-516.
8. Chen, S.-Y., Lin, Y.-L., Chang, W.-T., **Lee, C.-T.**, Chan, C.-C. (2014) "Increasing emergency room visits for stroke by elevated levels of fine particulate constituents," *Science of the Total Environment* 473-474, 446-450.
9. Sheu, G.-R.* **Lee, C.-T.**, Lin, N.-H., Wang, J.-L., Chuang, M.-T., Wang, S.-H., Chi, K.-H., and Ou Yang, C.-F. (2013) "Distribution of atmospheric mercury in northern Southeast Asia and South China Sea during Dongsha Experiment," *Atmospheric Environment* 78, 174-183.
10. Ou Yang C.-F., Hsieh, H.-C., Wang, S.-H., Lin, N.-H., **Lee, C.-T.**, Sheu, G.-R., Wang, J.-L.* (2013) "Influence of Asian continental outflow on the regional background ozone level in Northern South China Sea," *Atmospheric Environment* 78, 144-153.
11. Chuang, M.-T., Chang, S. C., Lin, N.-H., Wang, J.-L., Sheu, G.-R., Chang, Y. C., **Lee, C.-T.*** (2013) "Aerosol chemical properties and related pollutants measured in Dongsha Island in the northern South China Sea during 7-SEAS/Dongsha Experiment," *Atmospheric Environment* 78, 82-91.
12. Chuang, M.-T., Chou, C. C.-K., Sopajaree, K., Lin, N.-H., Wang, J.-L., Sheu, G.-R., Chang, Y. C., **Lee, C.-T.*** (2013) "Characterization of aerosol chemical properties from near-source biomass burning in the northern Indochina during 7-SEAS/Dongsha Experiment," *Atmospheric Environment* 78, 72-81.

13. Chen, B.-Y., Chan, C.-C., **Lee, C.-T.**, Cheng, T.-J., Huang, W.-C., Jhou, J.-C., Han, Y.-Y., Chen, C.-C., Guo, Y.-L.* (2012) "The association of ambient air pollution with airway inflammation in schoolchildren," *American Journal of Epidemiology*, 175, 764–774.
14. Chao, H. J.* , Chan, C.-C., Rao, C. Y., **Lee, C.-T.**, Chuang, Y.-C., Chiu, Y.-H., Hsu, H.-H., Wu, Y.-H. (2012) "The effects of transported Asian dust on the composition and concentration of ambient fungi in Taiwan," *International Journal of Biometeorology* 56, 211-219.
15. **Lee, C.-T.***, Chuang, M.-T., Lin, N.-H., Wang, J.-L., Sheu, G.-R., Chang, S.-C., Wang, S.-H., Huang, H., Chen, H.-W., Weng, G.-H., Hsu, S.-P. (2011) "The enhancement of PM_{2.5} mass and water-soluble ions of biosmoke transported from Southeast Asia over the Mountain Lulin site in Taiwan," *Atmospheric Environment* 45, 5784-5794.
16. Yan, Y.-H., Chou, C.C.-K., **Lee, C.-T.**, Liu, J.-Y., Cheng, T.-J.* (2011) "Enhanced insulin resistance in diet-induced obese rats exposed to fine particulate matter," *Inhalation Toxicology* 23, 507-519.
17. Chen, B.-Y., Chao, H. J., Chan, C.-C., **Lee, C.-T.**, Wu, H.P., Cheng, T.-J., Guo, Y.-L.* (2011) "Effects of fine particulates and fungal spores on lung function in schoolchildren," *Pediatrics* 127(3) e690-698.
18. Chang, S.-C., Lin, T.-H., Young, C.-Y., and **Lee, C.-T.*** (2011) "The impact of ground-level fireworks (13 km long) display on the air quality in the traditional Yanshui Lantern Festival in Taiwan," *Environmental Monitoring and Assessment* 172, 463–479.



13:30-14:15, Tuesday, October 17

PM_{2.5} and Its Components, Associations with ER Visits

Ho Kim, Ph.D.

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Graduate School of Public Health
Seoul National University, Seoul
Korea

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Abstract:

Many studies have revealed an association between particulate matter (PM) and emergency room (ER) visits. But few studies have investigated component-wise associations. We studied the associations of ER visits for cardiovascular and respiratory diseases with PM_{2.5} components, including organic carbon (OC), elemental carbon (EC), and ion species (SO₄²⁻, NO₃⁻, and NH₄⁺). We adopted the time-series approach, and generalized linear models with natural spline functions. We found that the greatest increase in cardiovascular ER visits was associated with NH₄⁺ (RR=1.05; 95% CI: 1.01-1.09), which was followed by OC, SO₄²⁻, NO₃⁻, and EC. This is one of few studies to evaluate the associations between ER visits and PM components in South Korea. As PM components are related to traffic and industrial sources, and exhibited positive associations with ER visits, our results may help improve air pollution regulation and public health.

Profile:**Education**

- 1988 B.S. Department of and Computer Science and Statistics, Seoul National University, Republic of Korea
- 1990 M.S. Department of Statistics, Seoul National University, Republic of Korea
- 1996 Ph.D. in Biostatistics, University of North Carolina at Chapel Hill, USA

Professional Career

- 2016 Dean, Graduate School of Public Health, Seoul National University
- 2009-present Professor, Seoul National University
- 2011-2013 Associate Dean, Graduate School of Public Health, Seoul National University
- 2005-2006 Visiting Scholar, University of Washington, USA
- 2004-2009 Associate Professor, Seoul National University
- 2000-2004 Assistant Professor, Seoul National University
- 1998-2000 Senior Lecturer, Seoul National University, Republic of Korea
- 1997-1998 Senior Statistician, Frank Porter Graham Child Development Center, University of North Carolina at Chapel Hill, USA
- 1996-1997 Senior Statistician, PPD, Inc., NC, USA
- 1995-1996 Research Assistant, Collaborative Studies Coordinating Center, Department of Biostatistics, University of North Carolina at Chapel Hill, USA

Professional Society Memberships

American Statistical Association, International Society for Environmental Epidemiology, International Biometric Society (former Korean Region President), Korean Statistical Association, Korean Society for Public Health, Korean Society for Health Informatics and Statistics (President), Korean Society for Epidemiology (Vice-President), The Korean Society of Climate Change Research (Vice-President)

Editorial Boards & Editorial Services

Journal of Health Informatics and Statistics,
Editor Communications for Statistical Applications and Methods, Associate Editor
Environmental Health and Toxicology, Associate Editor
Journal of Preventive Medicine and Public Health, Statistical Editor

Research Interests

Climate change and its health effects, Air pollution epidemiology, Statistical methods in environmental epidemiology, Statistical consulting in public health and medical researches

Research Funding

Title	Role	Funder	Amount
1. Health Impact assessment of Air pollution and Climate change	PI	National Research Foundation of Korea	USD 340K /year
2. Integrated Model for climate change adaptation: Health, Water, and Integrated Model	PI	MOE	USD 1.0 M/year
3. Climate change adaptation policies	PI	MOE	USD 340K /year

Economic analysis of Climate Change Adaptation Policies (co-PI) MOE
 PM_{2.5} and transboundary pollutants and their health effects (Co-PI) National Research Foundation of Korea
 Quality assurance for Community Health Survey (PI) Korean CDC

Research Papers (selected from 200+ published papers) (in press)

- (in press) Yuming Guo, Antonio Gasparrini, Ben G. Armstrong, Benjawan Tawatsupa, Aurelio Tobias, Eric Lavigne, Micheline de Sousa Zanotti Stagliorio Coelho, Xiaochuan Pan, Ho Kim, Masahiro Hashizume, Yasushi Honda, Yue-Liang Leon Guo, Chang-Fu Wu, Antonella Zanobetti, Joel D. Schwartz, Michelle L. Bell, Matteo Scortichini, Paola Michelozzi, Kornwipa Punnasiri, Shanshan Li, Linwei Tian, Samuel David Osorio Garcia, Xerxes Seposo, Ala Overcenco, Ariana Zeka, Patrick Goodman, Tran Ngoc Dang, Do Van Dung, Fatemeh Mayvaneh, Paulo Hilario Nascimento Saldiva, Gail Williams, and Shilu Tong, "Heat Wave and Mortality: A Multicountry, Multicommunity Study" *Environmental Health Perspectives*
- (in press) Whan-Hee Lee, Youn-Hee Lim, Tran Ngoc Dang, Xerxes Seposo, Yasushi Honda, Yue-Liang Leon Guo, Hye-Min Jang, and **Ho Kim***, "An Investigation on Attributes of Ambient Temperature and Diurnal Temperature Range on Mortality in Five East-Asian Countries", *Scientific Reports*
- (in press) Chang-Fu Wu, Alistair Woodward, Ya-Ru Li, Haidong Kan, Rajasekhar Balasubramanian, Mohd Talib Latif, Mazrura Sahani, Tsun-Jen Cheng, Chia-Pin Chio, Nutta Taneepanichskul, Ho Kim, Chang-Chuan Chan, Seung-Muk Yi, Mellissa Withers, Jonathan Samet, "Regulation of fine particulate matter (PM_{2.5}) in the Pacific Rim: perspectives from the APRU Global Health Program", *Air Quality, Atmosphere & Health*
- (in press) Sung Hee Hwang, Jae Young Lee, Seung-Muk Yi, **Ho Kim***, "Effects of particulate matter and its components on emergency room visits for cardiovascular and respiratory diseases" *PLOS ONE*
- (in press) Cho SY, Lee YE, Doo KH, Lee JH, Jung WS, Moon SK, Park JM, Ko CN, Kim H, Rhee HY, Park HJ, Park SU, "Efficacy of combined treatment with acupuncture and bee venom acupuncture as an adjunctive treatment for Parkinson's disease" *Journal of Alternative and Complementary Medicine*
- (in press) Jayeun Kim, **Ho Kim***, "The association of ambient temperature with incidence of cardiac arrhythmias in a short timescale" A correspondence, *International Journal of Biometeorology*

7. (in press) Kim MH, Kim YC, Lee JP, Kim H, Kim DK, Ryu DR, Han SS, Lee J, Kim Y, Kang SW, Cho JH, Kim Y, "Three-year income trends in Korean adults commencing hemodialysis: a prospective cohort", *Nephrology*
8. (2017.08)) Jae Young Lee, **Ho Kim***, Commentary: "Comprehensive assessment of climate change risks" *The Lancet Planetary Health* 2017, 1(5), Pages e166–e167 [https://doi.org/10.1016/S2542-5196\(17\)30084-0](https://doi.org/10.1016/S2542-5196(17)30084-0)
9. (2017.07) Jae Young Lee, Eun Ha Park, Sung Hee Lee, Gwangpyo Ko, Yasushi Honda, Masahiro Hashizume, Furong Deng, Seung-muk Yi, **Ho Kim***, "Airborne Bacterial Communities in the East Asian Countries of China, South Korea, and Japan" *Scientific Reports* | 7: 5545 | DOI:10.1038/s41598-017-05862-4
10. (2017.05) Yeonseung Chung, Heesang Noh, Yasushi Honda, Masahiro Hashizume, Michelle L. Bell, Yue-Liang Leon Guo, **Ho Kim***, "Temporal changes in mortality related to extreme temperatures for 15 cities in Northeast Asia: adaptation to heat and mal-adaptation to cold." *American Journal of Epidemiology* 2017 May 15;185(10):907-913. doi: 10.1093/aje/kww199.
11. (2017.04) Jayeun Kim, **Ho Kim***, Demographic and environmental factors associated with mental health: A cross-sectional study, *International Journal of Environmental Research and Public Health* 2017, 14(4), 431; doi:10.3390/ijerph14040431
12. (2017.10) E-Jin Kim, **Ho Kim***, "Effect modification of individual- and regional-scale characteristics on heat wave-related mortality rates between 2009 and 2012 in Seoul, South Korea" *Science of the Total Environment* Volume 595, 1 October 2017, Pages 141–148 <http://dx.doi.org/10.1016/j.scitotenv.2017.03.248>
13. (2017.03) Hyewon Lee, Woojae Myung, Doh Kwan Kim, and **Ho Kim***, "Short-term air pollution exposure aggravates Parkinson's disease in a population-based cohort" *Scientific Reports* 2017 Mar 16;7:44741, doi: 10.1038/srep44741
14. (2017.03) Jae Young Lee, Soo Hyun Lee, Sung-Chul Hong, **Ho Kim***, "Projecting future summer mortality due to ambient ozone concentration and temperature changes" *Atmospheric Environment*, Volume 156, May 2017, Pages 88–94, <http://dx.doi.org/10.1016/j.atmosenv.2017.02.034>
15. (2017.03) Jayeun Kim, **Ho Kim***, "Influence of ambient temperature and diurnal Short-term air pollution exposure aggravates Parkinson's disease in a population-based cohort temperature range on incidence of cardiac arrhythmias", *International Journal of Biometeorology*, March 2017, Volume 61, Issue 3, pp 407–416
16. (2017.03) Ana Maria Ortega-Villa, Inyoung Kim, and **Ho Kim**, "Semiparametric time varying coefficient model for matched case-crossover studies" *Statistics in Medicine* 2017 Mar 15;36(6):998-1013
17. (2016.12) Hamdy F. F. Mahmoud, Inyoung Kim, and **Ho Kim**, "Semiparametric Single Index Multi Change Points Model with an Application of Environmental Health Study on Mortality and Temperature", *Environmetrics*, December 2016, Volume 27, Issue 8, pages 494–506.

18. (2016.11) Yadav Prasad Joshi, Eun-hye Kim, Jong-Hun Kim, **Ho Kim**, Hae-Kwan Cheong, "Associations between meteorological factors and aseptic meningitis in six metropolitan provinces of the Republic of Korea" *International Journal of Environmental Research and Public Health* 2016 Nov 30;13(12). pii: E1193.
19. (2016.10) Guo Y, Gasparrini A, Armstrong BG, Tawatsupa B, Tobias A, Lavigne E, Coelho MS, Pan X, **Kim H**, Hashizume M, Honda Y, Guo YL, Wu CF, Zanobetti A, Schwartz JD, Bell ML, Overcenco A, Punnasiri K, Li S, Tian L, Saldiva P, Williams G, Tong S. "Temperature variability and mortality: a multi-country study" *Environ Health Perspect* 124:1554–1559; <http://dx.doi.org/10.1289/EHP149>
20. (2016.11) Kwon JW, Han YJ, Oh MK, Lee CY, Kim JY, Kim EJ, **Kim H**, Kim WJ, "Emergency Department Visits for Asthma Exacerbation due to Weather Conditions and Air Pollution in Chuncheon, Korea: A Case-Crossover Analysis", *Allergy Asthma Immunol Res.* 2016 Nov;8(6):512-21. doi: 10.4168/aaair.2016.8.6.512.
21. (2016.11) Lachlan Mclver, Rokho Kim, Alistair Woodward, Simon Hales, Jeffery Spickett, Dianne Katscherian, Masahiro Hashizume, Yasushi Honda, **Ho Kim**, Steven Iddings, Jyotishma Naicker, Hilary Bambrick, Anthony J. McMichael*, and Kristie L. Ebi, "Health Impacts of Climate Change in Pacific Island Countries: A Regional Assessment of Vulnerabilities and Adaptation Priorities", *Environmental Health Perspectives* 2016 Nov;124(11):1707-1714. Epub 2015 Dec 8.
22. (2016.11) Satbyul E Kim, Yasushi Honda, Masahiro Hashizume, Haidong Kan, Youn-Hee Lim, Hyewon Lee, Clara T Kim, Seung-Muk Yi, **Ho Kim***, "Seasonal analysis of the short-term effects of air pollution on daily mortality in Northeast Asia" *Science of the Total Environment* 2016 Nov 7;576:850-857. doi: 10.1016/j.
23. (2016.09) Jae Young Lee, **Ho Kim***, "Projection of future temperature-related mortality due to climate and demographic changes", *Environment International* 2016 Sep;94:489-94. doi: 10.1016/j.envint.2016.06.007.
24. (2016.08) Yoo KD, Kim CT, Kim MH, Noh J, Kim G, **Kim H**, An JN, Park JY, Cho H, Kim KH, Kim H, Ryu DR, Kim DK, Lim CS, Kim YS, Lee JP." Superior outcomes of kidney transplantation compared with dialysis: An optimal matched analysis of a national population-based cohort study between 2005 and 2008 in Korea", *Medicine* 2016 Aug;95(33):e4352. doi: 10.1097/MD.00000000000004352.
25. (2016.07) Lim YH, Reid CE, Honda Y, **Kim H** "Temperature deviation index and elderly mortality in Japan" *International Journal of Biometeorology* 2016 60(7) pp991-998
26. (2016.10) Jayeun Kim, Khyuhyun Yoon, Jay Chol Choi, **Ho Kim**, Jung-Kook Song, "The Association between Wind-Related Variables and Stroke Symptom Onset: A Case-Crossover Study on Jeju Island" *Environmental Research* 150(2016) 97-105.

27. (2016.05) Antonio Gasparrini,* Yuming Guo, Masahiro Hashizume, Eric Lavigne, Aurelio Tobias, Antonella Zanobetti, Joel D. Schwartz, Michela Leone, Paola Michelozzi, Haidong Kan, Shilu Tong, Yasushi Honda, **Ho Kim**, Ben G. Armstrong, "Changes in susceptibility to heat within the summer: a multi-country analysis" *American Journal of Epidemiology* (2016) 183 (11): 1027-1036. doi: 10.1093/aje/kwv260
28. (2016.05) Chen BY, Chen CH, Chuang YC, **Kim H**, Honda Y, Chiang HC, Guo YL., "Schoolchildren's antioxidation genotypes are susceptible factors for reduced lung function and airway inflammation caused by air pollution." *Environ Res.* 2016 May 18;149:145-150. doi: 10.1016/j.envres.2016.05.007.
29. (2016.05) Whan Hee Lee; Jee-Young Choo; Ji-Young Son; **Ho Kim***, "Association between long-term exposure to air pollutants and prevalence of cardiovascular diseases in 108 communities of South Korea in 2008-2010: a cross-sectional study", *Science of the Total Environment* 565 (2016) 271–278.
30. (2016.04) Kim Y, **Kim H**, Hong YC, "Transmission of energy-saving efficiency from obese parents to their offspring: the Korean National Health and Nutrition Examination Survey 2007-2011." *Eur J Clin Nutr.* 2016 Apr;70(4):511-6. doi: 10.1038/ejcn.2015.172. Epub 2015 Oct 7.
31. (2016.03) Chang HY, Suh DI, Yang SI, Kang MJ, Lee SY, Lee E, Choi IA, Lee KS, Shin YJ, Shin YH, Kim YH, Kim KW, Ahn K, Won HS, Choi SJ, Oh SY, Kwon JY, Kim YH, Park H, Lee KJ, Jun JK, Yu HS, Lee SH, Jung BK, Kwon JW, Choi YK, Do N, Bae YJ, **Kim H**, Chang WS, Kim EJ, Lee JK, Hong SJ. "Prenatal maternal distress affects atopic dermatitis in offspring mediated by oxidative stress", *J Allergy Clin Immunol.* 2016 Mar 23. Vol. 138, Issue 2, p468–475.e5
32. (2016.02) Kim J, Kim JH, Cheong HK, **Kim H**, Honda Y, Ha M, Hashizume M, Kolam J, Inape K, "Effect of Climate Factors on the Childhood Pneumonia in Papua New Guinea: A Time-Series Analysis", *Int J Environ Res Public Health.* 2016 Feb 15;13(2). pii: E213. doi: 10.3390/ijerph13020213.
33. (2016.01) Li YR, Feng LT, Chen BY, **Kim H**, Yi SM, Guo YL, Wu CF, "Association of urban particle numbers and sources with lung function among children with asthma or allergies" *science of Total Environ* 2016 Jan 15;542(Pt A):841-4. doi: 10.1016/j.scitotenv.2015.10.098.
34. (2016.03) Oh YJ, Cha RH, Lee SH, Yu KS, Kim SE, **Kim H**, Kim YS. "Validation of the Korean coefficient for the modification of diet in renal disease study equation." *Korean J Intern Med.* 2016 Mar;31(2):344-56. doi: 10.3904/kjim.2015.227. Epub 2016 Jan 13.
35. (2016.01) Kim Y, **Kim H***, Honda Y, Guo YL, Chen BY, Woo JM, Ebi KL. "Suicide and Ambient Temperature in East Asian Countries: A Time-Stratified Case-Crossover Analysis", *Environ Health Perspect.* 2016 Jan;124(1):75-80. doi: 10.1289/ehp.1409392. Epub 2015 Jun 12



14:15~15:00, Tuesday, October 17

Landscape Fires Revisited

Bin Jalaludin, MPH, MRCP (UK), FAFPHM, Ph.D.

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Australia

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Abstract:

Landscape fires (for example, forest fires, peat fires and agricultural fires) pose a global environmental hazard as the smoke plumes are not constrained by international boundaries. Smoke particles and gases also contribute to climate change. About 339,000 deaths annually are attributable to landscape fires. The mortality burden falls disproportionately on the low income regions of the world, particularly sub-Saharan Africa and South-East Asia.

Landscape fire events are predicted to increase in both frequency and intensity in many parts of the world because of increasing human pressures and a warming climate. Particulate matter from such fire events will become an even more important contributor to particulate air pollution in many regions of the world with an accompanying increase in mortality and morbidity.

Most of the evidence for the health effects of particulate matter comes from epidemiological studies conducted in urban environments where the primary sources of particulate air pollution are road traffic and industry. The strongest epidemiological evidence for adverse health impacts of particulate air pollution is for effects on the cardiovascular system.

There are far fewer epidemiological studies on the effects of landscape fires on health. Fire smoke is associated with respiratory morbidity and all-cause mortality, but unlike urban particulates, the associations between fire smoke particulates and cardiovascular mortality and morbidity are less consistent. These variations in health outcomes may be related to differences in the chemical composition of urban and smoke fire particulates, duration and intensity of the exposures or the differential toxicity of the particulates.

Profile:

Qualifications

1978	MBBS, University of Sydney
1988	MRCP, Royal College of Physicians (UK)
1991	MPH, University of Sydney
1991	FAFPHM, Royal Australian College of Physicians
2001	PhD., University of Sydney

Employment History

Current Appointments

1. Director (since 2007; Deputy Director since 1998)
Epidemiology Group, Healthy People and Places Unit Population Health
Sydney South West Area Health Service
Locked Mail Bag 7279
Liverpool BC NSW 1871
2. Conjoint Professor (since August 2007)
School of Public Health and Community Medicine
Faculty of Medicine
University of New South Wales
3. Honorary Senior Research Fellow in Air Quality (since May 2006)
Woolcock Institute of Medical Research
Royal Prince Alfred Hospital and University of Sydney
4. Stream Leader, Population and Health Services Stream (since 2011)
Ingham Institute for Applied Medical Research
5. Investigator,
Respiratory, Sleep and Environmental Health Clinical Academic Unit (2015)
South Western Sydney Local Health District

Previous Appointments

Acting Director
Environmental Health Branch
NSW Health Department
October 2009 – November 2009

Conjoint Associate Professor (September 2001-August 2007)
School of Public Health and Community Medicine
Faculty of Medicine
University of New South Wales

Adjunct Associate Professor September 1999-September 2001
Centre for Healthy Futures
University of Western Sydney

Collaborating Fellow (1999-2005)
Centre for Environmental Health Development
WHO Collaborating Centre for Environmental Health
University of Western Sydney

Head

Centre for Epidemiology, Indicators, Research and Evaluation
Division of Service Development and Population Health
Western Sydney Area Health Service
April 1998 - August 1998

Epidemiologist and Deputy Medical Officer of Health
Western Sector Public Health Unit
June 1990 - March 1998

Acting Specialist Medical Adviser
AIDS/Communicable Diseases
NSW Health Department
April 1995 - May 1995

Paediatric Registrar (full-time and part-time)
Westmead Hospital, Sydney
1989-1994

Overseas Fellow in Neonatology and Tutor in Child Health
Bristol Maternity Hospital and University of Bristol, UK
1987-1988

Regional Paediatrician
Rural Paediatric Service
Kimberley Region
Western Australia
1986-1987

Paediatric Registrar
Princess Margaret Hospital for Children
Perth, Western Australia
1982-86

Paediatric Resident/Registrar
Royal Alexandra Hospital for Children and St Margaret Hospital, Sydney
1979-81

Intern
Royal Prince Alfred Hospital, Sydney
1978

Awards

1. NH&MRC Public Health Travelling Fellowship 1992.

The Fellowship enabled me to spend three months in the Air Pollution and Respiratory Health Section of the Centres for Disease Control and Prevention, Atlanta, USA. I was involved in a research project examining the respiratory health effects of dust storms.

2. Baxter Better Health Good Health Care Award, NSW Health Department 2001.

This award was for a research project entitled "Management of Chest Pain Guidelines in Emergency Departments".

3. **SWSAHS Quality Award, South Western Sydney Area Health Service, 2001.**
This award was for a research project entitled “Management of Chest Pain Guidelines in Emergency Departments”.
4. **Conjoint Researcher of the Year, 2011.**
Awarded by the School of Public Health and Community Medicine, Faculty of Medicine, University of New South Wales.
5. **Planning Institute of Australia (NSW Division) 2012.**
Cutting Edge Research and Teaching Award.
6. **Public Health and Community Medicine Prize 2012.**
Awarded by the South Western Sydney Clinical School, Faculty of Medicine, University of New South Wales.
7. **Best Senior Researcher 2013/14.**
Awarded by the Ingham Institute of Applied Medical Research.

International Collaboration and Consultancies

1. Environmental Health Research Centre, Institute for Medical Research, Ministry of Health, Malaysia – since 1999
2. Collaborating Fellow, Centre for Environmental Health Development, WHO Collaborating Centre for Environmental Health, University of Western Sydney, 1999-2008.
3. Short courses in environmental health epidemiology and air pollution epidemiology to Hong Kong Health Department – 2000 and 2001
4. World Health Organization Short term consultant to Ministry of Health, Malaysia – July 2001
5. Invited speaker – Seminar on “Applications of remote sensing and GIS for environmental health and epidemic surveillance”, Ministry of Science, Technology and Environment, Malaysia – 2003
6. International consultant on a project funded by Ministry of Health, Malaysia. Project title: Coastal recreational waters: quality and impact on health. Chief investigator: Dr Sithamparam, Environmental Health Research Centre, Institute for Medical Research, Malaysia.
7. World Health Organization Short term consultant to Environmental Health Branch, Ministry of Health, Malaysia – 26 February - 9 March 2007.
8. International consultant on a project titled Environmental factors and birth defects. Chief investigator: Dr Anthony, Environmental Health Research Centre, Institute for Medical Research, Malaysia.
9. Consultant epidemiologist to the World Society of the Abdominal Compartment Syndrome (WSACS), 2007-2009.
10. Editorial Board, Environmental Health. 2011-
11. WHO expert panel on Air Pollution and Health in Asia. WHO Western Pacific Regional Office. 2014-.
12. Member, Association of Pacific Rim Universities Global Health Program Environmental Health Working Group, 2015-
13. Member of Scientific Committee, ISEE Asia Chapter scientific conference, Sapporo, Japan, June 2016
14. Member of International Scientific Committee, ISEE scientific conference, Rome, Italy, August 2016

15. UNICEF Indonesia Technical Working Group on Haze. November 2016 –
16. Convenor of WHO Malaysia/Malaysian Ministry of Health workshop on calculating environmental burden of disease. Melaka, Malaysia, 26-29 July 2017.
17. Convenor of WHO Malaysia/Malaysian Ministry of Health workshop on calculating environmental burden of disease. Melaka, Malaysia, 26-29 July 2017.

Membership of Committees

1. Board member and member of Scientific Review Panel, Australian Paediatric Surveillance Unit, Royal College of Physicians (since 2000)
2. NSW Regional Committee, Australian Faculty of Public Health Medicine
3. Management Committee, Centre for Health Record Linkage, NSW Health (2007-2010)
4. Human Research Ethics Committee, South Western Sydney Local Health District (since 2005)
5. Deputy Chair, Human Research Ethics Committee, South Western Sydney Local Health District, August 2012-August 2015
6. Scientific Advisory Committee, Ingham Institute for Applied Medical Research and South Western Sydney Local Health District, 2005-
7. Area Cancer Registry Steering Committee, Sydney South West Area Health Service
8. Population Health Monitoring and Surveillance Network , NSW Health
9. NSW Population Health Survey Program, NSW Health
10. Years 3, 4 and 6 Clinical Teaching Committee, South Western Clinical School, Western zone, Sydney South West Area Health Service
11. Area Cancer Registry Implementation Committee, Sydney South West Area Health Service
12. Coronary Heart Disease Advisory Committee, Western zone, Sydney South West Area Health Service
13. Respiratory Disease Advisory Committee, Western zone, Sydney South West Area Health Service
14. Colorectal Tumour Group, Western zone, Sydney South West Area Health Service
15. PET Research Committee, Western zone, Sydney South West Area Health Service
16. Lane Cove Tunnel Health Study Steering Committee, NSW Health
17. Air Quality In and Around Traffic Tunnels Working Group, National Health and Medical Research Council
18. Recreational Water and Health Pilot Study Steering Group, NSW Health
19. NEPM Health Advisory Group, EPHC
20. NEPM Economics Group, EPHC
21. NSW Health CHO's Air Expert Committee, 2010-2015
22. Editorial Board, Environmental Health, 2011-
23. Joint NHMRC/ARPANSA Electromagnetic Emissions (EME) Working Committee-October 2014
24. Scientific Committee, ISEE Asia Chapter scientific conference, June 2016, Sapporo, Japan

25. Scientific Committee, ISEE scientific conference, August 2016, Rome, Italy
26. NSW Health CHO's Environmental Health Expert Committee, 2015-
27. Combined UNSW/WSU Teaching and Research Committee 2016-
28. Aboriginal Water and Sewerage Evaluation Advisory Committee, NSW Health, 2017-

Membership of Professional Associations

1. Public Health Association of Australia
2. Australasian Epidemiological Association
3. International Society for Environmental Epidemiology
4. Clean Air Society of Australia and New Zealand

Other Professional Activities

1. Comino E, Harris M, Fakhrul I, Tran D, **Jalaludin B**, Jorm L, Flack J, Haas M. Impact of diabetes on hospital admission and length of stay among general population aged 45 year or more: a record linkage study. *BMC Health Services Research* 2015;15(1):12.
2. Ding M, Chong S, **Jalaludin B**, Comino E, Bauman A. Risk factors of incident type 2-diabetes mellitus over a 3-year period: Results from a large Australian sample. *Diabetes Research and Clinical Practice* 2015;108(2):306-15.
3. Marashi-Pour S, Cretikos M, Lyons C, Rose N, **Jalaludin B**, Smith J. The association between the density of retail tobacco outlets, individual smoking status, neighbourhood socioeconomic status and school locations in New South Wales, Australia. *Spatial and Spatio-temporal Epidemiology* 2015;12:1-7.
4. Astell-Burt T, Feng X, Kolt GS, **Jalaludin B**. Does rising crime lead to increasing distress? Longitudinal analysis of a natural experiment with dynamic objective neighbourhood measures. *Social Science & Medicine* 2015;138:68-73. doi: 10.1016/j.socscimed.2015.05.014
5. Comino E, Fakhrul I, Tran DT, Jorm L, Flack J, **Jalaludin B**, Haas M, Harris MF. Association of processes of primary care and hospitalisation for people with diabetes: a record linkage study. *Diabetes Research and Clinical Practice* 2015;108(2):296-305. doi: 10.1016/j.diabres.2015.02.003
6. Cashmore AW, Indig D, Hampton SE, Hegney DG, **Jalaludin B**. Factors influencing workplace violence risk among correctional health workers: Insights from an Australian survey. *Australian Journal of Primary Health* 2015 Oct 12. doi: 10.1071/PY15071.
7. Chong S, Byun R, **Jalaludin B**. A feasibility study of geographic access to general practices and routinely collected data in public health and health services research. *Public Health Research & Practice*. 2015;25(4):e2541542 doi:http://dx.doi.org/10.17061/phrp2541542.
8. Eastwood JG, Kemp LA, Jalaludin BB. Being alone and expectations lost: a critical realist study of maternal depression in South Western Sydney. *SpringerPlus*. 2015;4(1):1-15.
9. Bauman A, Phongsavan P, Cowle A, Banks E, Jorm I, Rogers K, **Jalaludin B**, Grunseit A. Maximising follow-up participation rates in a large scale 45 and Up cohort study in Australia. *Emerging Themes in Epidemiology* 2016, 13:6 DOI: 10.1186/s12982-016-0046-y

10. Eastwood J, Kemp L, **Jalaludin B** "Each is in different circumstances anyway": A realist multilevel situational analysis of maternal depression in South Western Sydney, Australia. *SAGE Open* October-December 2016:1-14. doi: 10.1177/2158244016676863.
11. Astell-Burt T, Feng X, Kolt GS, **Jalaludin B**. More area-level crime, more sitting and less active? Longitudinal evidence from 37,162 Australians. *AJE* 2016;184:913-921.
12. Woolfenden S, Eapen V, Williams K, Axelsson E, Hendry A, **Jalaludin B**, Dissanyake C, Overs B, Descallar J, Eastwood J, Einfield SL, Silove N, Short K, Beasley, D, Črnčec R, Murphy E and the 'Watch Me Grow' Study Group. Who is in our cohort? Recruitment, Representativeness, Baseline Risk in the "Watch Me Grow" study. *BMC Pediatrics* 2016;16:46 DOI: 10.1186/s12887-016-0582-1.
13. Xu Z, Guo Y, Fitzgerald G, **Jalaludin B**, Tong S. Impact of heatwave on mortality under different heatwave definitions: a systematic review and meta-analysis *Environment International* 2016;89-90:193-203.
14. Cowie C, Ding M, Rolfe M, Mayne D, **Jalaludin B**, Bauman A, Morgan G. Neighbourhood walkability and traffic related air pollution in Sydney, Australia. *Environmental Health* 2016, 15:58 DOI: 10.1186/s12940-016-0135-y
15. Eastwood J, Kemp L, **Jalaludin B**. Realist theory construction for a mixed method multilevel study of neighbourhood context and postnatal depression. *SpringerPlus* 2016, 5:1081. DOI: 10.1186/s40064-016-2729-9
16. Wong V, Chong S, Mediratta S, **Jalaludin B**. Measuring glycated haemoglobin in women with gestational diabetes mellitus: how useful is it? *ANZJOG* 2016 Aug 8. doi: 10.1111/ajo.12511.
17. Chong S, Byun R, Mazumdar S, Bauman A, **Jalaludin B**. The impact of local and distant greenspace on physical activity in Sydney, Australia. *Journal of Physical Activity and Health* 2016 Oct 24:1-20.
18. Meena Chandra, **Bin Jalaludin**, Sue Woolfenden, Joseph Descallar, Laura Nicholls, Eapen V & The Watch Me Study Group. Screen Time in Children aged under 2 years in South West Sydney, Australia: A birth cohort study. *BMJ Open* 2016;6:e012342 doi:10.1136/bmjopen-2016-012342
19. Robyn. A. Barnes, Tang Wong, Glynis.P. Ross, **Bin B Jalaludin**, Vincent W Wong, Carmel E Smart, Clare E Collins, Lesley MacDonald-Wicks, Jeff R Flack. Development and validation of a model for the prediction of therapy type in women with gestational diabetes mellitus. *Diabetologia* 2016;59(11):2331-2338. doi: 10.1007/s00125-016-4047-8.
20. Woolfenden S, Eapen V, **Jalaludin B**, Hayen A, Kemp L, Dissanyake C, Hendry A, Axelsson E, Overs B, Descallier J Eastwood, J Einfield SL, Short K, Beasley, D, Črnčec R, Murphy E, Williams K on behalf of the 'Watch Me Grow' team. Prevalence and factors associated with parental concerns about development detected by the Parents Evaluation of Developmental Status (PEDS) at 6, 12 and 18 month well child checks. *BMJ Open* 2016;6: e012144. doi:10.1136/bmjopen-2016-012144
21. Crawford B, Byun R, Mitchell E, Thompson S, Torvaldsen S, **Jalaludin B**. Socioeconomic differences in the cost, availability and quality of healthy food in Sydney. *ANZJPH* (in press – accepted 4 May 2017).

22. Salimi F, Henderson S, Morgan G, **Jalaludin B**, Johnston F. Ambient particulate matter, landscape fire smoke, and emergency ambulance dispatches in Sydney, Australia. *Environment International* 2017;99:208-212 doi: 10.1016/j.envint.2016.11.018.
23. Chong S, Ding M, Byun R, Comino E, Bauman A, **Jalaludin B**. Life style changes following a diagnosis of type 2 diabetes. *Diabetes Spectrum* 2017;30(1):43-50.
24. Overs, B. J., Woolfenden, S., Williams, K., **Jalaludin, B.**, Axelsson, E., Dissanayake, C., Descallar, J., Harvey, S., Beasley, D., Murphy, E., Eapen, V., and the 'Watch Me Grow' Study Group. Predictors of developmental surveillance completion at six months of age in south western Sydney. *Child: Care, Health and Development* 2017;43(2):307-315. doi:10.1111/cch.12425.
25. Gongbo Chen, Yongming Zhang, Wenyi Zhang, Shanshan Li, Gail Williams, Guy B. Marks, **Bin Jalaludin**, Michael J. Abramson, Jiangtao Lin, Yuming Guo. Attributable risks of emergency hospital visits due to air pollutants in China: a multi-city study. *Environmental Pollution* 2017;278.
26. Valsamma Eapen, Amelia Walter, Jane Guan, Joseph Descallar, Emma Axelsson, Stewart Einfeld, John Eastwood, Elisabeth Murphy, Deborah Beasley, Natalie Silove, Cheryl Dissanayake, Sue Woolfenden, Katrina Williams, **Bin Jalaludin**, and the 'Watch Me Grow' study group. Maternal help-seeking intentions for child developmental concerns: Associations with sociodemographic factors. *Journal of Paediatrics and Child Health* (in press – accepted 26 April 2017)
27. Sarah Dennis, Jane Taggart, Hairong Yu, Bin Jalaludin, Mark Harris, Siaw-Teng Liaw. Linking data from general practice, hospital admissions and diabetes clinic database: what can it tell us? *International Journal of Medical Informatics* (submitted 4 September 2017)
28. Mayne DJ, Morgan GG, **Jalaludin BB**, Bauman AE. The contribution of area-level walkability to geographic variation in physical activity: a spatial analysis of 95,837 participants from the 45 and Up Study living in Sydney, Australia. *Population Health Metrics* (in press – accepted 17 August 2017)
29. Comino EJ, Elcombe E, **Jalaludin B**, Kemp L, Wright D, Harris MF. Describing the general health of an urban cohort of Aboriginal children from birth to seven years in urban Sydney, Australia. *MJA* 2017;3rd July. Doi: 10.5694/mja16.01346.
30. Worthington J, Gatellari M, Goumas C, **Jalaludin B**. Differentiating incident from recurrent stroke using administrative data: the impact of varying lengths of look-back periods on the risk of misclassification. *Neuroepidemiology* (in press – accepted 8 June 2017)
31. Pankaj Garg; My Trinh Ha; John Eastwood; Susan Harvey; Sue Woolfenden; Elisabeth Murphy; Cheryl Dissanayake; **Bin Jalaludin**; Katrina Williams; Anne McKenzie; Stewart Einfeld; Valsamma Eapen. Explaining culturally and linguistically diverse (CALD) parents' experiences of accessing health services for anticipatory guidance and developmental surveillance. *BMC Health Services Research* (in press – accepted 6/3/2017)

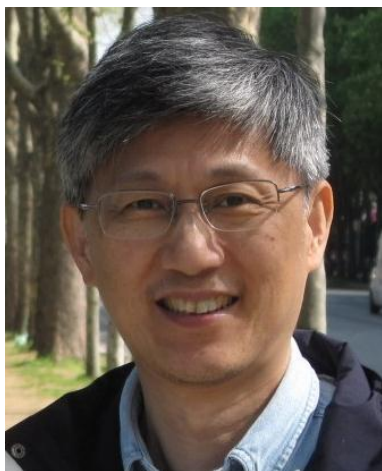
32. Ogbo FA; Eastwood J; Page A; Arora A; McKenzie A; **Jalaludin B**; Tennant E; Miller E; Kohlhoff J; Noble J; Chaves K; Jones JM; Smoleniec J; Chay P; Smith B; Oei J; Short K; Collie L; Kemp L; Raman S; Woolfenden S; Clark T; Blight V; Eapen V. Prevalence and determinants of cessation of exclusive breastfeeding in the early postnatal period in Sydney, Australia. *International Breastfeeding Journal* 2017;12:16. DOI 10.1186/s13006-017-0110-4
33. Garg P, Ha MT, Eastwood J, Harvey S, Woolfenden S, Murphy E, Dissanayake C, **Jalaludin B**, Williams K, McKenzie A, Einfeld S, Eapen V. Health professional perceptions regarding surveillance tools for child development in a multicultural part of Sydney, Australia. *BMC Family Practice* (under editorial review)
34. Worthington J, Goumas C, **Jalaludin B**, Gattellari M. Decreasing risk of fatal subarachnoid haemorrhage and other epidemiological trends in the era of coiling. *Front. Neurol.* doi: 10.3389/fneur.2017.00424 (Accepted August 8, 2017)
35. Ivan Hanigan, Grant Williamson, Luke Knibbs, Joshua Horsley, Margaret Rolfe, Martin Cope, Adrian Barnett, Christine Cowie, Jane Heyworth, Marc Serre, **Bin Jalaludin**, G. Morgan. Blending multiple data sources for neighbourhood estimates of long-term nitrogen dioxide exposure for health research. *Environmental Science and Technology* (under editorial review)
36. Gongbo Chen, Shanshan Li, Yongming Zhang, Wenyi Zhang, Daowei Li, Xuemei Wei, Yong He, Michelle L. Bell, Gail Williams, Guy B. Marks, **Bin Jalaludin**, Michael J. Abramson, Yuming Guo. Assessing the effects of ambient PM₁ air pollution on daily emergency hospital visits in China: a multi-city study. *Lancet Planetary Health* (in press - accepted 3 August 2017)
37. Karina Chaves, John Eastwood, Felix Ogbo, Alexandra Hendry, **Bin Jalaludin**, Andrew Page. Intimate partner violence at the time of pregnancy and maternal and perinatal health outcomes. *Pediatrics* (submitted 10 July 2017)
38. A'ishah Bhadelia, Joseph Descallar, Valsamma Eapen, **Bin Jalaludin**, John Eastwood, Amelia Walter, Katrina Williams, Cheryl Dissanayake, Susan Woolfenden. Difficult toddler temperament – Prevalence and associated variables at 18-month follow up of a birth cohort.
39. Mazumdar S et al. MEASURING RELATIONSHIPS BETWEEN DOCTOR DENSITIES AND PATIENT VISITS: A DOG'S BREAKFAST OF SMALL AREA HEALTH GEOGRAPHIES *Australian Geography* (submitted 11 July 2017)
40. Felix Akpojene Ogbo, John Eastwood, Alexandra Hendry, **Bin Jalaludin**, Kingsley Agho, Bryanne Barnette, Andrew Page. Determinants of antenatal depression and postnatal depression in Australia. *BMC Psychiatry* (submitted 14 August 2017)
41. Chiew KL, Chong S, **Jalaludin B**, Vinod S. Perspectives in the quality of cancer care and development of a conceptual framework. *BMJ Quality & Safety* (submitted 17 August 2017).
42. Mazumdar S, Chong S, **Jalaludin B**, A GEOGRAPHIC CLUSTER OF WALKING AND THE 5Ds OF THE BUILT ENVIRONMENT *Journal of Urban Health* (submitted 17 August 2017)

Conference Abstracts in Peer-reviewed Journals(Last 5 years)

1. Mayne D., Morgan G., Wilmore A., Bauman A., **Jalaludin B.**, Bambrick H., Rose N., Rodgers B., Bennett C. An objective index of walkability for the Sydney metropolitan region. Conference: Be Active 2012 Sydney, NSW Australia. Conference Start: 20121031 Conference End: 20121103. Journal of Science and Medicine in Sport.15 (pp S32-S33), 2012. Date of Publication: December 2012.
2. Worthington J.M., Goumas C., Jaeger M., **Jalaludin B.**, Gattellari M. Emergency presentations in the one month prior to a diagnosis of Subarachnoid haemorrhage (SAH). Results from the OASIS study: Observational Australian study investigating the epidemiology, outcomes and management of non-traumatic subarachnoid haemorrhage. Conference: STROKE 2012 Conference - A Combined Event of the Stroke Society of Australasia 2012 Annual Scientific Meeting and the 8th Smart Strokes Australasian Nursing and Allied Health Stroke Conference Sydney, NSW Australia. Conference Start: 20120829 Conference End: 20120831. International Journal of Stroke. 7 (pp 24), 2012. Date of Publication: September 2012.
3. Worthington J.M., Goumas C., Jaeger M., **Jalaludin B.**, Gattellari M. Observational Australian Study Investigating the epidemiology, outcomes and management of nontraumatic Subarachnoid haemorrhage (OASIS study): Attack rates, admission rates and outcomes. Conference: STROKE 2012 Conference - A Combined Event of the Stroke Society of Australasia 2012 Annual Scientific Meeting and the 8th Smart Strokes Australasian Nursing and Allied Health Stroke Conference Sydney, NSW Australia. Conference Start: 20120829 Conference End: 20120831. International Journal of Stroke. 7 (pp 4-5), 2012. Date of Publication: September 2012.
4. Manley H.A., Callander I., **Jalaludin B.**, Hill M. Variations in intensive respiratory support during the first week of life in preterm babies (less than 30 weeks gestation) and short term outcomes in New South Wales (NSW).Journal of Paediatrics and Child Health. Conference: 15th Annual Congress of the Perinatal Society of Australia and New Zealand, PSANZ 2011 Hobart, TAS Australia. Conference Start: 20110410 Conference End: 20110413. 47 (pp 66), 2011. Date of Publication: April 2011.
5. **Jalaludin B.** Outdoor air pollution and cardiovascular disease: an additional opportunity for intervention. *The Medical Journal of Malaysia* 2015;70(Supp 1):10. Invited speaker - 4th Asia Pacific Conference on Public Health, Kuantan, Malaysia, 7-9 September 2015.

Books/Book Chapters

1. **Jalaludin B.** Cars, trucks and buses, the urban environment and ambient air pollution – what’s the connection? In: Healthy Environments -11 essays. Editor: Chris Johnson. Government Architect’s Publications, Sydney 2004.
2. Taggart J, Liaw ST, Dennis S, Yu H, Rahimi A, **Jalaludin B**, Harris M. The University of NSW electronic Practice Based Research Network: disease registers, data quality and utility. In ebook: Health Informatics: Building a Healthcare Future Through Trusted Information. Pages: 219-227. Editors: AJ Maeder and FJ Martin-Sanchez. IOS Press 2012.



15:15-16:00, Tuesday, October 17

Inhalation Toxicology of Ambient Particles: Cardiovascular Toxicities and Beyond

Tsun-Jen Cheng, M.D., Ph.D.

Institute of Occupational Medicine and Industrial Hygiene
National Taiwan University, Taipei
Taiwan

E-mail: tcheng@ntu.edu.tw

Abstract

Ambient particles have been reported in epidemiological studies to be associated with the mortality and morbidity from respiratory and cardiovascular diseases. However, the causal relationship and underlying mechanisms were unclear for cardiovascular diseases. We have conducted a serial inhalation studies to answer the questions. The state of the art particle concentrator was used to generate particles to expose animals. We first investigated if ambient particles caused acute hemodynamic changes. Blood pressure and electrocardiogram were recorded continuously before, during and after the exposure. We found that acute exposure to ambient particles caused the alterations of blood pressure, heart rate and heart rate variability. This system was also used to investigate the toxicity of particles during Asian dust event. Again, we found an increase of systemic and lung inflammation, heart rate, and blood pressure during the dust event. These studies have demonstrated that acute exposure to ambient particles may affect the autonomic function of the cardiovascular system. In addition to acute toxicity, we are interested in the health effects from chronic exposure to ambient particles. We constructed a non-concentrated ambient particle exposure system, Taipei Air Pollution Exposure System (TAPES). The system is easy to operate and maintain for chronic exposure as compared to the particle concentrator. Hyperglycemic rats were induced and exposed to ambient particles for three months. The average concentration of ambient particles during the three months of exposure period was around $13 \mu\text{g}/\text{m}^3$. We found emphysematous changes of lung, increased wall thickness of aorta, myocardial inflammation, and advanced glomerulosclerosis and proximal tubule changes. There were biochemical changes including increased HbA1c, fibrinogen and systemic inflammation. In the healthy rats, we also observed increased wall thickness, focal myocarditis, systemic inflammation and increased insulin resistance. Thus, PM exposure may induce the macro-and micro-vascular complications in the diabetics through chronic hyperglycemia and systemic inflammation. Furthermore, findings in healthy animals support the hypothesis that diabetes may be caused by PM through insulin resistance.

Recently, associations between ambient particles and central nervous system (CNS) diseases have been reported. We are interested in the toxicity of particles on degenerative CNS diseases. The spatial learning and memory of animals was affected after both acute exposure to diesel particles and sub-chronic inhalation exposure to ambient particles, although the markers of inflammation and reactive oxidative stress

were not consistent. Currently, triple transgenic Alzheimer's diseases (AD) animal model was adopted for chronic exposure to test if ambient particles would induce pathological AD changes.

Our study has shown that ambient particles could cause systemic diseases from respiratory exposure. The results not only provided evidence of causal relationship to support the epidemiological studies, but also provided directions for epidemiological studies. It is also noted that the average concentration of PM_{2.5} during exposure was lower than the current national standard and close to WHO guideline. Therefore, our results have policy implications in air pollution control.

Profile:

Education

1980	MD, Taipei Medical College, Taiwan
1984	MPH, Harvard School of Public Health, USA
1995	ScD, Cancer Biology, Harvard School of Public Health, USA

Professional Experiences

2005-2011	Director, Institute of Occupational Medicine and Industrial Hygiene College of Public Health, National Taiwan University, Taiwan
2002-present	Professor, Institute of Occupational Medicine and Industrial Hygiene College of Public Health, National Taiwan University, Taiwan
2004- present	Professor, Division of Environmental and Occupational Medicine College of Medicine, National Taiwan University, Taiwan
2006-present	Adjunct Visiting Staff, Environmental and Occupational Medicine, National Taiwan University Hospital, Taiwan
1995-2006	Adjunct Visiting Staff, Internal Medicine, National Taiwan University Hospital, Taiwan
2000-2005	Director, Occupational Hygiene Section Environmental Protection and Occupational Safety and Hygiene Center, National Taiwan University, Taiwan
1996-1997	Director, Department of Occupational Safety and Hygiene, National Taiwan University Hospital, Taiwan

Licensure and Certification

2002	Board of Environmental and Occupational Medicine, Taiwan
1993	American Board of Preventive Medicine (Occupational Medicine)
1991	American Board of Internal Medicine

Editorial Assignments

2016-	Editor, Aerosol and Air Quality Research
2008-11	Associate Editor, Environmental Health Perspectives
2004-07	Editorial board, Inhalation Toxicology
2003-08	Editorial review board, Environmental Health Perspectives
2001-	Editorial board, Institute of Occupational Safety and Health Journal
2001-13	Editorial board, Taiwan Journal of Public Health

Major Research Interests

1. Occupational and environmental medicine
2. Inhalation toxicology
3. Air pollution and health
4. Nanotechnology and health
5. PVC workers and liver cancer

Peer-reviewed Articles (Last 5 years)

1. Chuang HC, Lin YJ, Chou CCK, Hwang JS, Chen CC, Yan YH, Hsieh HI, Chuang KJ, **Cheng TJ**. Alterations in cardiovascular function by particulate matter in rats using a crossover design. *Environ Pollut* 2017;231:812-820.
2. Juang YM, Chien HJ, Yang CY, Yeh HC, **Cheng TJ**, Lai CC. Comparative Proteomic Analysis of Rat Bronchoalveolar Lavage Fluid after Exposure to Zinc Oxide Nanoparticles. *Mass Spectrom (Tokyo)* 2017;6:S0066.
3. Chang HH, **Cheng TJ**, Huang CP, Wang GS. Characterization of titanium dioxide nanoparticle removal in simulated drinking water treatment processes. *Sci Total Environ* 2017;601-602:886-894.
4. Huang KL, Liu SY, Chou CC, Lee YH, **Cheng TJ**. The effect of size-segregated ambient particulate matter on Th1/Th2-like immune responses in mice. *PLoS One* 2017;12:e0173158.
5. Chuang HC, Chuang KJ, Chen JK, Hua HE, Shen YL, Liao WN, et al. Pulmonary pathobiology induced by zinc oxide nanoparticles in mice: A 24-hour and 28-day follow-up study. *Toxicol Appl Pharmacol* 2017;327:13-22.
6. Lu MC, Wang P, **Cheng TJ**, Yang CP, Yan YH. Association of temporal distribution of fine particulate matter with glucose homeostasis during pregnancy in women of Chiayi City, Taiwan. *Environ Res* 2017; 152:81-87.
7. Wu C, Chen ST, Peng KH, **Cheng TJ**, Wu KY. Concurrent quantification of multiple biomarkers indicative of oxidative stress status using liquid chromatography-tandem mass spectrometry. *Anal Biochem* 2016;512:26-35.
8. Lee SH, Wang TY, Hong JH, **Cheng TJ**, Lin CY. NMR-based metabolomics to determine acute inhalation effects of nano- and fine-sized ZnO particles in the rat lung. *Nanotoxicology* 2016;10(7):924-34.
9. Hu NC, Chen JD, **Cheng TJ***. The Associations Between Long Working Hours, Physical Inactivity, and Burnout. *J Occup Environ Med* 2016;58:514-8.
10. Lee HH, Lo SH, Chen BY, Lin YH, Chu D, **Cheng TJ**, et al. Increased night duty loading of physicians caused elevated blood pressure and sympathetic tones in a dose-dependent manner. *Int Arch Occup Environ Health* 2016;89:413-23.
11. Tseng E, Ho WC, Lin MH, **Cheng TJ**, Chen PC, Lin HH. Chronic exposure to particulate matter and risk of cardiovascular mortality: cohort study from Taiwan. *BMC Public Health* 2015;15:936.
12. Chuang HC, Ho KF, Cao JJ, Chuang KJ, Ho SS, Feng PH, Tian L, Lee CH, Han YM, Lee CN, **Cheng TJ**. Effects of non-protein-type amino acids of fine particulate matter on E-cadherin and inflammatory responses in mice. *Toxicology Letters* 2015;237 (3):174-180.
13. Huang KL, Lee YH, Chen HI, Liao HS, Chiang BL, **Cheng TJ***. Zinc oxide nanoparticles induce eosinophilic airway inflammation in mice. *Journal of Hazardous Materials* 2015; 297: 304-312.

14. Chuang HC, Chen LC, Lei YC, Wu KY, Feng PH, **Cheng TJ***. Surface area as a dose metric for carbon black nanoparticles: A study of oxidative stress, DNA single-strand breakage and inflammation in rats. *Atmospheric Environment* 2015; 106: 329-334.
15. Shih TJ, Lin YP, **Cheng TJ**. Public perception of nanotechnology and its policy in Taiwan. *Chinese Journal of Communication Research*, 2015; 29:183-219.
16. Meg Tseng MC, Lin YP, **Cheng TJ***. Effects of Psychopathology on the Characteristics of Individuals with Self-reported Electromagnetic Field Hypersensitivity. *Taiwanese Journal of Psychiatry* 2014;28:27-37.
17. Chen CH, Chan CC, Chen BY, **Cheng TJ**, Leon Guo Y. Effects of particulate air pollution and ozone on lung function in non-asthmatic children. *Environ Res* 2014;137C:40-48.
18. Yan YH, C CKC, Wang JS, Tung CL, Li YR, Lo K, **Cheng TJ ***. Subchronic effects of inhaled ambient particulate matter on glucose homeostasis and target organ damage in a type 1 diabetic rat model. *Toxicol Appl Pharmacol* 2014;281:211-220.
19. Chen WL, Lin CY, Yan YH, Cheng KT, **Cheng TJ ***. Alterations in rat pulmonary phosphatidylcholines after chronic exposure to ambient fine particulate matter. *Mol Biosyst* 2014;10:3163-9.
20. Chuang HC, Juan HT, Chang CN, Yan YH, Yuan TH, Wang JS, Chen HC, Hwang YH, Lee CH, **Cheng TJ***. Cardiopulmonary toxicity of pulmonary exposure to occupationally relevant zinc oxide nanoparticles. *Nanotoxicology*. 2014; 8:593-604.
21. Jung CC, Tsai YS, Chang CC, **Cheng TJ**, Chang CW, Liu PY, Chiu YJ, Su HJ. Allergen exposure induces adipose tissue inflammation and insulin resistance. *Int Immunopharmacol* 2014;23:104-112.
22. Liu WT, Bien MY, Chuang K J, Chang TY, Jones T, BeruBe K, Lalev G, Tsai DH, Chuang HC*, **Cheng TJ** and Taiwan CardioPulmonary Research Group. Physicochemical and biological characterization of single-walled and double-walled carbon nanotubes in biological media. *J Hazard Mater* 2014;280C:216-225.
23. Juang YM, Lai BH, Chien HJ, Ho M, **Cheng TJ**, Lai CC. Changes in protein expression in rat bronchoalveolar lavage fluid after exposure to zinc oxide nanoparticles: an iTRAQ proteomic approach. *Rapid Commun Mass Spectrom* 2014;28:974-80.
24. Chen TT, Chuang KJ, Chiang LL, Chen CC, Yeh CT, Wang LS, Clive G., Tim J., Kelly B., Lee CN, Chuang HC*, **Cheng TJ***. Characterization of the interactions between protein and carbon black. *Journal of Hazardous Materials*. 2014;264:127-135.
25. Tseng MC, Lin YP, Hu FC, **Cheng TJ ***. Risks perception of electromagnetic fields in taiwan: the influence of psychopathology and the degree of sensitivity to electromagnetic fields. *Risk Anal*. 2013;33:2002-12.
26. Su CL, Chen TT, Chang CC, Chuang KJ, Wu CK, Liu WT, Ho KF, Lee KY, Ho SC, Tseng HE, Chuang HC *, **Cheng TJ***. Comparative proteomics of inhaled silver nanoparticles in healthy and allergen provoked mice. *International journal of nanomedicine*. 2013;8:2783-99.

27. Hsiao-Chi Chuang, Ta-Chih Hsiao, Cheng-Kuan Wu, Hui-Hsien Chang, Chii-Hong Lee, Chih-Cheng Chang, **Cheng TJ ***. Allergenicity and toxicology of inhaled silver nanoparticles in allergen-provocation mice models. *International Journal of nanomedicine*. 2013;8:4495-506.
28. Chuang HC, Hsueh TW, Chang CC, Hwang JS, Chuang KJ, Yan YH, **Cheng TJ***. Nickel-regulated heart rate variability: the roles of oxidative stress and inflammation. *Toxicol Appl Pharmacol*. 2013;266:298-306.
29. Chuang HC, Cheng YL, Lei YC, Chang HH, **Cheng TJ***. Protective effects of pulmonary epithelial lining fluid on oxidative stress and DNA single-strand breaks caused by ultrafine carbon black, ferrous sulphate and organic extract of diesel exhaust particles. *Toxicol Appl Pharmacol*. 2013;266:329-34.
30. Chen MF, Lin YP, **Cheng TJ***. Public attitudes toward nanotechnology applications in Taiwan. *Technovation*. 2013;33:88-96.
31. Kao YY, **Cheng TJ**, Yang DM, Wang CT, Chiung YM, Liu PS. Demonstration of an Olfactory Bulb-Brain Translocation Pathway for ZnO Nanoparticles in Rodent Cells In Vitro and In Vivo. *J Mol Neurosci* 2012;48:464-71. (SCI)
32. Kao YY, Chen YC, **Cheng TJ**, Chiung YM, Liu PS. Zinc oxide nanoparticles interfere with zinc ion homeostasis to cause cytotoxicity. *Toxicol Sci* 2012; 125: 462-72. (SCI)
33. Chen BY, Chan CC, Lee CT, **Cheng TJ**, Huang WC, Jhou JC, Han YY, Chen CC, Guo YL. The association of ambient air pollution with airway inflammation in schoolchildren. *Am J Epidemiol* 2012;175: 764-74. (SCI)

16:00~16:45, Tuesday, October 17

Environmental Exposure-Disease Relationship in Asthma



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Abstract:

Adult asthma, a common and often debilitating disorder, still remains a critical public health, medical and economic problem, and the changing environment, in concert with alterations in lifestyle, has been suggested to be an etiological culprit. This is particularly highlighted by recent awareness of, and concern about, the exposure to ubiquitous environmental pollutants, including chemicals with oxidant-generating capacities or endocrine-disrupting effects and their impact on the human immune system and health. However, the mechanisms of action remain unclear and the causal relationship has not been established. To address this important problem, our continuing effort has been on investigating the environmental exposure-disease relationship, integrating clinical, epidemiological, exposure science and systems medicine approaches. Results from our Consortium's efforts have suggested that common chemicals and pollutants target regulatory cell types and influence mucosal immune function via, in part, their abilities to modify signaling, stress response and metabolic programming. Notably, our recent evidence suggests an important role of the aryl hydrocarbon receptor (AhR; a unique cellular chemical sensor)-ligand axis in controlling cellular homeostasis, maturation and optimal activation of several regulatory cell types, including dendritic cells, macrophages and mast cells. Further, in assessing the exposure-disease relationship, bio-monitoring analyses provided evidence of association with asthma for a few common environmental pollutants and metals, correlating with the levels of oxidative stress markers and asthma severity. Also, lipidomics analyses of a battery of oxylipins and phospholipids demonstrated a unique profile in subjects with asthma. Collectively, our current results have led us to propose an "environmental priming hypothesis" that exposure to environmental chemical pollutants is able to "sensitize" or "prime" the immune system and tissue resident cells, and in genetically susceptible individuals, lead to the development of disease, particularly when it is in the context of co-exposure to chemical and biological pollutants, including allergens. With this collective effort integrating clinical, epidemiological and mechanistic investigations, it is hoped that the outcomes of this effort will add a new dimension to the understanding of disease mechanisms and will provide a foundation to ultimately establishing a causal relationship between exposure to environmental pollutants and the development of adult asthma.

Profile:

Education

1981	BS, Medical Technology, Taipei Medical University, Taiwan
1985	MS, Medical Technology, University of Vermont, U.S.A.
1988	PhD, Immunology, University of Vermont, U.S.A.
1990	Postdoctoral Fellow, Johns Hopkins University School of Medicine, USA

Position Held:

1992.10-present	Instructor/Assistant Professor/Associate Professor/Professor of Medicine, Department of Medicine, School of Medicine, Johns Hopkins University
2001.10-present	Adjunct Professor, Institute of Medical Biotechnology, Taipei Medical University, Taiwan
2010.07-present	Distinguished Investigator, National Health Research Institutes, Taiwan
2015.12-present	Adjunct Chair Professor, Kaohsiung Medical University, Taiwan

Recent Editorial Activities

Editorial Board: Clin Mol Allergy; Clin Dev Immunol; Kaohsiung J Med Sci (Advisory Editorial Board); Journal Peer Reviewer: Nat Immunol, J Clin Invest, Blood, J Allergy Clin Immunol, J Biol Chem, J Immunol, Allergy, Am J Physiol, Am J Respir Cell Mol Biol, Biochem Pharmacol, Clin Exp Allergy, Eur J Immunol, Eur Respir J, J Immunological Met, J Mol Med, J Pharmacol Exp Therapeutics, Ped Allergy and Immunol, PLoS ONE, Tox Sci, Environmental Sci & Technol, Canadian Respiratory J, Frontiers in Public Health, Clin Immunol, J Invest Dermatol

Scientific Production

1. Author of over 200 original and review articles in international journals, including Nat Med (3), Blood, J Exp Med, J Immunol, Hum Mol Genet, Am J Respir Crit Care Med, J Allergy Clin Immunol, Environ Health Perspect.
2. Citations: Sum of the Times Cited: 10,653; H-index: 52.
3. Discovery of novel mucosal dendritic cell subset in regulating oral tolerance (Nat Med, 2010).
4. Pioneering work on genetic immunization in regulating allergic diseases [Nat Med, 1996; J Immunol, Cutting Edge, 1996; Nat Med, 1999; Curr Opin Immunol (Review), 1997].
5. Defining the structure-function correlates of allergen glycan structures in regulating innate immunity (J Allergy and Clin Immunol, 2007; J Biol Chem, 2010).
6. Discovery of IL-13 expression in asthma, which is now recognized as a key cytokine and a therapeutic target (J Immunol, 1995); Discovery of IL-17F, its signalling pathway and in vivo function [J Immunol, 2001; J Biol Chem, 2002; Am J Respir Crit Care Med, 171:12-18, 2005; J Allergy Clin Immunol, 117:795-807, 2006; J Allergy Clin Immunol (Review), 2004)], setting the stage for uncovering "Th17" cells and their role in diseases.
7. Discovery of a regulatory role of lung Clara cell secretory protein, CC10, in airway diseases (J Immunol, Cutting Edge, 267: 3025-8, 2001; J Allergy and Clin Immunol, 2004; Am J Respir Crit Care Med, 2010).

8. Discovery of susceptibility genes for asthma and allergic diseases (J Allergy Clin Immunol, 1999; Hum Genet, 2003; Hum Mol Genet, 2004).
9. Pioneering work on the aryl hydrocarbon receptor (AhR)-ligand axis in regulating mast cell differentiation and response (Blood, 2013).
10. Discovery of a self-perpetuating regulatory in cancer immunity (Cancer Res, 2017)
11. Over 170 invited lectures, including keynotes and plenaries, in US, Europe, Japan, Korea, Taiwan, China.

Training and Mentoring

Trained over 45 MD and/or PhD postdoctoral fellows, many of whom are currently full professors at academic institutions in the US, Europe, Japan, Taiwan and China.

Selected Recent Publications (2013 – present; relevant to Environmental Medicine)

1. Zhou YF, Tung HY, Tsai YM, Hsu SC, Chang HW, Kawasaki H, Tseng HC, Plunkett B, Vonakis BM, **Huang SK***. Aryl hydrocarbon receptor controls mast cell homeostasis. *Blood*. 2013;121:3195-204.
2. Suen JL, Hsu SH, Hung CH, Chao YS, Lee CL, Lin CY, Weng TH, Yu HS, **Huang SK***. A common environmental pollutant, 4-nonylphenol, promotes allergic lung inflammation in a murine model of asthma. *Allergy*. 2013;68:780-7
3. Kuo CH, Hsieh CC, Kuo HF, Huang MY, Yang SN, Chen LC, **Huang SK**, Hung CH. Phthalates suppress type I interferon in human plasmacytoid dendritic cells via epigenetic regulation. *Allergy*. 2013;68:870-9.
4. Kawasaki H, Chang HW, Tseng HC, Hsu SC, Yang SJ, Hung CH, Zhou Y, **Huang SK***. A tryptophan metabolite, kynurenine, promotes mast cell activation through aryl hydrocarbon receptor. *Allergy*, 2014;69:445-52.
5. Lee CL, Huang HC, Wang CC, Sheu CC, Wu CC, Leung SY, Lai RS, Lin CC, Wei YF, Lai IC, Jiang H, Chou WL, Chung WY, Huang MS, **Huang SK***. A new grid-scale model simulating the spatiotemporal distribution of PM2.5-PAHs for exposure assessment, *J Hazard Mater*, 2016;314:286-294.
6. Wang LT, Chiou SS, Chai CY, Hsi E, Wang SN, **Huang SK**, Hsu SH. Aryl hydrocarbon receptor regulates histone deacetylase 8 expression to repress tumor suppressive activity in hepatocellular carcinoma. 2016. *Oncotarget*.9841.
7. Su HH, Lin HT, Suen JL, Sheu CC, Yokoyama KK, **Huang SK***, Cheng CM. Aryl hydrocarbon receptor-ligand axis mediates pulmonary fibroblast migration and differentiation through increased arachidonic acid metabolism. *Toxicology*. 2016;370:116-126.
8. Hong CH, Lee CH, Yu HS, **Huang SK***. Benzopyrene, a major polyaromatic hydrocarbon in smoke fume, mobilizes Langerhans cells and polarizes Th2/17 responses in epicutaneous protein sensitization through the aryl hydrocarbon receptor. *Int Immunopharmacol*. 2016;36:111-7.
9. Wang HC, Zhou YF, **Huang SK***. SHP-2 phosphatase controls aryl hydrocarbon receptor-mediated stress response in mast cells. *Arch Toxicol*, 2017;91:1739-1748.
10. Liao WT, Wang WT, Hung CH, Sheu CC, **Huang SK***. Aryl hydrocarbon receptor in concert with IL-4-mediated epigenetic mechanism selectively regulates

- CCL1 chemokine expression in human, but not murine, macrophage subset. *J Mol Med*, 2017;95:395-404.
11. Zhou Y, Do DC, Ishmael FT, Squadrito ML, Tang HM, Tang HL, Hsu MH, Qiu L, Li C, Zhang Y, Becker KG, Wan M, **Huang SK***, Gao P. Mannose receptor modulates macrophage polarization and allergic inflammation through miR-511-3p. *J Allergy Clin Immunol*. 2017 S0091-6749(17)30990-9.
 12. Wang LT, Chiou SS, Chai CY, Hsi E, Yokoyama KK, Wang SN, **Huang SK***, Hsu SH. Intestine-Specific Homeobox Gene ISX Integrates IL6 Signaling, Tryptophan Catabolism, and Immune Suppression. *Cancer Res*. 2017;77:4065-4077.
 13. Chang JH, Hsu SC, Bai KJ, **Huang SK**, Hsu CW. Association of time-serial changes in ambient particulate matters (PMs) with respiratory emergency cases in Taipei's Wenshan District. *PLoS One*. 2017;12(7):e0181106.
 14. Chen LC, Tseng HM, Kuo ML, Chiu CY, Liao SL, Su KW, Tsai MH, Hua MC, Lai SH, Yao TC, Yeh KW, Wu AH, Huang JL, **Huang SK***. A composite of exhaled LTB4, LXA4, FeNO and FEV1 as an "asthma classification ratio" characterizes childhood asthma. *Allergy*, in press, 2017.

Review Articles

1. Fang F, Wuptra K, Chen D, Li H, **Huang SK**, Jin C, Yokoyama KK. Environmental stress-induced chromatin regulation and its heritability. *J Carcinog Mutagen*. 2014;5(1).
2. **Huang SK***, Zhang Q, Qiu Z, Chung KF. Mechanistic impact of outdoor air pollution on asthma and allergic diseases. *Journal of Thoracic Dis*, 2015:7:23-33.
3. Zhang Q, Qiu Z, Chung KF, Huang SK. Link between environmental air pollution and allergic asthma: East meets West. *Journal of Thoracic Dis*, 2015:7:14-22.

Book Chapter

Kawasaki H, **Huang SK***. Role of Kynurenine Pathway in Allergy, in "Targeting the Broadly Pathogenic Kynurenine Pathway", Ed. S. Mittal, pp 109-119, 2015, Springer International Publishing