

**RAMANAN LAXMINARAYAN**

1616 P St NW, Washington DC 20036  
Phone: 202.328.5085 Fax: 202.939.3460  
Email: ramanan@cddep.org

**EDUCATION**

**PhD** University of Washington, Seattle, Economics (1999)  
Alfred P. Sloan Dissertation Fellowship (1998-99), Grover and Creta  
Ensley Fellowship for Public Policy (1998), Hewlett Fellowship (1997),  
Harborview Medical Center Research Grant (1997)

**MPH** University of Washington, Seattle, Epidemiology (1999)

**BE** Birla Institute of Technology & Science, Pilani, India, Instrumentation  
(1992)

**PROFESSIONAL EXPERIENCE**

**Director** Center for Disease Dynamics, Economics & Policy (2008-present)

**Associate Research Scholar/Lecturer** Princeton University (2007-present)

**Adjunct Professor** Indian Institutes of Public Health (2009-present)

**Senior Fellow** Resources for the Future, Washington DC (2006-2010) Fellow (1999-2005)

**Visiting Scholar and Lecturer** Princeton University (2007-2010)

**Associate** Department of International Health, Johns Hopkins Bloomberg School of Public Health (2005-2007)

**Adjunct Professor** Paul H. Nitze School of Advanced International Studies (SAIS), Johns Hopkins University (2003-2010)

**Adjunct Professor** Krieger School of Arts and Sciences, Johns Hopkins University (2001-2004)

**Visiting Professor** Dept. of Interdisciplinary Arts and Sciences, University of Washington, Bothell (1998-1999)

**Consultant** World Health Organization (1999-present), Centers for Disease Control and Prevention (2002, 2005-06), Center for International Development, Harvard University (2000-01), Aventis Pharma (2002), World Bank (1997, 2004-present), Population Reference Bureau (2005-2007), University of Toronto (2006-present), United Nations Environment Programme (2010).

**BOOKS AND REPORTS**

1. Prabhat Jha and **R. Laxminarayan**, Choosing Health in India, University of Toronto and Resources for the Future, New Delhi, 2009.

2. **Laxminarayan, R.** J. Chow, E. Klein, P. Whitacre, Closing India's Nutrition Gap: The Role of Golden Mustard in Fighting Vitamin A Deficiency, Resources for the Future, Washington DC 2007.
3. **Laxminarayan, R.**, A. Malani, Extending the Cure: Policy Responses to the Growing Threat of Antibiotic Resistance, Resources for the Future, Washington DC 2007.
4. **Laxminarayan, R.**, ed. Battling resistance to antibiotics and pesticides: An economic approach, RFF Press, Washington DC, 2002.

#### JOURNAL ARTICLES

1. Johannsson B., S. E. Beekmann, A. Srinivasan, A.L. Hersh, **R. Laxminarayan**, P.M. Polgreen "Improving Antimicrobial Stewardship: The Evolution of Programmatic Strategies and Barriers", Infection Control and Hospital Epidemiology, Forthcoming.
2. Schweizer ML, Eber MR, **Laxminarayan R**, Furuno JP, Popvich KJ, Hota B, Rubin MA, Perencevich EN. "Validity of ICD-9-CM Coding for Identifying Incident Methicillin-resistant *S. aureus* (MRSA) Infections: Is MRSA Coded as a Chronic Disease?" Infection Control and Hospital Epidemiology, Forthcoming.
3. Malani A., **R. Laxminarayan**, "Incentives for surveillance and reporting of infectious disease outbreaks" Journal of Human Resources, **46** (1), 176-202, 2011.
4. Macauley, M, **R. Laxminarayan**, "The value of information: 'Methodological Frontiers and New Applications for Realizing Social Benefit' workshop", Space Policy, **26** (4), 249-51, 2010.
5. Tozan, Y, E. Klein, S. Darley, R. Panicker, **R. Laxminarayan**, J. Breman, "Pre-referral rectal artesunate is cost-effective for treatment of severe childhood malaria", Lancet, **376** (9756), 1910–15, 2010
6. Dhingra, N., P. Jha, V.P. Sharma, A.A. Cohen, R. M. Jotkar, P.S. Rodriguez, D.G. Bassani, W. Suraweera, **R. Laxminarayan**, R. Peto, "Adult and Child Malaria mortality in India" Lancet, **376** (9754), 1768 – 1774, 2010.
7. Smith D.L., E.Y. Klein, F. Ellis McKenzie, **R. Laxminarayan**, "Prospective Strategies to Delay the Evolution of Antimalarial Drug Resistance: Weighing the Uncertainty," Malaria Journal, **9** (217), 1-10, 2010.
8. Jeff, C., E. Klein, **R. Laxminarayan**, "Cost effectiveness analysis for treating vitamin A deficiency in India" PLOS One, **5** (8) e12046, 2010.
9. **Laxminarayan, R.**, I.W.H Parry, E. Klein, D.L. Smith, "Should new antimalarial drugs be subsidized?" Journal of Health Economics, **29**, 445–456, 2010.

10. Hermann, M., **R. Laxminarayan**, "Antibiotic effectiveness: new challenges in natural resource management" Annual Review of Resource Economics, **2** (4) 1-14, 2010.
11. Eber, M., **R. Laxminarayan**, E. Perencevich, A. Malani "Attributable economic and health costs of hospital-acquired infections in the United States, 1998–2006" Archives of Internal Medicine, **170** (4) 347-353, 2010.
12. Fischer C., **R. Laxminarayan**, "Managing partially protected resources under uncertainty" Journal of Environmental Economics and Management, **59** (2010) 129-141, 2010.
13. Klein E, DL Smith, **Laxminarayan R.**, "Trends in Community-Associated Methicillin-Resistant *Staphylococcus aureus* in Outpatient Settings of US Hospitals, 1999-2006" Emerging Infectious Diseases, **15** (12), 1925-30, 2009.
14. Hoffman, M. M Eber, **R. Laxminarayan**, "Increasing Resistance of Acinetobacter Species to Imipenem in US hospitals, 1999–2006," Infection Control and Hospital Epidemiology, **31** (2), 2009.
15. Parry, I. W. H., S. West, **R. Laxminarayan** "Fiscal and Externality Rationales for Alcohol Policies," The B.E. Journal of Economic Analysis & Policy, **9** (1) (Contributions), Article 29, 2009.
16. Olliaro, P., S. Darley, **R. Laxminarayan**, S. Sundar, "Cost-effectiveness projections of single and combination therapies for visceral leishmaniasis in Bihar, India," Tropical Medicine and International Health, **14** (8), 1-8, 2009.
17. **Laxminarayan, R.**, H. Gelband, "A Global Subsidy: Key to Affordable Drugs for Malaria?" Health Affairs, **28** (4) 949-961, 2009.
18. Rowthorn, R.E., **R. Laxminarayan**, C. Gilligan, "Optimal control of epidemics in metapopulations" Journal of the Royal Society Interface, **6**, 1135-44, 2009.
19. **Laxminarayan, R.**, E. Klein, S. Darley, O. Adeyi, "Economic Benefits of Global Investments in Tuberculosis Control," Health Affairs, **28** (4), w730-42, 2009.
20. Buchman, T., J. Dushoff, M. Effron, P. Ehrlich, S. Fitzpatrick, **R. Laxminarayan**, B. Levin, S. Levin, M. Lipsitch, A. Malani, C. Nemeroff, S. Otto, V. Patel, and J. Solomkin, "Antibiotic Overuse: The Influence of Social Norms" Journal of the American College of Surgeons **265**, 2008.
21. Boni, M., DL Smith, **R. Laxminarayan**, "Benefits of Using Multiple First-Line Therapies Against Malaria" Proceedings of the National Academy of Sciences, **105** (37), 14216-14221, 2008.
22. Deolalikar A.B., DT Jamison, P Jha, **R. Laxminarayan**, "Financing Health Improvements in India" Health Affairs, **27** (4), 2008.

23. Klein E, MF Boni, DL Smith, **R. Laxminarayan**, "Clinically-immune hosts as a refuge for drug-sensitive malaria parasites" Malaria Journal, **7** (67), 2008.
24. Klein E, DL Smith, **Laxminarayan R.**, "Trends in Hospitalizations and Deaths in the United States Associated with Infections Caused by *Staphylococcus aureus* and MRSA, 1999–2005" Emerging Infectious Diseases, **13** (2): 1840-46, 2007.
25. Klein E, **Laxminarayan R**, Smith DL, Gilligan C. Economic incentives and mathematical models of disease. Environment and Development Economics, **12**: 1-26, 2007.
26. **Laxminarayan R.**, A. Mills, J.G. Breman, A.R. Measham, G. Alleyne, M. Claeson, P. Jha, P. Musgrove, J. Chow, S. Shahid-Salles, D.T. Jamison, "Advancing global health: key messages from the Disease Control Priorities Project" The Lancet, **367** (9517): 1193-1208, 2006. (Nominated for The Lancet Paper of the Year, 2006)
27. **Laxminarayan R.**, Mead Over, David Smith, "Will a global subsidy of new antimalarials delay the emergence of resistance and save lives?" Health Affairs, **25** (2), 325-36, 2006.
28. Iruka N. Okeke, **Ramanan Laxminarayan**, Zulfiqar A. Bhutta, Adriano G. Duse, Philip Jenkins, Thomas F. O'Brien, Ariel Pablos-Mendez, Keith P. Klugman, "Antimicrobial resistance in developing countries: Recent trends and current status" Lancet Infectious Diseases, **5**: 481-93, 2005.
29. Iruka N. Okeke, Keith P. Klugman, Zulfiqar A. Bhutta, Adrian G. Duse, Philip Jenkins, Thomas F. O'Brien, Ariel Pablos-Mendez, **Ramanan Laxminarayan**, "Antimicrobial resistance in developing countries: Strategies for containment" Lancet Infectious Diseases, **5**: 568-80, 2005.
30. Fischer C., **R. Laxminarayan**, "Sequential development and exploitation of an exhaustible resource: do monopoly rights promote conservation?" Journal of Environmental Economics and Management, **49** (3): 500-515, 2005.
31. **Laxminarayan, R.**, David Smith, Leslie Real and Simon Levin, "On the importance of incentives in hospital infection control" Discovery Medicine, **5** (27): 303-308, 2005.
32. Smith D.L., S.A. Levin, **R. Laxminarayan**, "Strategic Interactions in multi-institution epidemics of antibiotic resistance" Proceedings of the National Academy of Sciences, **102** (8): 3153-3158, 2005.
33. **Laxminarayan R.**, A. Deolalikar, "Tobacco initiation, cessation and change: evidence from Vietnam," Health Economics, **13** (12): 1191-1201, 2004.
34. **Laxminarayan R.**, "ACT now or later: economics of malaria resistance," American Journal of Tropical Medicine and Hygiene, **71** (S2): 187-95, 2004.
35. **Laxminarayan R.**, "Does reducing malaria improve household living standards?" Tropical Medicine and International Health, **9**(2): 267-72, 2004.

36. Fischer, C., **R. Laxminarayan**, "Monopoly extraction of an exhaustible resource with two markets," Canadian Journal of Economics, **37**(1): 178-88, 2004.
37. **Laxminarayan, R.**, "How broad should the scope of antibiotics patents be?" American Journal of Agricultural Economics, **84**(5): 1287-92, 2002.
38. Guerin, P., P. Olliaro, F. Nosten, P. Druilhe, **R. Laxminarayan**, F. Binka, W. Kilama, N.J. White, "Malaria: current status of control, diagnosis and treatment, and a proposed essential R&D agenda," Lancet Infectious Diseases, **2**: 564-73, 2002.
39. **Laxminarayan, R.**, R.D. Simpson, "Refuge strategies for managing pest resistance in transgenic agriculture," Environmental and Resource Economics, **22**(4): 521-536, 2002.
40. **Laxminarayan, R.**, M.L. Weitzman, "On the implications of endogenous resistance to medications," Journal of Health Economics, **21**(4): 709-718, 2002.
41. Reed, S., **R. Laxminarayan**, D. J. Black, S. D. Sullivan, "Economic issues and antibiotic resistance in the community," Annals of Pharmacotherapy, **36**: 148-54, 2002.
42. **Laxminarayan, R.**, G.M. Brown, "Economics of antibiotic resistance: A theory of optimal use," Journal of Environmental Economics and Management, **42**(2): 183-206, 2001.

#### BOOK CHAPTERS

1. **Laxminarayan R.**, A. Malani, "Economics of Infectious Diseases" in Oxford Handbook of Health Economics (P. Smith, S. Glied Ed), Oxford University Press, 2010.
2. **Laxminarayan R.**, M. Sequeira, "Making Antimalarials Affordable: The Story of AMFm" in Case studies in health diplomacy: At the intersection of global health and politics (Harley Feldbaum Ed.), 2010.
3. **Laxminarayan R.** "Disease control: Alternative perspective" in Global Crises, Global Solutions. (Bjorn Lomborg Ed.), Cambridge University Press, 2009.
4. O. Adeyi, **R. Laxminarayan**, A. Melby, G. Beeharry, and A. Imasheva, The Affordable Medicines Facility – Malaria: What do Policymakers Need to Know? Commonwealth Health Ministers Book 2008, Commonwealth Secretariat, 2008.
5. **Laxminarayan, R.** and D. Jamison. Global Burden of Disease: Causes, Consequences and Intervention Strategies. Oxford Textbook of Medicine. D. Warrell. Oxford UK, Oxford University Press, 2008.
6. Smith, D. L. and **R. Laxminarayan**, "Human Interventions on Evolution of Host-Bacteria Interactions" in Introduction to Evolutionary Biology of Bacterial and Fungal Pathogens (C. N. Fernando Baquero, Gail H. Cassell and José A. Gutiérrez Ed.) Elsevier, The Netherlands, 2006.

7. **Laxminarayan R.** and D.L. Smith, "Ecology and economics of cycling antibiotics: Insights from mathematical modeling" in Multiple drug resistant bacteria (Carlos-Amabile Cuevas Ed.) Horizon Scientific Press, Norwich UK, 2006.
8. Smith DL, Boni MF, **Laxminarayan R.** "Dynamics and control of antibiotic resistance in structured metapopulations" in Disease evolution: Models, concepts, and data analyses, Feng Z, Dieckmann U, Levin S. American Mathematical Society, 2006.
9. **Laxminarayan, R.**, Jeffrey Chow, Sonbol Shahid-Salles, "Intervention Priority Setting: Overview of General Messages and Specific Neglected Opportunities" in Disease Control Priorities in Developing Countries, (D.T. Jamison et. al. Ed.) Oxford University Press, 2006.
10. Chandra V., Pandav R., **Laxminarayan R.**, Tanner C., Manyam B., Morillo L., Rajkumar S., Ogunniyi A., Brayne C., Zhang Z., Kasner S., Hourihan F., Chow J., "Neurological Disorders" in Disease Control Priorities in Developing Countries, (D.T. Jamison et. al. Ed.) Oxford University Press, 2006.
11. Haile T. Debas, **Laxminarayan R.**, S. Strauss, " Complementary and Alternative Medicine: Implications for Health Policies in the Developing World " in Disease Control Priorities in Developing Countries, (D.T. Jamison et. al. Ed.) Oxford University Press, 2006.
12. Peter J. Hotez, Donald A.P. Bundy, Kathleen Beegle, Simon Brooker, Lesley Drake, Nilanthi De Silva, Antonio Montresor, Dirk Engels, Matthew Jukes, Lester Chitsulo, Jeffrey Chow, **Ramanan Laxminarayan**, Catherine Michaud, Jeff Bethony, Rodrigo Correa-Oliveira, Xiao Shuhua, Alan Fenwick, Lorenzo Savioli, "Helminthic Infections" in Disease Control Priorities in Developing Countries, (D.T. Jamison et. al. Ed.) Oxford University Press, 2006.
13. **Laxminarayan R.**, Z. Bhutta, A. Duse, P. Jenkins, T. O'Brien, I. Okeke, A.P. Mendes, K. Klugman, "Drug Resistance," in Disease Control Priorities in Developing Countries, (D.T. Jamison et. al. Ed.) Oxford University Press, 2006.
14. **Laxminarayan, R.**, "Economic issues related to antimicrobial resistance," in Economics of Infectious Diseases, (J. Roberts, Ed.) Oxford University Press, UK, 2006.
15. **Laxminarayan, R.**, "Getting Serious about Antibiotic Resistance" in New Approaches on Energy and the Environment: Policy Advice for the President (R. D. Morgenstern and P. R. Portney, ed.) RFF Press, 2004.
16. **Laxminarayan R.**, R.D. Simpson, "Biological limits on agricultural intensification: An example from resistance management," in Environmental Costs and Benefits of Transgenic Crops in Europe (J. Wesseler, Ed.) Wageningen UR Frontis Series vol. 7, Kluwer Academic Publishers, Dordrecht, 2004.
17. **Laxminarayan, R.**, "On the economics of resistance," in Battling resistance to antibiotics and pesticides: An economic approach, RFF Press, Washington DC, 2002.

18. **Laxminarayan, R.**, M.L. Weitzman, "Treatment heterogeneity in infectious diseases," *in* Battling resistance to antibiotics and pesticides: An economic approach, RFF Press, Washington DC, 2002.
19. **Laxminarayan, R.**, "Economic responses to the problem of drug resistance," *in* The Resistance Phenomenon in Microbes and Infectious Disease Vectors: Implications for Human Health and Strategies for Containment, The National Academies Press, Washington DC, 2003. Also issued as RFF Issues Brief 02-05, Dec 2002.
20. **Laxminarayan, R.**, R.D. Simpson, "Managing pest resistance: Timing the initiation of refuge areas," *in* The Economics of Managing Biotechnologies. T. Swanson. The Netherlands, Kluwer Academic Publishers, 2002.

#### OTHER PUBLICATIONS

1. **Laxminarayan, R.**, A. Malani, "The Right Combination of Carrots and Sticks," Resources **173** (Fall): 13-15, 2009.
2. **Laxminarayan, R.**, C. Fischer, "Congestion and the Commons: What Happens When Some Resources Are Enclosed and Others Are Open Access?" Resources **173** (Fall): 16-18 2009.
3. **Laxminarayan, R.**, Jeffrey Chow, Eili Klein, and Paula Tarnapol Whitacre, "A Recipe to Fight Vitamin A Deficiency in India: Add Mustard and Stir?" Resources **167** (Fall/Winter): 2008.
4. **Laxminarayan, R.**, "Malaria among African Children: Hope for Progress Against a Growing Menace" Resources **148** (Winter): 25-28, 2006.
5. **Laxminarayan R.** "A Sustainable Malaria Treatment Strategy for the 21st Century", SciDev.Net, Portfolio on Malaria ([www.scidev.net](http://www.scidev.net))
6. **Laxminarayan, R.**, C. Fischer, "Keeping One Row Ahead of the Bugs: The Economics of Pest Resistance to Transgenic Crops" Resources **146** (Fall/Winter): 5-8, 2004.
7. **Laxminarayan, R.**, Antibiotic resistance: an emerging environmental health threat, RFF Issues Brief 02-19, 2002.
8. **Laxminarayan, R.**, "Fighting antibiotic resistance: Can economic incentives play a role?" Resources **143** (Spring): 9-12, 2001.
9. **Laxminarayan, R.**, "Economic consequences of red tides," Red Tides. National Oceanic and Atmospheric Administration (NOAA): Autumn 2000.

10. **Laxminarayan, R.**, "Public participation in environmental decision-making: The role of NGOs" Proceedings of RFF-ISEP Workshop on Public Participation in Environmental Decision-making, Bangkok, Apr. 2000.

#### **WORKING PAPERS**

1. "One size fits all? Time to rethink how we use antibiotics" (with Patricia Geli, Michael Dunne and David Smith) (Submitted to *Plos One*)
2. "Diversify or Focus? Spending to Combat Infectious Diseases When Budgets are Tight" (with Soren Anderson and Steve Salant) (submitted to *Journal of Health Economics*)
3. "Are physicians sensitive to pharmaceutical prices?" (with Shanjun Li) (submitted to *Review of Economics and Statistics*)
4. "Hospital Financial Characteristics and Rates of Central Line-Associated Bloodstream Infection" (with Mike Eber) (submitted to *Archives of Internal Medicine*)
5. "Replenishing antibiotic effectiveness: is there a role for government?" (with John Powers) (submitted to *Nature Medicine*)
6. "The effect of free antibiotic programs on retail antibiotic sales" (with Mike Eber and Shanjun Li) (submitted to *Annals of Internal Medicine*)
7. "A policy proposal to contain hospital infections" (submitted to *Health Affairs*)
8. "Surveillance and reporting of emerging pathogens" (with Eili Klein, Anup Malani and Alison Galvani)
9. "Valuing smoke free laws" (with Shawn Magnuson and Juha Siikamaki)
10. "Transboundary Malaria Financing" (with Dave Smith)
11. "Demand for antimalarials: evidence from Tanzania" (with Megumi Gordon and Oliver Sabot)
12. Malaria and adaptation of agricultural households (with Yeon Soo Kim)
13. "Malaria, Adaptation and Crop Choice" (with Klaus Moeltner)

#### **RESEARCH GRANTS**

Disease Control Priorities Network: Bill & Melinda Gates Foundation, Sub-grant from the University of Washington, \$3,700,000 (2011-15) PI

The Impact of Foundation Giving, Robert Wood Johnson Foundation, \$800,000 (2010-12) PI

Global Antibiotic Resistance Partnership, Bill & Melinda Gates Foundation, Seattle, \$2,100,000 (2008-09) PI

Consultative Forum on the Affordable Medicines Facility on Malaria, Bill & Melinda Gates Foundation, Seattle, \$494,000 (2008-09) PI

Measuring the Impact of Foundation Giving, Robert Wood Johnson Foundation, \$344,000 (2008-09) PI

Extending the Cure: Policy Research to Address Antibiotic Resistance Robert Wood Johnson Foundation, \$1,798,500 (2007-10) PI

Shaping the Antimalarial Subsidy Bill & Melinda Gates Foundation, Seattle, \$678,000 (2007-08) PI

Using Genetically Modified Crops to Address Micronutrient Deficiencies International Center for Tropical Agriculture (CIAT), Colombia, \$208,000 (2006-07) PI

Systemic Changes to Tackle Antibiotic Resistance , Robert Wood Johnson Foundation, \$348,000 (2005-07) PI

Reforming Alcohol Taxes: Health and Fiscal Issues, Robert Wood Johnson Foundation, \$100,000 (2005-06) Co-PI (with Ian Parry)

Reforming Alcohol Taxes: Health and Fiscal Issues, National Institute of Alcohol Addiction and Abuse, \$100,000 (2005-06) Co-PI (with Ian Parry)

Principal Investigator, Grants (263-MD-310352; 263-MD-408779; 263-MD-503186) from National Institutes of Health, Fogarty International Center, Disease Control Priorities Project. \$431,000 (2003-2007)

Co-Principal Investigator, Grant (R21 TW006548-01) from National Institutes of Health, Fogarty International Center, Reducing SO<sub>2</sub> emissions in Taiyuan, China. \$228,000 (2003-2006)

Principal Investigator, Grant (HS10943) from Agency for Healthcare Research and Quality (AHRQ), Conference on Economics of Resistance. \$28,000 (2000-2002)

Principal Investigator, Grant from Resources for the Future, Economics of Drug Resistance. \$75,000 (2001-2002)

Principal Investigator, Grant from Resources for the Future, Managing Transgenic Crops for Resistance and Biodiversity. \$140,000 (1999-2002)

## **PROFESSIONAL SERVICE**

**Advisory Group/Committee Memberships**

External Scientific Advisory Committee, University of California Global Health Institute (2010-present)

PSI ACTWatch Advisory Group (2008-present)

WHO Quantitative Immunization and Vaccines Related Research Expert Advisory Group (QUIVER) (2007-present)

Institute of Medicine Committee on *Achieving Sustainable Global Capacity for Surveillance and Response to Emerging Diseases of Zoonotic Origin* (2008-09)

Global Fund AMFm Copayment Technical Advisory Group (2008-09)

Roll Back Malaria ACT Subsidy Task Force (2007)

Roll Back Malaria Finance and Resources Working Group (2006-present)

CDC Alcohol Related Disease Impact (ARDI) Working Group (2005-06)

National Academy of Sciences/Institute of Medicine Review Panel on *Malaria Control: A Reconsideration of the Role of DDT* (2004)

Institute of Medicine Committee on *Economics of Antimalarial Treatments* (2002-2004)

World Health Organization Task Force on Drug Resistance and Policies for Malaria (WHO-TDR-RAP) (2000-2002)

**Conferences/Workshops Organized**

RFF Conference on Antimalarial Treatment Strategies (with David Smith) Kruger National Park, South Africa (Apr. 2008)

DIMACS Workshop on Economic Epidemiology under the Computational and Mathematical Epidemiology Series (with David Smith), Rutgers University, NJ (Oct. 2005)

RFF-Taiyuan CDC *Workshop on Air Pollution and the People's Health* (in collaboration with Taiyuan Centers for Disease Control and Prevention and Johns Hopkins Bloomberg School of Public Health), Taiyuan China (Mar. 2005)

RFF-CAEP Workshop on *Policy Activities to Improve Urban Air Quality in China: Experience from Taiyuan and Other Cities* (in collaboration with the Chinese Academy for Environmental Planning) Sanya, China (Nov. 2004)

DCPP Consultation on *Cardiovascular Diseases*, Washington DC (Aug 2004)

RFF Workshop on *Discounting for Health in Developing Countries*, Washington DC (May 2003)

RFF Conference on *Economics of Resistance*, Airlie House, VA (Apr. 2001)

*International Workshop on Antibiotic resistance: Global policies and options*, at Center for International Development, Harvard University (Feb. 2000)

## Referee

*Journal of Political Economy, RAND Journal of Economics, Journal of Environmental Economics and Management, Proceedings of the National Academy of Sciences, Proceedings of the Royal Society Phil Trans, Environmental and Resource Economics, Environment and Development Economics, Journal of Agricultural and Resource Economics, Marine Resources Economics, B.E. Journals in Economic Analysis, Social Science and Medicine, Tropical Medicine and International Health, Health Policy, Health Affairs, Bulletin of the World Health Organization, European Journal of Health Economics, Air Quality, Atmosphere and Health, Ashgate Publishers, Swiss National Science Foundation, Social Sciences and Humanities Research Council of Canada, Wellcome Trust, UK.*

## PRESENTATIONS

“The Drug Resistance Index”, Annual Meetings of the American Society for Tropical Medicine and Hygiene, Atlanta (Nov. 2010)

“Extending the Cure: Challenges in Ensuring Effective Antibiotics in the 21<sup>st</sup> Century” The Society of Infectious Diseases Pharmacists Annual Meeting, Boston (Sep. 2010)

“Perspectives on Rational Use and Access”, Conference on the Global Need for Effective Antibiotics, Uppsala, Sweden (Sept. 2010)

“Transboundary problems in infectious diseases” Fields Institute, Toronto, Ontario, Canada (Jul. 2010)

“The Growing Problem of Multidrug-Resistant Bacteria in Developing Countries” International Conference on Emerging Infectious Diseases, Atlanta (Jul. 2010)

“Antibiotic Resistance in the Developing World: Policy Options and Opportunities” Global Health Conference, Washington, DC (Jun. 2010)

“Using Economic Principles to Guide Appropriate Use of Antimicrobials” Fifth Decennial International Conference on Healthcare-Associated Infections, Atlanta, Georgia (Mar. 2010)

“Economics of Antibiotic Development” National Foundation for infectious Diseases Antimicrobial Resistance Conference, Bethesda, Maryland (Feb. 2010)

- “Global Public Goods in Surveillance, Reporting and Control of Infectious Diseases,” Fifteenth Annual Shih-I Pai Lecture, Washington, DC (Dec. 2009)
- “Antibiotic Resistance: A Multi-Billion Dollar Health Care Crisis,” Congressional Health Briefing, Washington, DC (Dec. 2009)
- “Priorities for Antimalarial Drug Development,” ASTMH Annual Meeting, Washington, DC (Nov. 2009)
- “The Cost of Losing Antibiotic Effectiveness,” CLF House Briefing on AMR and Costs to the Health System, Washington, DC (Nov. 2009)
- “Prevention and Treatment of Infectious and Parasitic Diseases,” United Nations, New York City, NY (Nov. 2009)
- “Treatment and Burden of Disease,” Measles/Rubella Modeling Workshop, Princeton, NJ (Nov. 2009)
- “A Hedonic Estimation of Benefits from Anti-Smoking Laws,” Society for Benefit-Cost Analysis, Washington, DC (Oct. 2009)
- “Antimicrobial Resistance – Implications for Global Health and Novel Intervention Strategies,” Institute of Medicine’s Forum on Microbial Threats, Washington, DC (Sept. 2009)
- “Setting Priorities for Health: The Disease Control Priorities Project,” Disease Control Priorities Project, South Africa (Aug. 2009)
- “Externalities in Infectious Diseases,” DIMACS, Kampala, Uganda (Aug. 2009)
- “Financing Malaria Treatment”, Grand Challenges Seminar Series, Princeton, NJ (Feb. 2009)
- “Economics of Antibiotic Resistance” Dartmouth College, Hanover, NH (Jan. 2009)
- “Incentives for Surveillance and Reporting of Disease Outbreaks” Dartmouth College Health Policy Workshop, Hanover, NH (Oct. 2008)
- “Cost-effective Quality of Care in Resource Poor Settings” IOM Workshop on Quality Care Issues for Mental Health and Neurological Disorders in Sub-Saharan Africa (Sep. 2008)
- “Antimalarial Treatment Strategies” Bill & Melinda Gates Foundation, Seattle, WA (Apr. 2008)
- “Hospital Incentives to Control Drug Resistant Infections” Modeling the dynamics of the Drug-Resistant killers of the Twenty First Century, AAAS Meetings, Boston MA (Feb. 2008)
- Panel on "Resistance Prevention and Monitoring" Gates Malaria Forum (Oct 2007)
- “Infection Control Games Hospitals Play” Conference on Game Theoretic Approaches to Epidemiology and Ecology, DIMACS, Rutgers University (Oct 2007)

“Antibiotics: Protecting a Vital Resource” Annual Conference of the Alliance for Prudent Use of Antibiotics, Boston, MA (Oct. 2007)

“Global economics of sustainable malaria control” at Gordon Research Conference on Malaria, Oxford, UK (Sep. 2007)

“Extending the Cure” to Robert Wood Johnson Foundation Board of Trustees, Princeton, NJ (Jul. 2007)

“Economic aspects of economic epidemiology” at DIMACS Capstone Workshop on Mathematical Modeling and Infectious Disease, Stellenbosch, South Africa (Jun. 2007)

“Policy Perspective: Systems Approach in the Health Sector” at Symposium on Systems Science for Global Health: Designing Sustainable Health Services and Systems within Developing Country Settings, Fogarty/OBSSR Satellite Gathering, 29th Annual IUBS Scientific Symposium (May 2007)

“Infectious disease: ecology, economics and policy” New York Times Foundation Institute for Journalism, Punta Cana, Dominican Republic (Mar. 2007)

“Economics of Fisheries” New York Times Foundation Institute for Journalism, Punta Cana, Dominican Republic (Mar. 2007)

“Incentives for surveillance and reporting of disease outbreaks” Economics Department Seminar, University of California, Riverside (Mar. 2007)

“Antibiotics: Protecting a Vital Resources” Public Policy Economics Seminar, University of California, Riverside (Mar. 2007)

“Antibiotics: Protecting a Vital Resources” Woods Environmental Forum, Stanford University, Stanford, CA (Feb. 2007)

“Disease Control Priorities in Developing Countries” Cost and Outcomes Grand Rounds, University of Washington, Seattle, WA (Feb. 2007)

“The Case for a Global Subsidy for ACTs” Department of Pharmacy, University of Washington, Seattle, WA (Feb. 2007)

“Improving the quality of health spending in India” DCPPI-India workshop on “Choosing health: an opportunity for India” New Delhi, India (Jan. 2007)

“Economics of antimalarial drugs” Ugandan National Academy of Sciences, Kampala, Uganda (Oct. 2006)

“Insights from economic-epidemiology” DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa, University of the Witwatersrand, Johannesburg, South Africa (Oct. 2006)

“Intervention cost-effectiveness Summary of key messages of the Disease Control Priorities Project” Bill & Melinda Gates Foundation, Seattle; DCPD Launch and 2<sup>nd</sup> Global meeting of the inter-academy medical panel, Beijing; Africa launch of DCPD in Johannesburg and Nairobi; Makerere University, Kampala; Capitol Hill Briefing organized by Global Health Council, Washington DC; Global Health Council Annual Conference, Washington DC; USAID Mini-University (Apr. - Oct. 2006)

Six part lecture series on Economic Epidemiology, Princeton Environmental Institute, Princeton University, NJ (Oct. – Dec. 2005)

“The influence of economic incentives on hospital infection control and surveillance” DIMACS Seminar Series, Rutgers University, NJ (Dec. 2005)

“Managing partially protected resources under uncertainty: an application to antibiotic resistance” at the Department of Agricultural and Resource Economics, University of Maryland, College Park, MD (Oct. 2005)

“Infectious disease, resistance and public goods” DIMACS Workshop on Economic Epidemiology, Rutgers University, NJ (Oct. 2005)

“Will a global subsidy of artemisinin-based combinations (ACTs) for malaria delay the emergence of resistance and save lives?” at the Roll Back Malaria Partnership Finance and Resources Working Group Meeting, Washington, DC (Sep. 2005)

“The Case for a Global Subsidy for ACTs” at the World Bank hosted Conference of Donors for the Booster Program for Malaria Control in Africa, Paris, France (Sep. 2005)

“Economic Analysis in the Disease Control Priorities Project” at the International Health Economists Association Conference, Barcelona, Spain (Jul. 2005)

“Drug resistance: applications of economic epidemiology” at Johns Hopkins Bloomberg School of Public Health, Washington, DC (May 2005)

“Drug resistance: applications of economic epidemiology” at the Workshop on Infectious Disease: Theoretical, Ecological and Economic Approach, Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy (Apr. 2005)

“Intervention Priority Setting: Overview of General Messages and Specific Neglected Opportunities” at the Pasteur Institute, Paris, France (Dec. 2004)

“Antibiotic Resistance: A Problem of Missing Incentives” at Robert Wood Johnson Foundation, Princeton, NJ (Nov. 2004)

“Saving Lives, Buying Time: Modeling Resistance” Botswana-Harvard Partnership of the Harvard Aids Institute, Botswana (Oct. 2004)

“Drug Resistance: Economics and Policies” at Peking University Guanghai School of Management, Beijing, PRC (Sep. 2004)

"Cost-effectiveness of Interventions for Neurological Disorders" at World Health Organization, Geneva, Switzerland (Mar. 2004)

"Drug resistance: Economic Incentives and Regulatory Approaches," University of Virginia School of Law, Charlottesville, VA (Mar. 2004)

"Sequential Development and Exploitation of an Exhaustible Resource: Do Monopoly Rights Promote Conservation?" University of Virginia Dept. of Economics Seminar, Charlottesville, VA (Mar. 2004)

"Drug Resistance," Plenary Session on Disease Control Priorities Project at the International Clinical Epidemiology Network (INCLIN) Annual Meeting, Agra, India (Feb. 2004)

"Drug Resistance, Globalization, and Public Health," Foreign Service Institute, Department of State, Washington DC (Dec. 2003)

"Reducing SO<sub>2</sub> emissions in Taiyuan, China," NIH/Fogarty Investigators Network Meeting (Oct. 2003)

"Malaria, Living Standards, Adaptation and Crop Choice," Triangle Resource and Environmental Economics Seminar Series, NCSU, Raleigh, NC. Also presented at Northeastern Universities Development Consortium Conference at Yale University (NEUDC) (Oct. 2003).

"Economics of drug resistance in malaria," Institute of Medicine Bioeconomic Modeling Workshop, Oxford, UK (Jul. 2003)

"Policy responses to antimicrobial resistance," Office of the Commissioner, Food and Drug Administration, Washington, DC (Jul. 2003)

"Economic consequences of resistance to transgenic crops," Frontis Workshop on Environmental Costs and Benefits of Transgenic Crops in Europe, Wageningen University, Netherlands (Jun. 2003)

"Bioeconomic models for infectious disease control," Economics of Invasive Species Workshop, ERS, U.S. Department of Agriculture, Washington, DC (May 2003)

"Threats to control: drug resistance," DCPD Workshop on Tropical Diseases, FIOCRUZ, Rio de Janeiro, Brazil (Apr. 2003)

"Sequential development and exploitation of a non-renewable resource: do monopoly rights promote conservation?" Conference in Honor of Professor Gardner Brown on Frontiers in Environmental and Natural Resource Economics, University of Washington, Seattle, WA (Apr. 2003)

"Economics of antimalarial resistance and the optimal use of artemisinin-based combination treatments," Meeting of the Institute of Medicine and the Global Fund on AIDS, TB and Malaria at the Royal Society, London, UK (Mar. 2003)

"On setting global disease control priorities," Department of Agricultural and Resource Economics, University of California, Davis, CA (Jan. 2003)

"Drug Resistance, Globalization, and Public Health," Foreign Service Institute, Department of State, Washington, DC (Nov. 2002)

"Drug Resistance, Globalization, and Public Health," Conference on Globalization and Public Health, Johns Hopkins School of Advanced International Studies, Washington, DC (Nov. 2002)

"Malaria: its social and economic consequences," Meet-the-expert session on Malaria, 42nd Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), San Diego, CA (Sep. 2002)

"Antibiotic resistance: an emerging environmental threat," World Summit on Sustainable Development (WSSD), Johannesburg, South Africa (Aug. 2002)

"How broad should the scope of antibiotics patents be?" Principal session paper, AAEA Annual Meetings, Long Beach, CA (Jul. 2002)

"On setting global disease priorities" and "Biological limits on agricultural intensification: an example from resistance management," at the World Congress of Environment and Resource Economics, Monterey, CA (Jun. 2002)

"Health-environment linkages: Role of economic analysis" Workshop on Health, Environment and Economic Development: Building a Research Program, Conference on Health People – Healthy Ecosystems, Washington DC (Jun. 2002)

"A model of spread," Department of Plant Sciences, University of Cambridge, UK (May 2002)

"Economic responses to the problem of drug resistance," Resources for the Future 50<sup>th</sup> Anniversary Council Meeting, Washington, DC (Apr. 2002)

"On the use of mathematical models and economic analysis in malaria control," Ministry of Health, Peru (Apr. 2002)

"Economics of tobacco control," Guest Lecture, Bloomberg School of Public Health, Johns Hopkins University, Washington, DC (Feb. 2002 and Feb. 2003)

"Bacterial resistance and the optimal use of antibiotics," Woodrow Wilson School, Princeton University, NJ (Feb. 2002)

"Economic incentives to encourage new antibiotics in the face of drug resistance," RFF Wednesday Seminar Series, Resources for the Future, Washington, DC (Feb. 2002)

"Comments on future research directions on antimicrobial resistance," Panel Discussion at IOM Forum on Emerging Infections workshop on Issues of Resistance: Microbes, Vectors, and the Host, Institute of Medicine, Washington, DC (Feb. 2002)

"On the implications of endogenous resistance to medications," University of Massachusetts, Amherst, MA (Oct. 2001)

"The Rise of Antibiotic Resistance: Depletion of a Public Resource," Resources for the Future Board of Directors, Washington, DC (Oct. 2001)

"The economics of antimicrobial resistance," Bayer-Canada, Toronto, Canada (Oct. 2001)

"The economic case for combination therapy for malaria," World Health Organization, Geneva, Switzerland (Jul. 2001)

"On the implications of endogenous resistance to medications," Environment and Natural Resources Seminar, Stanford University, CA (Apr. 2001)

"Biological limits on agricultural intensification: an example from resistance management," Department of Agricultural Economics, Rutgers University, NJ (Apr. 2001)

"The Rise of Antibiotic Resistance: Depletion of a Public Resource," London School of Hygiene and Tropical Medicine, London, UK (Mar. 2001)

"The Rise of Antibiotic Resistance: Depletion of a Public Resource," Delhi School of Economics, New Delhi, India (Mar. 2001)

"The Rise of Antibiotic Resistance: Depletion of a Public Resource," Center for Risk Analysis Seminar Series, Harvard School of Public Health, Cambridge, MA (Feb. 2001)

"Combination Therapy for Malaria: Economic Issues and Methodology," WHO Workshop on Combination Therapy hosted by Center for International Development, Harvard University, Cambridge, MA (Jan. 2001)

"The Rise of Antibiotic Resistance: Depletion of a Public Resource," RFF Wednesday Seminar Series, Resources for the Future, Washington, DC (Jan. 2001)

"Refuge strategies for managing pest resistance in transgenic agriculture and implications for land use," American Economic Association Annual Meetings, New Orleans, LA (Jan. 2001)

"Economics of antibiotic resistance: A theory of optimal patents," *Mini-symposium on Food Safety*, International Agricultural Economists Association Conference, Berlin, Germany (Aug. 2000)

"Refuge strategies for managing pest resistance in transgenic agriculture", European Science Foundation (ESF) Workshop on *Biotechnology, Agriculture and Environment* at International Plant Genetics Resources Institute (IPGRI), Rome, Italy (May 2000)

"Survey of agricultural biotechnology in India," Conference on *Biotechnology and the Public Interest: Prospects of Biotechnology in the Developing and Developed World* at University of California, Berkeley, CA (May 2000)

"Socio-economic determinants of disease transmission in Cambodia," Madras School of Economics, Chennai, India (Apr. 2000)

"Public participation in environmental decision making: The role of NGOs," ISEP-RFF Workshop on *Public Participation in Environmental Decision Making*, Bangkok, Thailand (Apr. 2000)

"Optimal cycling of antibiotics," International Workshop on *Antibiotic resistance: Global policies and options*, at Center for International Development, Harvard University, Cambridge, MA (Feb. 2000)

"Economics of antibiotic resistance: a theory of optimal use," National Bureau of Economics Research (NBER) *Summer Institute on Public Economics and Environment*, Cambridge, MA (Aug. 1998)

"Bacterial resistance and the optimal use of antibiotics," Department of Economics, Ben-Gurion University of the Negev, Be'er Sheva, Israel (Apr. 1999)

"Using antibiotic resistance surveillance data to determine optimal treatment of acute otitis media," Poster presentation at Infectious Diseases Society of America (IDSA) Annual Conference, Denver, CO (Nov. 1998)

"Using antibiotic resistance surveillance data to determine optimal treatment of acute otitis media," Center for Costs and Outcomes Research, University of Washington, Seattle, WA (Nov. 1998)

"Economist or Shoeshine boy: A model of formal-informal sector duality based on individual rational choice," Western Economic Association Annual Meeting (Aug. 1997)