

**Edmund C. Lau**  
**Senior Managing Scientist**

**Professional Profile**

Mr. Edmund C. Lau is a Senior Managing Scientist in Exponent's Health Sciences Center for Epidemiology, Biostatistics, and Computational Biology. Mr. Lau specializes in the application of statistical methods using large-scale databases in health outcome and epidemiologic research. He has been instrumental in the analyses of several health and epidemiologic studies examining health outcomes and their association with environmental or occupational factors including the study of brain cancers among workers in the petrol-chemical industry, the association between lung cancer and chromium exposures, and the health effect of perchlorate on newborns. He also has a continuing research interest in bone and joint diseases, especially in the study of vertebral compression fractures and hip and knee arthroplasty. Mr. Lau has over 15 years of experience using hospital discharge data, health surveillance data, and medical claims data, and he excels in extracting critical information from these data to help address significant health issues. Mr. Lau is also an expert in SAS, and serves as Exponent's SAS representative and education coordinator.

In addition to his consulting work on epidemiologic studies, Mr. Lau also is also actively involved in automotive safety studies. His consulting work has involved applying statistical methods to address significant vehicular design and occupant protection issues. Mr. Lau conducted an industry-wide safety and benefit analyses on antilock brakes, and was the principal investigator in the first comprehensive study in the U.S. on the effectiveness of daytime running lights. He has collaborated regularly with other experts in biomechanics, accident reconstruction, and engineering mechanics in the study of seat belt designs, rollover injury factors, automotive fire risks, and under-ride protection effectiveness.

**Academic Credentials and Professional Honors**

M.S., Statistics, Stanford University, 1984

B.S., Civil Engineering, Massachusetts Institute of Technology, 1979

Chi Epsilon (Honor Society for Civil Engineering)

Phi Delta Kappa (Honor Society for Educational Professional)

Award: "Excellence in Oral Presentation," Society of Automotive Engineers (2000)

**Languages**

Chinese (Cantonese and Mandarin)

## **Publications**

Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projection of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg* 2007; 89A(4):780–785.

Schmier J, Halpern M, Covert D, Lau E, Robin A. Evaluation of Medicare costs of endophthalmitis among patients following cataract surgery. *J Am Acad Ophthalmol* 2007; 114(6):1094–1099.

Kurtz S, Ong K, Schmier J, Mowat F, Saleh K, Dybvik E, Kärrholm J, Garellick G, Havelin LI, Furnes O, Malchau H, Lau E. Future clinical and economic impact of revision total hip and knee arthroplasty. *Journal of Bone and Joint Surgery* 2007; 89A(Suppl 3): 144–151.

Teta MJ, Lau E, Scurman BK, Wagner ME. Therapeutic radiation for lymphoma: Risk of malignant mesothelioma. *Cancer* 2007; 109:1432–1438.

Buffler P, Kelsh M, Lau E, Edinboro C, Barnard J, Rutherford G, Daaboul J, Palmer L, Lorey F. Thyroid function and perchlorate in drinking water: An evaluation among California newborns, 1998. *Environ Health Perspect* 2006; 114(5):798–804.

Kurtz S, Lau E, Schmier J, Parvizi J, Halpern M. Nationwide infection burden in revision hip and knee arthroplasty. *Trans Ortho Res Soc* 2006; 31:235.

Kurtz S, Lau E, Chin K, Mowat F, Villarraga M. Age and gender prevalence of revision spine fusion rates in the United States from 1990 to 2003. *Trans Ortho Res Soc* 2006; 31:1265.

Kurtz S, Lau E, Mowat F, Ong K, Halpern M. Nationwide trends in revision surgery caseload in the US from 1990–2003. *Trans Ortho Res Soc* 2006; 31:179.

Kurtz S, Mowat F, Ong K, Chan, N, Lau E, Halpern M. Prevalence of primary and revision total hip and knee arthroplasty in the United States (1990–2002). *J Bone Joint Surg* 2005; 87A(7):1487–1497.

Buffler P, Kelsh MA, Chapman P, Wood S, Lau E, Golembesky A, Wood R, Kalmes R, Borby G. Primary brain tumor mortality at a petroleum exploration and extraction research facility. *J Occup Environ Med* 2004; 46:257–270.

Ebi K, Exuzides K, Lau E, Kelsh M, Barnston A. Weather changes associated with hospitalizations for cardiovascular diseases and stroke in California, 1983–1998. *Int J Biometeorol* 2004; 49(1):48–58.

Hessel P, Teta M, Goodman M, Lau E. Mesothelioma among brake mechanics: an expanded analysis of a case-control study. *Risk Anal* 2004; 24:547–552.

Hessel P, Kalmes R, Smith T, Lau E, Mink P, Mandel J. A nested case-control study of prostate cancer and atrazine exposure. *J Occup Environ Med* 2004; 46:379–385.

Buffler PA, Kelsh MA, Chapman P, Wood S, Lau E, Golembesky A, Wood R, Kalmes R, Broby G. Primary brain tumor mortality at a petroleum exploration and extraction research facility. *J Occup Environ Med* 2004; 46:257–270.

Kelsh MA, Buffler PA, Daaboul J, Rutherford G, Lau E, Exuzides KE, Cahill J, Palmer L, Lorey F. Primary congenital hypothyroidism and newborn thyroid function among residents of a Southern California community. *J Occup Environ Med* 2003; 45(11):1–10.

Hessel PA, Teta MJ, Goodman M, Lau E. Mesothelioma among brake mechanics: An expanded analysis of a case-control study. *Risk Anal* 2003; 23(6).

Hessel PA, Kalmes, R, Smith, TJ, Lau E, Mink P, Mandel J. A nested-case control study of prostate cancer and atrazine exposure. *J Occup Environ Med* 2003.

Deubner D, Kelsh MA, Shum M, Maier L, Kent MS, Lau E. Beryllium sensitization, chronic beryllium disease, and exposures at a beryllium mining and extraction facility. *Appl Occup Environ Hyg* 2001; 16(5):579–592.

Deubner DC, Lowery YW, Paustenbach DJ, Shum, M, Lau E. Contribution of incidental exposure pathways to total beryllium exposure. *Appl Occup Environ Hyg* 2001, 16(5):568–578.

Ebi K, Exuzides KA, Lau E, Kelsh MA, Branstorm A. Association of normal weather periods and El Nino events with viral pneumonia hospitalization in females, California 1983–1998. *Am Public Health Assoc J* 2001; 91:1200–1208.

Lau E, Ray R, Parenteau CS. Characteristics of children in rollover collisions. Proceedings, 43rd Annual Meeting of the Association for Advancement of Automotive Medicine (AAAM) and IRCOBI, Barcelona, September 22, 1999.

Ray R, Lau E, Cheng LY. Deployment of airbags in traffic accidents: Characteristics and consequence. Proceedings, 41st Annual Meeting of the Association for Advancement of Automotive Medicine (AAAM), Orlando, FL, November 10–12, 1997.

Donelson AC, Kelkar R, Lau E. Alcohol, boating accidents, and the interpretation of BAC. Proceedings, 14th Conference on Alcohol, Drug, and Traffic Safety, Lyon, France, 1997.

Padamanban J, Lau E. Accident experience of passenger vehicles with four-wheel antilock braking systems. Proceedings, 40th Annual Meeting of the Association for Advancement of Automotive Medicine (AAAM), Vancouver, Canada, October 1996.

Ayres TJ, Lau EC, Schmidt RA, Young DE. Operator experience and accident risk. Proceedings, 40th Annual Meeting of the Human Factors and Ergonomic Society, pp. 94–95, Philadelphia, PA, September 2–6, 1996.

Cheng LY, Khatua TP, Lau E, Werner SM, Ray R. Heavy truck crashworthiness—case studies of heavy truck accident involving truck occupant fatality. Proceedings, 15th International Technical Conference on the Enhanced Safety of Vehicles, Paper 96-S11-0-12, Sydney, Australia, 1996.

Ayres TJ, Gross MM, Fowler G, McCarthy RL, Kalinowski A, Lau E. Evaluation of potential safety modification by review of accident reports. Proceedings, 35th Annual Meeting of the Human Factors and Ergonomic Society, pp. 476–480, San Francisco, CA, September 2–6, 1991,

## **Presentations**

Lau E, Ong K, Kurtz S. Survival of hip and knee implants in the U.S. using Medicare data. Poster No. 33. 16th Annual Meeting of the American Association of Hip and Knee Surgeons, Dallas, TX, November 3–5, 2006.

Kurtz S, Lau E, Zhao K, Mowat F, Ong K, Halpern M. The future burden of hip and knee revisions: U.S. projections from 2005 to 2030. Scientific Exhibit No. SE21. 73rd Annual Meeting of the American Academy of Orthopedic Surgeons, Chicago, IL, March 22–26, 2006.

Ong K, Kurtz S, Lau E, Chin K, Mowat F, Villarraga M. Changes in revision spine fusion rates at all levels in the United States from 1990–2003. Paper No. P394. 73rd Annual Meeting of the American Academy of Orthopedic Surgeons, Chicago, IL, March 22–26, 2006.

Ong K, Mowat F, Chan, N, Lau E, Halpern M, Kurtz S. Hip and knee arthroplasty revision rates in the United States: Implications for a National Registry. 51st Annual Meeting of the Orthopedic Research Society (ORS), Washington DC, February 20–23, 2005.

Kurtz S, Lau E, Ong K, Mowat F, Schmier J, Halpern M. Racial differences in hip and knee arthroplasty in the United States. Poster No. 1. 15th Annual Meeting of the American Association of Hip and Knee Surgeons, Dallas, TX, November 4–6, 2005.

Lau E, Kurtz S, Schmier J, Halpern M, Edidin A. Mortality following diagnosis of vertebral compression fracture (VCF) in the Medicare population. Paper No. 197. Proceedings, North American Spine Society, Philadelphia, PA, September 28–October 1, 2005.

Ong K, Mowat F, Chan N, Lau E, Halpern M, Kurtz S. Economic burden of hip and knee arthroplasty procedures in the Medicare population. 51st Annual Meeting of the Orthopedic Research Society (ORS), Washington DC, February 20–23, 2005.

Ong K, Mowat F, Chan N, Lau E, Halpern M, Kurtz S. The revision burden for hip and knee arthroplasty in the United States. 72nd Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS), Washington DC, February 23–27, 2005.

Halpern MT, Schmier JK, Covert D, Lau E. Medicare treatment patterns and costs for age-related macular degeneration (AMD) and by AMD subtype. 9th Annual meeting of the

International Society for Pharmacoeconomics and Outcome Research, Arlington, VA, May 16–19, 2004.

Proctor D, Kelsh MA, Lau E, Exuzides KE, Cahill J. Analysis beyond publication: further evaluation of an occupational study of chromium workers. Society for Epidemiology Research 36th Annual Meeting, Atlanta, GA, June 11–14, 2003.

Proctor D, Lau E, Cahill J, Kelsh M. Alternative reference population sensitivity analysis for the mortality assessment of a hexavalent chromium exposed worker cohort. Abstract 2008. International Society of Environmental Epidemiology, Vancouver, Canada, August 11–16, 2002.

Erdreich LS, Lau E, Cahill JC, Kelsh MA. Glioma incidence trends in the U.S. by age and brain lobe. Society for Epidemiology Research 35th Annual Meeting, Palm Desert, CA, June 18–21, 2002. *Am J Epidemiol* 2002; 155:S38.

Exuzides KA, Lau E, Kelsh MA, Ebi KL. Association of weather variables with hospital admissions for asthma in Northern and Southern California regions, 1983–1998. 13th Conference for the International Society for Environmental Epidemiology, Garmish-Partenkirchen, Germany, September 2–5, 2001.

Lau E. A Preliminary evaluation of daytime running light effectiveness in U.S. SAE Visioning Technology TOPTEC, Long Beach, CA, September 19–20, 2000.

Lau E. Daytime running light effectiveness. Invited Presentation, SAE Government-Industry Meeting, Washington, DC, June 19–21, 2000.

Dickinson LV, Lau E. Heavy truck-trailer underride risk analysis. SAE Heavy Truck Under-ride Protection TOPTEC, Palm Spring, CA, April 15–16, 1997.

Lau E, Exuzides KA. Rear impact collision field data analysis. SAE High Speed Rear Impact TOPTEC, Tempe, AZ, October 27–28, 1997.

Ray R, Lau E. Characterization of the type and severity of traffic collisions in the United States using delta-v. American Society of Mechanical Engineers, Winter Annual Meeting, San Francisco, CA, 1995.

Ray R, Lau E, Kalinowski A. Statistical analysis of observational data: A study of ATV-related injury. American Society of Mechanical Engineers, Winter Annual Meeting, Anaheim, CA, 1992.

Ray R, Padmanaban J, Kalinowski A, Lau E. Logistic regression in passenger vehicle rollover research. American Society of Mechanical Engineers, Winter Annual Meeting, Anaheim, CA, 1992.

Mendinach EB, Calfee RC, Lau E, Capell F. Test structure, information content, and curriculum linkage in minimum competency tests. American Educational Research Association (AERA), New York, NY, March 1982.

### **Current Academic Appointment**

- University of California Extension (UCSC), Instructor

### **Professional Affiliations**

- American Statistical Association—ASA
- Association for Advancement in Automotive Medicine—AAAM
- International Society of Automotive Engineers—SAE
- Elected Office: Secretary, American Statistical Association—San Francisco Chapter (2001, 2002)