

University of California, San Francisco
CURRICULUM VITAE

Name: John R Balmes
Position: Professor In Residence, Step 8
Medicine
School of Medicine

Address: Box 0843, 1001 Potrero Ave, ZSFG 30, 3520
University of California, San Francisco

Voice: 415 206-8314
Fax: 415 695-1551
email: john.balmes@ucsf.edu

EDUCATION

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

LICENSES, CERTIFICATION

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

PRINCIPAL POSITIONS HELD

| | | |
|----------------|--|---|
| 1998 - present | University of California, San Francisco | Professor of Medicine in Residence |
| 1992 - 1998 | University of California, San Francisco | Associate Professor of Medicine in Residence |
| 1986 - 1992 | University of California, San Francisco | Assistant Professor of Medicine in Residence |

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|----------------|------------------------------------|---|-------------------------|
| 2002 - present | University of California, Berkeley | Professor of Environmental Health Sciences in Residence | School of Public Health |
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OTHER POSITIONS HELD CONCURRENTLY

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

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 ORGANIZATIONSMemberships

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

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|-------------|--|-------------------------------------|
| 2016 -- | Ad Hoc Committee on the Occupational Burden of Disease, American Thoracic Society/European Respiratory Society | Member |
| 2015 – | 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 |

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| 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, Chair California Thoracic Society | |
| 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

INVITED PRESENTATIONS (last 5 years)

INTERNATIONAL

| | | |
|------|---|------------------------------------|
| 2017 | 2 nd International Conference on Obesity and Chronic Diseases, San Francisco | Invited speaker |
| 2017 | Annual Conference on Environmental, Occupational, and Population Health, University of Washington/University of British Columbia/Simon Fraser University/Oregon State University, Semiahmoo, WA | Plenary speaker |
| 2016 | Pan-African Thoracic Society-MECOR/BREATHE consortium, Brackenhurst, Kenya (also 2014 and 2015) | Instructor/Invited speaker |
| 2014 | Indicators and Biomarkers of NCDs, Global Alliance for Clean Cookstoves, Washington, DC | Invited speaker |
| 2014 | World Air Day/Seoul National University, South Korea | Invited speaker/Visiting professor |
| 2014 | Indo-US Workshop on Chronic Obstructive Pulmonary Disease, Pune, India | Invited speaker |
| 2011 | Department of Environmental and Occupational Medicine, Aarhus University, Denmark | Visiting professor |
| 2011 | British Thoracic Society, London | Invited speaker |
| 2010 | International Society for Exposure Science-International Society for Environmental Epidemiology joint conference, Seoul | Invited speaker |
| 2010 | Northeast Asian Air Pollution Workshop, Seoul Metropolitan Government, Seoul | Keynote speaker |

NATIONAL

- 2017 Aspen Lung Conference, University of Colorado School of Medicine, Division of Pulmonary Sciences and Critical Care Medicine
- 2017 American Thoracic Society, International Scientific Conference (Philadelphia, 2013; San Diego, 2014; Denver, 2015; San Francisco, 2016; Washington, DC, 2017)
- 2017 American Lung Association webinar on air quality, climate change and public health (February 2017)
- 2016 American College of Chest Physicians, Annual Meeting (Los Angeles, 2016)
- 2016 Bloomberg Philanthropies, Household Air Pollution Expert Meeting (NYC, 2016)
- 2016 Health Effects Institute annual conference (Boston, 2011; Chicago, 2012; Alexandria, VA, 2014; Denver, 2016)
- 2016 US EPA/NIEHS Children's Centers webinar on air pollution and obesity/glucose dysregulation (January, 2016)
- 2015 Medicine Grand Rounds, Icahn School of Medicine at Mount Sinai, New York City
- 2015 Visiting Professor, University of Colorado School of Public Health
- 2015 Visiting Professor, Colorado State University, Department of Environmental Health Sciences
- 2014 Webinar presenter, Collaborative on Health and the Environment (July, 2014)
- 2014 Moderator, US EPA/NIEHS Children's Centers webinar on social determinants of health (July, 2014)
- 2013 US EPA workshop on sulfur dioxide (Research Triangle Park, NC, 2013)
- 2013 New York University School of Medicine, Department of Medicine, Grand Rounds (New York City, 2013)
- 2012 U.S. Department of Energy site medical directors annual meeting, Lawrence Berkeley Laboratory (Berkeley, 2012)
- 2012 US EPA workshop on nitrogen dioxide health effects (Chapel Hill, NC, 2012)
- 2011 Centers for Disease Control and Prevention, National Environmental Public Health Tracking conference/workshop (Albuquerque, 2007; New York City, 2011)
- 2011 US EPA workshop on multi-pollutant exposures and health effects (Chapel Hill, NC, 2011)
- 2011 University of Cincinnati National Institute for Occupational Safety and Health ERC Pilot Research Symposium
- 2011 NIOSH Work-Related Asthma meeting (Oakland, 2011)

REGIONAL AND OTHER INVITED PRESENTATIONS

- 2017 UCSF Update in Occupational and Environmental Medicine
- 2017 UCSF Occupational and Environmental Medicine Grand Rounds, 2013, 2015, 2016
- 2017 Guest lecture, UC Davis Epidemiology Program, 2016
- 2017 Invited speaker, 2nd Annual Air Pollution Conference, UCSF-Fresno
- 2016 The Association of Environmental & Engineering Geologists, San Francisco & Sacramento Chapters, Special Joint Symposium on Naturally Occurring Asbestos (Oakland)
- 2016 California Occupational Health Nurses Summit, Johnson & Johnson Global Health Services (Fremont, CA)
- 2016 Environmental Health Sciences Center, 2nd Annual Retreat, UC Davis
- 2016 San Joaquin Valley Asthma, Air Pollution, and Health Symposium, Central California Asthma Collaborative (Fresno)
- 2016 Structural Competency: New Responses to Inequity and Discrimination in Health and Welfare, Berkeley Center for Social Medicine, UC Berkeley School of Public Health
- 2016 UCLA Center for Occupational and Environmental Health Annual Fall Symposium
- 2016 Guest lecture, UC Davis Epidemiology Program
- 2016 Children's Environmental Health Symposium, Cal/EPA, 2012, 2013, 2015 and 2016
- 2015 Asthma Summit, California Department of Public Health
- 2015 UC Berkeley School of Public Health Environmental Health Sciences Symposium
- 2015 Pulmonary Research Conference, UCSF, 2011 and 2015
- 2015 Occupational and Environmental Medicine Symposium, UC Davis, Sacramento, 2010, 2012 and 2015
- 2013 American Lung Association of California webinar, 2011, 2012 and 2013

CONTINUING EDUCATION COURSES ATTENDED (last 5 years)

- 2016 American Thoracic Society annual meeting (2011-2016)
- 2013 European Respiratory Society (2011 and 2013)
- 2016 Update in Occupational and Environmental Medicine, UCSF (2011-2016)
- 2016 Occupational and Environmental Medicine Grand Rounds, UCSF (2011-2016)

2016 Department of Medicine Grand Rounds, San Francisco General Hospital (2011-2016)

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 | Chair |

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|----------------|---|--------|
| | Education Committee, UC Berkeley-UC Davis-UCSF | |
| 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

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|----------------|---|--------|
| 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

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|----------------|---|--------------------|
| 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)

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| 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 (last 5 years)

TEACHING

FORMAL SCHEDULED CLASSES FOR UCSF and UC BERKELEY STUDENTS

| Qtr | Academic Yr | Course Number and Title | Teaching Contribution | Units | Class Size |
|-----------------|----------------|--|---|---------|--------------------|
| Winter quarter | 2002 - present | Interdepartmental Studies 102b | 1 lecture | | entire MS Y1 class |
| Spring semester | 2016 | UCSF-UC Berkeley Joint Medical Program Problem-Based Learning, Unit 11 | Tutor | 3 units | 8 students |
| Spring semester | 2016 | Environmental Health Sciences MPH seminar PH292-003 | Instructor | 1 unit | 6 students |
| Fall semester | 2010 - present | Introduction to Research seminar HMEDSCI 261 | Instructor | 1 unit | 8 students |
| Fall semester | 2010-present | Introduction to Environmental Health Sciences PH270 | Instructor | 3 units | 12-26 students |
| Fall semester | 2010-2016 | Introduction to Environmental Health Sciences PH150B | Co-instructor 2010-2014; guest lecturer 2015-2016 | 3 units | 120-140 students |

POSTGRADUATE AND OTHER COURSES

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|-------------|--|-----------------------|
| 2011 - 2014 | UCSF Update in Occupational and Environmental Medicine | 1-2 lectures per year |
| 2001 - 2016 | UCSF Pulmonary Physiology Seminar | 2 lectures per year |
| 2007 - 2015 | UCSF Pulmonary Fellowship summer didactic lecture series | 1 lecture per year |

INFORMAL TEACHING

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|-------------|---|
| 2011 - 2016 | UCSF Occupational and Environmental Grand Rounds and Journal Club, 3-4 residents/year |
| 2011 - 2016 | ZSFG Pulmonary Service Case Conference, 6 fellows/year, 6 residents/year, 6 medical students/year |
| 2011 - 2016 | ZFG Pulmonary Consult Service, 4 fellows, 1 resident, and 2 students/year |
| 2011 - 2014 | SFGH Medical Intensive Care Unit, 4 residents and 6 interns/year |

TEACHING NARRATIVE

My teaching load at UCSF has been stable over the past 5 years, except for stopping attending . In contrast, my teaching load at the School of Public Health at UC Berkeley (UCB) has been increasing. At UCB since 2011, I have been the course instructor for PH270, the Introduction to

Environmental Health Sciences graduate-level course, as well as for PH150B, the undergraduate Introduction to Environmental Sciences course (the latter through 2014). Since 2011, I also have been leading one of the two sections of HMEDSCI261, the Introduction to Research seminar for the UCSF-UCB Joint Medical Program (JMP) Y1 students. In 2016, I also began teaching as Problem-Based Learning tutor in the JMP. In addition, I regularly give guest lectures at UC Berkeley and mentor graduate students at both the master's and doctoral levels.

MENTORING (last 5 years)

PREDOCTORAL STUDENTS SUPERVISED OR MENTORED

| Dates | Name | Program or School | Role | Current Position |
|--------------|--------------------------|--|-----------------|--|
| 2009 - 2011 | Marga Glasser | UCSF-UCB Joint Medical Program | Thesis advisor | Attending Physician, Dept. of Anesthesia, Highland Hospital |
| 2009 - 2012 | Nathan Sackett | UCSF-UCB Joint Medical Program | Thesis advisor | Univ. of Washington Psychiatry Resident |
| 2009 - 2012 | Michael Mangahas | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF Benioff Children's Hospital of Oakland, Pediatrics Resident |
| 2010 - 2014 | Joshua Lang | UCSF-UCB Joint Medical Program | Thesis advisor | Brigham & Women's Hospital Internal Medicine Resident |
| 2011-2014 | Julie Selezneva | UCSF-UCB Joint Medical Program | Thesis advisor | Stanford Pediatrics Resident |
| 2012-2014 | Callan (Elswick) Fockele | UCSF-UCB Joint Medical Program | Thesis advisor | Univ. of Washington Emergency Medicine |
| 2013-2015 | Theo Slomoff | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF MS4 |
| 2014-2016 | Alyssa Baccarella | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF MS3 |
| 2014-2016 | Julie Mirzabekov | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF MS3 |
| 2014-2016 | Elizabeth Bruns | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF MS3 |
| 2014-2016 | Simon Chu | UCSF-UCB Joint Medical Program | Thesis advisor | UCSF MS3 |
| 2015-present | Axel Adams | UCSF-UCB Joint Medical Program | Thesis advisor | JMP3 |
| 2015-present | Sunhee Kim | UCSF-UCB Joint Medical Program | Thesis advisor | JMP3 |
| 2015-present | Paul Carty Soriano | UCSF-UCB Joint Medical Program | Thesis advisor | JMP3 |
| 2015-present | Joshua Pepper | UCSF-UCB Joint Medical Program | Research mentor | JMP3 |
| 2015-present | Brent Klaphor | UCSF-UCB Joint Medical Program | Research mentor | JMP2 |
| 2014-2015 | Amy Heinzerling | UCSF School of Medicine Pathways to Distiction | Research mentor | UCSF Internal Medicine Resident |

| Dates | Name | Program or School | Role | Current Position |
|--------------|-------------------------|--|---|--|
| 2015-2016 | Kurt Anthony | Epidemiology, UC Berkeley School of Public Health | Thesis advisor | Research staff, CA Dept of Public Health |
| 2016-present | Stephanie Holm | Epidemiology, UC Berkeley School of Public Health | Thesis advisor | MPH student |
| 2016-present | Connie Ng | Epidemiology, UC Berkeley School of Public Health | Thesis advisor | MPH student |
| 2009-2013 | Alberto Ortega Hinojosa | Environmental Health Sciences, UC Berkeley School of Public Health | Co-dissertation advisor | Graduated with PhD in 2013 |
| 2010-2014 | Colleen Reid | Environmental Health Sciences, UC Berkeley School of Public Health | Co-dissertation advisor | Graduated with PhD in 2014; Assistant Professor, University of Colorado, Boulder |
| 2011-present | Kathleen Navarro | Environmental Health Sciences, UC Berkeley School of Public Health | Dissertation advisor | Graduated with PhD in 2016 |
| 2011-present | Candace Vahlsang | Environmental Health Sciences, UC Berkeley School of Public Health | Co-dissertation advisor | Doctoral student |
| 2015-present | Graham Flitz | Environmental Health Sciences, UC Berkeley School of Public Health | Master's Thesis and Doctoral Dissertation advisor | Doctoral student |

POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR MENTORED

| Dates | Name | Fellow | Faculty Role | Current Position |
|-------------|-------------------|-------------------------|-----------------|--|
| 2012 - 2015 | Michael Guarnieri | Pulmonary/Critical Care | Research mentor | Staff physician, Kaiser-Permanente, San Leandro |
| 2012 - 2015 | Robert Blount | Pulmonary/Critical Care | Research mentor | Assistant Professor, UCSF |
| 2011-2013 | Sarah Muni | Pulmonary/Critical Care | Research mentor | Staff physician, Evergreen Hospital Medical Center, Seattle, |

FACULTY MENTORING

| Dates | Name | Position While Mentored | Mentoring Role | Current Position |
|----------------|-----------------------|------------------------------|-----------------|---|
| 2006 - present | Merhdad Arjomandi, MD | Associate Clinical Professor | Research mentor | SFVAMC Pulmonary/Critical Care Medicine |
| 2007 - present | Suzaynn Schick, PhD | Assistant Adjunct Professor | Research mentor | Assistant Adjunct Professor |

| Dates | Name | Position While Mentored | Mentoring Role | Current Position |
|----------------|---------------------------|---|-----------------|--|
| 2012 - present | Colette Auerswald, MD, MS | Associate Professor of Pediatrics, UCSF; Associate Professor of Clinical X, UC Berkeley School of Public Health | Career advisor | Associate Professor of Clinical X, UC Berkeley School of Public Health |
| 2014 - present | Amin Azzam, MD, MS | Clinical Professor, UCSF and UC Berkeley School of Public Health | Career advisor | Clinical Professor, UCSF and UC Berkeley School of Public Health |
| 2015 - present | Robert Blount, MD, MS | Assistant Adjunct Professor | Research mentor | Assistant Adjunct Professor |

MENTORING NARRATIVE

I have mentored fewer UCSF post-doctoral fellows in the last several years because of increased graduate student mentoring at UC Berkeley, where I am currently advising five Joint Medical Program students on their masters research theses, two Epidemiology masters students, and two doctoral students.

TEACHING AND MENTORING AWARDS AND NOMINATIONS

2011 UCSF-UC Berkeley Joint Medical Program Research Mentor of the Year

2014-2015, 2015-2016 UC Berkeley School of Public Health Committee on Teaching Excellence Awardee

SUMMARY OF TEACHING AND MENTORING HOURS (UCSF including JMP)

2011 - 2012 257 total hours of teaching (including preparation)
 Formal class or course teaching hours: 37
 Informal class or course teaching hours: 170
 Mentoring hours: 50

2012 - 2013 297 total hours of teaching (including preparation)
 Formal class or course teaching hours: 37
 Informal class or course teaching hours: 170
 Mentoring hours: 90

2013 – 2014 237 hours of teaching (including preparation)
 Formal class or course teaching hours: 37
 Informal class or course teaching hours: 110
 Mentoring hours: 90

2014-2015 197 hours of teaching (including preparation)
 Formal class or course teaching hours: 37

Informal class or course teaching hours: 70
 Mentoring hours: 90

2015-2016 267 hours of teaching (including preparation)
 Formal class or course teaching hours: 37
 Informal class or course teaching hours: 140
 Mentoring hours: 90

RESEARCH AND CREATIVE ACTIVITIES

RESEARCH AWARDS

CURRENT

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| Subcontract (PI) American College of Medical Toxicology Pediatric Environmental Health Specialty Unit (Region 9) | 02/01/15-09/29/2019 \$158,000 direct/yr1 |
| T42 OH008429-12 (PI) CDC/NIOSH Northern California Education and Research Center | 07/01/2015 - 06/30/2020 \$1,533,132 direct/yr1 \$7,665,660 total |
| 4803-RFA10-1/11-4 (PI) Health Effects Institute Multicenter Ozone Study of Elderly Subjects (MOSES) | 07/01/2011 - 6/30/2017 \$342,348 direct/yr1 \$1,250,000 total |
| 1P01ES022849-04 (Hammond, Shaw, Balmes) NIEHS/EPA UC Berkeley/Stanford Children's Environmental Health Center | 07/17/2013-05/31/2018 \$6,000,000 total |
| P0501698 (PI) Enterprise Community Partners, Inc. Evaluating the Health Benefits of Green Affordable Housing | 05/01/2014 - 04/30/2021 \$278,000 total/yr1-2 |

RECENTLY COMPLETED

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| R56ES023566 (Balmes) NIEHS Cluster Randomized Controlled Trial of an Advanced Stove to Reduce Risk of COPD | 09/01/14-8/31/16 \$100,000 direct total |
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| Subcontract A118679 Association of Occupational and Environmental Clinics (PI) (Cooperative Agreement with the Agency for Toxic Substances And Disease Registry and the U.S. EPA) California Pediatric Environmental Health Specialty Unit | 02/01/2000 - 012/31/2014 \$64,000 dire ct/yr1 \$896,000 total |
| R01 ES010906 (Blanc) (Co-investigator) NIEHS Physical and Social Environmental Factors in Adult Asthma Outcomes | 09/01/2007-06/30/2013 \$583,904 direct/yr1 \$2,920,000 total |
| P20 ES018173 UC Berkeley (Tager) (Co-investigator) NIEHS/US EPA Berkeley/Stanford Children's Environmental Health Center | 05/07/2010-03/31/2013 \$560,000 direct/yr1 \$1,800,000 total |
| R01 ES014038 (Bates) (Co-investigator) NIEHS Effects of Long-term Low Level Hydrogen Sulfide Exposure | 09/28/2007-12/31/12 \$478,828 direct/yr 1 \$2,394,000 total |
| DE-FC02-96SF21261 (Harrison) (Co-investigator) Queens College/Dept. of Energy Medical Surveillance for Former Department of Energy Workers | 12/01/2005 - 1/31/2013 \$92,657 direct/yr1 \$651,000 total |
| CoE 2001 (Benowitz) (Co-investigator) Flight Attendant Medical Research Institute UCSF Center for Excellence on Second Hand Smoke: Impact of ETS Exposure on Adults with Chronic Obstructive Pulmonary Disease (2002-2007); Effects of Secondhand Smoke in the Upper and Lower Respiratory Tract (2007-2012) | 10/01/2002 - 09/03/2012 \$300,000 direct/yr1 \$1,500,000 total |
| R01 HL081521 UC Berkeley (Tager) (Co-investigator) NHLBI Fresno Asthmatic Children's Environment Study (FACES) | 05/15/2010 - 03/31/2012 \$192,953 direct/yr1 \$964,764 total |
| 03-315 (PI) California Air Resources Board Effect of GSTM1 Genotype on Ozone-induced Allergic Airway Inflammation | 06/20/2004 - 05/19/2011 \$132,271 direct/yr1 \$712,944 total |
| R01 ES010178 UC Berkeley (Smith, KR) (Co-PI) NIEHS Chronic Respiratory Effects of Early Life PM Exposure | 10/01/2005 - 09/30/2011 \$560,000 direct/yr1 \$2,800,000 total |
| R01 HL081520 UC Berkeley (Smith, A) (Co-investigator) | 05/01/2007 - 04/30/2012 |

NHLBI
Arsenic and Child Respiratory Health in Bangladesh

\$550,000 direct/yr1
\$2,200,000 total

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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

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.

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.

Guarnieri 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.

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-Cintron 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.

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*