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**CURRENT POSITION:**

Assistant Professor, Biostatistics and Epidemiology, University of California, Berkeley 2008-

**EDUCATION:**

M.D., University of California, San Francisco 2009

Ph.D. in Biostatistics, University of California, Berkeley 2007

*Advisor: Mark van der Laan*

*Dissertation: "Application of causal inference methods to improve the treatment of antiretroviral resistant HIV infection"*

M.S. in Health and Medical Sciences, University of California, Berkeley 2002

B.A. in Human Biology, Stanford University 1998

**AWARDS/FELLOWSHIPS:**

Doris Duke Clinical Scientist Development Award 2011

Hellman Family Faculty Fund Award 2011

Alpha Omega Alpha, Honor Medical Society 2008

Evelyn Fix Prize 2007

*Awarded to the Ph.D. student showing the greatest promise in statistical research, with preference for applications to biology and problems of health.*

Howard Hughes Medical Institute Pre-Doctoral Fellowship in Biological Sciences 2001-06

Graduation with Academic Distinction and Honors from Stanford University 1998

Stanford University Human Biology Invited Commencement Speaker 1998

Phi Beta Kappa 1997

**COURSES: UC BERKELEY SCHOOL OF PUBLIC HEALTH:**

Introduction to Causal Inference 2010-

Advanced Topics in Causal Inference 2010-

**EDITORIAL AND REFEREE SERVICE:**

**Founding Editor**

Journal of Causal Inference 2011-

**Editorial Board**

*Epidemiology* 2010-2014

*Epidemiological Methods* 2011-

**Manuscript Review for:**

*Lancet, PLOS Medicine, Journal of Infectious Disease, Epidemiology, American Journal of Epidemiology, Journal of the Royal Statistical Society, Series B; Biometrika, Biometrics, Statistics in Medicine, Biometrical Journal, Statistical Applications in Genetics and Molecular Biology, Journal of the Canadian Medical Association, International Journal of Biostatistics, Annals of Statistics*

**Grant and Project Proposal Review for:**

The National Institutes of Health  
The Bill and Melinda Gates Foundation  
The World Bank

**ADDITIONAL PROFESSIONAL ACTIVITIES**

**Consultant to The World Bank** 2011-  
Impact Evaluation for HIV Combination Prevention Programs

**Member, Data Safety Monitoring Board** 2011-  
RO1 HL 108704-01

**Co-Instructor, Executive Level Short Course** 2011  
Statistical Methods for Causal Inference in Observational and Randomized Studies  
Forum for Collaborative HIV Research, Washington DC  
(with Mark van der Laan and Sherri Rose)

**PEER-REVIEWED ARTICLES:**

1. Geng EH, Kahn JS, Olivia CC, Hare B, Christopoulos, K; Jones D; Petersen ML, Deeks, S, Havlir, D, Gandhi, M. The Effect of AIDS Clinical Trials Group Protocol 5164 on the Time from Pneumocystis Jirovecii Pneumonia Diagnosis to Antiretroviral Initiation in Routine Clinical Practice: a Case Study of Diffusion, Dissemination and Implementation. *Clin Infect Dis. (in press)*
2. Geng EH, Glidden D, Bangsberg, DR; Bwana MB, Musinguzi, N, Metcalfe, J, Yiannoutsos, CT, Martin, J, Petersen, ML. Causal Framework for Understanding the Effect of Losses to Follow-up on Epidemiologic Analyses in Clinic Based Cohorts: the Case of HIV-infected Patients on Antiretroviral Therapy in Africa. *American Journal of Epidemiology (in press)*
3. Gsponer T, Petersen ML, Egger M, Phirid S, Maathuis M, Boulle A, Tweyad, H Peter K , Chif B, Keiser O for IeDEA Southern Africa. The Causal Effect of Switching to Second-line ART in Programmes without Access to Routine Viral Load Monitoring. *AIDS.(in press)*
4. Petersen ML. Compound treatments, transportability, and the structural causal model: the power and simplicity of causal graphs. *Epidemiology*. 2011; 22(3):378-81.
5. Geng EH, Kahn JS, Chang OC, Hare CB, Christopoulos KA, Jones D, Petersen ML, Deeks SG, Havlir DV, Gandhi M. The Effect of AIDS Clinical Trials Group Protocol 5164 on the Time From Pneumocystis jirovecii Pneumonia Diagnosis to Antiretroviral Initiation in Routine Clinical Practice: A Case Study of Diffusion, Dissemination, and Implementation. *Clin Infect Dis*. 2011 [Epub ahead of print]
6. Petersen, ML, Porter KE, Gruber S, Wang Y, van der Laan MJ, Diagnosing and responding to violations in the positivity assumption. *Statistical Methods in Medical Research*, 2010. [Epub ahead of print]

7. Tsai AC, Weiser SD, Petersen ML, Ragland K, Kushel MB, Bangsberg DR. A Marginal Structural Model to Estimate the Causal Effect of Antidepressant Medication Treatment on Viral Suppression Among Homeless and Marginally Housed Persons With HIV. *Arch Gen Psychiatry*. 2010;67(12): (1282-1290)
8. Geng EH, Nash D, Kambugu A, Zhang Y, Braitstein P, Christopoulos KA, Muyindike W, Bwana MB, Yiannoutsos CT, Petersen ML, Martin JN. Retention in care among HIV-infected patients in resource-limited settings: emerging insights and new directions. *Curr HIV/AIDS Rep*. 2010; 7(4):234-44.
9. Bembom O, Petersen ML, Rhee SY, Fessel WJ, Sinisi SE, Shafer R, van der Laan MJ. Biomarker discovery using targeted maximum likelihood estimation: Application to the treatment of antiretroviral resistant HIV infection. *Statistics in Medicine*: 2009 28(1):152-72.
10. Petersen ML, van der Laan MJ, Napravnik S, Eron J, Moore R, Deeks S. Long Term Consequences of the Delay between Virologic Failure of Highly Active Antiretroviral Therapy and Regimen Modification: a Prospective Cohort Study. *AIDS*: 2008 22(16):2097-106.
11. Petersen ML, van der Laan MJ. Direct Effect Models. *The International Journal of Biostatistics*: 2008 4(1): Article 23.
12. Petersen ML, Wang Y, van der Laan MJ, Guzman D, Riley E, and Bangsberg DR. Pillbox Organizers are Associated with Improved Adherence to HIV Antiretroviral Therapy and Viral Suppression: A Marginal Structural Model Analysis. *Clinical Infectious Diseases*: 2007 45(7):908-15.
13. Petersen ML, Deeks SG, van der Laan, MJ. Individualized Treatment Rules: Generating Candidate Clinical Trials. *Statistics in Medicine*: 2007 26(25):4578-601.
14. Petersen ML, Deeks SG, Martin JN, van der Laan MJ. History-Adjusted Marginal Structural Models to Estimate Time-Varying Effect Modification. *American Journal of Epidemiology*: 2007 166(9):985-93.
15. Petersen ML, van der Laan MJ, Response to Invited Commentary: Petersen et. al. Respond to “Effect Modification by Time-varying Covariates”. *American Journal of Epidemiology*: 2007 166(9):1003-1004
16. Cordeiro SM, Neves AB, Ribeiro CT, Petersen ML, Gouveia EL, Ribeiro GS, Lobo TS, Reis JN, Salgado KM, Reis MG, Ko AI. Hospital-based surveillance of meningococcal meningitis in Salvador, Brazil. *Transaction of the Royal Society of Tropical Medicine and Hygiene*. 2007 101(11):1147-53.
17. Petersen ML, Molinaro A, Sinisi SE, van der Laan MJ. Cross-validated Bagged Learning. *Journal of Multivariate Analysis*: 2007 98 (9): 1693-1704.
18. Petersen ML, Wang Y, van der Laan MJ, Rhee SY, Shafer RW, WJ Fessel. Virologic Efficacy of Boosted Double vs. Boosted Single Protease Inhibitor Therapy *AIDS*: 2007 21(12): 1547-1554.
19. van der Laan MJ, Petersen ML. Statistical Learning of Origin-Specific Statically Optimal Individualized Treatment Rules. *The International Journal of Biostatistics*: 2007 3(1): Article 6
20. van der Laan MJ, Petersen ML. Causal Effect Models for Realistic Individualized Treatment and Intention-to-Treat Rules. *The International Journal of Biostatistics*: 2007 3 (1): Article 3
21. Sinisi SE, Polley EC, Petersen ML, Rhee SY, van der Laan MJ. Super Learning: an Application to Prediction of HIV-1 Drug Susceptibility. *Statistical Applications in Genetics and Molecular Biology*: 2007; 6(1): Article 7
22. Petersen ML, Wang Y, van der Laan MJ, Bangsberg D. Assessing the Effectiveness of Antiretroviral Adherence Interventions: Using Marginal Structural Models to Replicate the Findings of Randomized Controlled Trials. *JAIDS* 2006: 43 (Suppl 1): S96-S103
23. Petersen ML, Sinisi SE, van der Laan MJ. Estimation of direct causal effects. *Epidemiology*: 2006; 17(3): 276-284

24. Bastos FI, Malta M, Hacker M, Petersen ML, Sudbrack M, Colombo M, Caiaffa WT. (2006) Assessing Needle Exchange Operations in a Poor Brazilian Community. *Substance Use and Misuse*: 2006; 41(6-7): 937-51.
25. Petersen ML, Boily MC, Bastos FI. Assessing HIV resistance in developing countries: Brazil as a case study. *Rev Panam Salud Publica*: 2006; 19(3): 146-56.
26. van der Laan MJ, Petersen ML, Joffe MM. History-Adjusted Marginal Structural Models and Statically-Optimal Dynamic Treatment Regimens. *The International Journal of Biostatistics*: 2005; 1(1): 10-20 (Article 4). <http://www.bepress.com/ijb/vol1/iss1/4>
27. Malta, M, Petersen ML, Clair S, Freita F, Bastos FI. Adherence to antiretroviral therapy: a qualitative study with physicians from Rio de Janeiro, Brazil. *Cadernos de Saúde Pública* 2005; 21(5): 1424-1432.
28. Hacker MA, Petersen ML, Enriquez M, Bastos FI. Highly active antiretroviral therapy in Brazil: The challenge of universal access in a context of social inequality. *Rev Panam Salud Publica*. 2004; 16(2):78-83.
29. Ribeiro GS, Reis JN, Cordeiro SM, Lima JB, Gouveia EL, Petersen M, Slagado K, et al. Prevention of *Haemophilus influenzae* type b (Hib) meningitis and emergence of serotype replacement with type a strains after introduction of Hib immunization in Brazil. *Journal of Infectious Diseases*. 2003;187(1):109-16.
30. Steiner H, Petersen ML, Saxena K, Ford S, Matthews Z. Divalproex sodium for the treatment of conduct disorder: a randomized controlled clinical trial. *Journal of Clinical Psychiatry*. 2003; 64(10):1183-91.

## **BOOK CHAPTERS**

1. van der Laan MJ, Petersen ML. Super Learning. In Zhang, C, Ma, Y. Ensemble Machine Learning: Methods and Applications. 2012, New York, Springer International.
2. Petersen ML, Porter KE, Gruber S, Wang Y, van der Laan MJ. Diagnosing and responding to violations in the positivity assumption. In van der Laan MJ, Rose S (eds.). Causal Inference: Targeted Learning from Data. 2011, New York, Springer International.
3. Petersen ML, van der Laan, MJ. Case study: Analysis of longitudinal HIV cohort data to improve management of antiretroviral treatment failure. In van der Laan MJ, Rose S (eds.). Causal Inference: Targeted Learning from Data. 2011, New York, Springer International.
4. Baggaley, RF, Petersen ML, Soares M, Boiley MC, Bastos FI. HIV resistance in developing countries (In press, August 2009). In: Anibal Sosa; Denis Byarugada; Carlos Amabile-Cuevas; Po Ren Hsueh; Sam Kariuki; Iruka Okeke. (Ed.). Antimicrobial Resistance in Developing Countries. 2009, New York: Springer International.
5. Bembom O., Petersen ML, van der Laan MJ (2006). Identifying important explanatory variables for time-varying outcomes. In W. Dubitzky, M. Granzow, and D.P. Berrar (eds.), Fundamentals of Data Mining in Genomics and Proteomics. 2006, New York: Springer International.
6. Petersen ML, Travassos C, Bastos FI, Hacker MA, Beck EJ, de Noronha JC. The healthcare system and HIV epidemic in Brazil. In: Beck EJ, Mays N, Whiteside A, Zuniga JM, eds. The HIV Pandemic: local and global implications. 2005, Oxford: Oxford University Press.
7. Bastos FI, Petersen ML, Kerrigan D, Boily MC. Management of HIV/AIDS: The Brazilian experience. In: Lévy JJ, Pierret J, Trottier G. Antiretroviral treatment: Experiences and challenges. 2004, Québec, Canada: Presses de l'Université du Québec.

## **SELECTED INVITED TALKS:**

1. Application of Causal inference methods to improve the treatment of HIV in resource-limited settings. Center for AIDS Prevention Studies Core Methods Seminar. October 18, 2010. Division of Biostatistics, University of California, San Francisco.
2. Impact Evaluation for Combination Prevention Packages Community Randomization, Covariate Adjustment, and Adaptive Designs Meeting on the Evaluation of Complex, Combination Prevention Programs. October 6-7, 2010. The World Bank, Washington, D.C.
3. Application of causal inference methods to improve the treatment of HIV in resource-limited settings. Department of Preventive Health. September 28. 2010. University of Bern, Bern, Switzerland.
4. Application of causal inference methods to improve the treatment of HIV in resource-limited settings. May 19, 2010. Biostatistics Seminar, University of California, San Francisco.
5. Application of causal Inference Methods to Improve Treatment of HIV in Resource-Limited Settings. April 28, 2010. Neyman Seminar, Department of Statistics, UC Berkeley.
6. Analyzing Real-Time Adherence Data to Predict Virologic Rebound in HIV Patients. Conference on Real Time Medication Monitoring. March 23, 2010. NIVEL Institute, Utrecht, Netherlands.
7. Estimation of dynamic treatment regimes and extrapolation to populations with distinct monitoring structures: The use of laboratory monitoring to detect HIV treatment failure. Joint Statistical Meetings, August 8, 2009. Washington. DC, USA.
8. Inverse probability weighting to improve the treatment of antiretroviral resistant HIV infection; practical aspects of implementation and extension to dynamic treatment regimes. Biostatistics Seminar Series. November 18, 2008. McGill University, Montreal, Canada.
9. Application of inverse probability weighting to improve the treatment of antiretroviral resistant HIV infection. Course on Epidemiologic Research Methods and New Directions. Conference of the International Epidemiologic Association. September 20-21, 2008. Porto Alegre, Brazil.
10. Marginal structural models and inverse probability of treatment weighting for the estimation of causal effects: An introduction based on the antiretroviral treatment of HIV infection. 40th Annual Society for Epidemiological Research (SER) Meeting. June 19 - 22, 2007. Boston, Massachusetts, USA.
11. Estimation of direct effects: Illustration in a study of the treatment of HIV infection. May 19, 2007. School of Public Health, University of California, Los Angeles, USA.
12. Statistical estimation of individualized treatment rules: Deciding when to modify the antiretroviral therapy regimen of individuals infected with resistant HIV. Howard Hughes Medical Institute Meeting of Predoctoral & Physician Postdoctoral Fellows. Sept. 18- 20, 2006. Chevy Chase, Maryland.
13. Individualized Treatment Rules: Generating Candidate Clinical Trials. The Western North American Region of the International Biometric Society (WNAR) Annual Meeting. June 27-30, 2006. Flagstaff, Arizona, USA
14. Models for direct effects: generalization and estimation illustrated in a study of treatment for HIV. Second American Congress of Epidemiology. June 21-24, 2006 Seattle, Washington, USA
15. Variable Importance Measures to Rank the Effects of Viral Mutations on Clinical Virologic Response.. Workshop on Quantitative Methods for Antiviral Resistance. Collaborative Forum for HIV Research. May 10-11, 2006. Boston, Massachusetts, USA.
16. History-Adjusted Marginal Structural Models: an application in HIV research. Invited talk. Statistics Section. American Public Health Association (APHA) Annual Meeting. December 10-14, 2005. Philadelphia, Pennsylvania, USA.

17. History-Adjusted Marginal Structural Models and Time-Dependent Causal Effect Modification. Session 214, Joint Statistical Meetings (JSM). August 9, 2005. Minneapolis, Minnesota, USA.

**SELECTED PRESENTATIONS/POSTERS:**

1. F. Vahidnia, M. Petersen, G. Rutherford, M. Busch, S. Assmann, J. Stapleton, B. Custer. Transfusion transmission of GB Virus type C (HGV) in a cohort of HIV infected patients. American Society of Hematology. December 6, 2011, Orlando Florida.
2. Geng E, Bangsberg D.R., Glidden, D.V., Emenyonu, N., Metcalfe, J., Musinguzi, N., Deeks, S.G., Bwana, M.B., Martin J.N., Petersen M. A structural approach to understanding the affect of unascertained outcomes on epidemiologic analyses of HIV-infected patients on antiretroviral therapy in Africa. 4th International Workshop on HIV Observational Databases. 25-27 March, 2010. Sitges, Spain.
3. Tsai AC, Weiser SD, Petersen ML, Ragland K, Kushel MB, Bangsberg DR. A Marginal Structural Model to Estimate the Causal Effect of Antidepressant Medication Treatment on Viral Suppression Among Homeless and Marginally Housed Persons With HIV. 4th International Workshop on HIV Observational Databases. 25-27 March, 2010. Sitges, Spain.
4. Tsai A, Weiser S, Petersen ML, Ragland K, Bangsberg D. Effect of Antidepressant Medication Treatment on Antiretroviral Adherence and HIV-1 RNA Viral Load in HIV+ Homeless and Marginally Housed Individuals. 16th Conference on Retroviruses and Opportunistic Infections (CROI). Poster # 584. February 8-11, 2008. Montreal, Canada.
5. Petersen ML, van der Laan MJ, Napravnik S, Eron J, Moore R, Deeks S. Incomplete viral suppression on a first line protease inhibitor-based regimen is associated with slower CD4+ T cell declines than that observed on a reverse transcriptase inhibitor regimen: implications for treatment strategies in resource poor regions and the management of drug-resistant HIV. Poster# K-210. 12th International Workshop on HIV Observational Databases. March 27-30, 2008. Malaga, Spain.
6. Petersen ML, van der Laan MJ, Napravnik S, Eron J, Moore R, Deeks S. Long Term Consequences of the Delay between Virologic Failure of Highly Active Antiretroviral Therapy and Regimen Modification: a Prospective Cohort Study. 15th Conference on Retroviruses and Opportunistic Infections (CROI). February 3-6, 2008. Boston, MA, USA.
7. Petersen ML, Wang Y, van der Laan MJ, Guzman D, Riley ED, Bangsberg DR. Pill Box Organizers are Associated with Improved Antiretroviral Adherence, Viral Suppression and are Highly Cost Effective. Poster # K-179. 14th Conference on Retroviruses and Opportunistic Infections (CROI). February 25-28, 2007. Los Angeles, CA, USA.
8. Petersen ML, Wang Y, van der Laan MJ, Guzman D, Riley ED, Bangsberg DR. Pill box organizers are associated with improved HIV antiretroviral adherence and viral suppression: A marginal structural model analysis. Poster #90. 10th International Workshop on HIV Observational Databases. March 23-26, 2006. Madrid, Spain.
9. Petersen ML, Wang Y, van der Laan MJ, Guzman D, Riley ED, Bangsberg DR. No evidence that once daily antiretroviral therapy improves adherence to HIV antiretroviral therapy: a marginal structural analysis. Poster #89. 10th International Workshop on HIV Observational Databases. March 23-26, 2006. Madrid, Spain.

10. Petersen ML, van der Laan MJ, Martin JN, Deeks SG. Defining the Immunologic Consequences of Early vs Delayed Treatment Modifications Using Marginal Structural Models. Session 87, Poster # 524. 13th Conference on Retroviruses and Opportunistic Infections (CROI). February 5-9, 2006. Denver, Colorado, USA.
11. Petersen ML, Sinisi SE, Rhee SY, Shafer RA, Fessel JW, van der Laan MJ. The Use of Machine Learning and Causal Inference Methodology to Interpret the Association between Drug-Resistance Mutations and Treatment Response. Poster Presentation. XIV International HIV Drug Resistance Workshop: Basic Principles and Clinical Implications. July 7-11, 2005. Quebec City, Quebec, Canada.
12. van der Laan MJ, Petersen ML, Sinisi S, Shafer R, Fessel J. Data-adaptive learning of direct effects: Application to HIV research. Presentation to the Biomarkers in HIV and Cancer Research Workshop, Mathematical Biosciences Institute, Ohio State University April 18-22, 2005. Columbus, Ohio.
13. Petersen, ML, Hacker MA, Renton A, Bastos FI. Trends in the distribution of opportunistic diseases among newly notified AIDS cases in Brazil over a period spanning introduction of universal access to antiretroviral therapy. Abstract TuPeC4718. XV International AIDS Conference (IAC): Access for All. July 11-16, 2004. Bangkok, Thailand.
14. Bastos FI, Petersen ML, Renton A, Hacker MA. The impoverishment of the Brazilian AIDS epidemic is partially driven by new cases among gay men from deprived communities. Abstract WePeC6078. XV International AIDS Conference (IAC): Access for All. July 11-16, 2004. Bangkok, Thailand.
15. Bastos FI, Petersen ML, Renton A, Hacker MA. Dramatic declines in AIDS deaths and AIDS-related hospitalizations are made of small steps: Findings from a monthly reconstruction of the introduction of HAART in Brazil. Abstract TuPeC4708. XV International AIDS Conference (IAC): Access for All. July 11-16, 2004. Bangkok, Thailand.
16. Malta M., Petersen ML, Freitas F, Bastos FI. ARV adherence: A qualitative study with physicians from Rio de Janeiro, Brazil. Abstract WePeE6685. XV International AIDS Conference (IAC): Access for All. July 11-16, 2004. Bangkok, Thailand.
17. Enriquez MEM, Petersen ML, Hacker M, Bastos FI. An ecological study of HAART in Brazil: The impact of universal access on AIDS incidence and mortality (1984-2000). Oral Presentation TuOrC1160. XV International AIDS Conference (IAC): Access for All. July 11-16, 2004. Bangkok, Thailand.
18. Petersen ML. The Brazilian response to the HIV epidemic. Presented to the 6<sup>th</sup> International Conference on Healthcare Resource Allocation for HIV/AIDS (ICHRA): Healthcare Systems in Transition. October 13-15, 2003. Washington, DC, USA.