

Curriculum Vitae

CATHRYN A. CARROLL, Ph.D.

Division of Pharmacy Practice, School of Pharmacy
Department of Economics, College of Arts and Sciences
University of Missouri-Kansas City
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ACADEMIC AND PROFESSIONAL BACKGROUND

Education:

- 1996 **Ph.D., Economics,**
University of Kansas.
- 1995 **M.A., Economics,**
University of Kansas.
- 1992 **M.B.A., Finance,**
University of Missouri-Kansas City.
- 1982 **B.S., Pharmacy,**
University of Missouri-Kansas City.

Professional Positions:

- 2000-** **Assistant Professor, Department of Economics,**
Joint Appointment College of Arts & Sciences, University of Missouri-
Kansas City, Kansas City, Missouri.
- 1999-** **Assistant Professor, Division of Pharmacy Practice,**
School of Pharmacy, University of Missouri-Kansas City, Kansas City,
Missouri.
- 1996-1999** **Director, Health Outcomes Research,**
Hoechst Marion Roussel, Kansas City, Missouri.
- 1996** **Assistant Director, Health Outcomes Research,**
Hoechst Marion Roussel, Kansas City, Missouri.
- 1993-1996** **Part-Time Pharmacist,**
Express Mail Order Pharmacy, Kansas City, Missouri.

- 1991-1992 **Manager, Quality Assurance,****
Humana Health Plans, Kansas City, Missouri.

- 1986-1991 **Pharmacist-In-Charge,****
Humana Health Plans, Kansas City, Missouri.

- 1985-1986 **Staff Pharmacist,****
Humana Health Plans, Kansas City, Missouri.

- 1984-1985 **Staff Pharmacist,****
K-Mart, Kansas City, Missouri.

- 1982-1984 **Sales Representative,****
Eli Lilly & Company, Grand Rapids, Michigan.

Experience and Expertise Summary:

Retail and Managed Care Pharmacy: Clinical experience in providing pharmaceutical care to various patient populations as well as directing pharmacy operations, managing prescription drug formularies, inventory control, financial analysis and conducting drug use evaluations.

Pharmaceutical Industry: Responsibility for sales functions, prescription drug pricing, economic assessment of pharmaceutical technology as well as economics research operations management.

University of Missouri-Kansas City Teaching: Undergraduate teaching of general economic and health economic courses. Graduate teaching included coursework for the professional pharmacy curriculum and upper level graduate course work in economics. Created new health economic concentrations for traditional MA program and Interdisciplinary PhD program.

University of Missouri-Kansas City Research Program: Multiple types of analysis relevant to economic issues in health care. The primary areas of research focus include analysis of healthcare manpower, the interaction of information technology and medical quality, prescription benefit design and forecasting and educational research. In addition, occasional analysis of issues in end stage renal disease, depression, diabetes, and cardiovascular disease.

HONORS, AWARDS AND RECOGNITION

2003 Kauffman Technology Fellow

2001 Faculty Shares Award

A University of Missouri program created to recognize outstanding faculty performance.

RESEARCH AMPLIFICATION

Bibliography:

Lurk, J.T., Knell, M., Dejong, D., Woods, T.M. and Carroll, C.A. "Effect of Changes in Patient Cost-Sharing and Drug Sample Policy on Prescription Drug Costs and Utilization in a Safety-Net Provider," *American Journal of Health-Systems Pharmacy*, **in press**.

Carroll, C.A., Coen, M.M. and Rymer, M.M. "Assessment of the Effect of Ramipril Therapy on Direct Health Care Costs for First and Recurrent Stroke in High-Risk Cardiovascular Patients Using Data from the Heart Outcomes Prevention Evaluation (HOPE) Study," *Clinical Therapeutics*, 2003 April; 25(2): 1248-1261.

Santos, S.R., Carroll, C.A., K.C. Cox, S.L. Teasley, S.D. Simon, Bainbridge, L., Cunningham, M. and Ott, L. "Baby Boomer Nurses Bearing the Burden of Care: A Four Site Study of Stress, Strain, and Coping for Inpatient Registered Nurses," *Journal of Nursing Administration*, 2003 April;33(4):234-250.

Carroll, C.A., Coen M.M. and Piepho, R.W. "Economic Impact of Ramipril on Hospitalization of High-Risk Cardiovascular Patients," *The Annals of Pharmacotherapy*, 2003 March; 37(3):327-331.

Carroll, C.A. and Garavalia, L.S. "Gender and Racial Differences in Student Motivation and Perceived Use of Self-Regulated Learning Strategies," *American Journal of Pharmaceutical Education*, 2002 Winter; 66(4): 382-387.

Garavalia, L.S., Scheuer, D.A. and Carroll, C.A. "A Comparative Analysis of First- and Third-Year Pharmacy Students' Perceptions of Student-Regulated Learning Strategies and Motivation," *American Journal of Pharmaceutical Education*, 2002 Fall; 66(3): 219-223.

Carroll, C.A., Abboud, D. and Santos, S.R. "Measuring Occupational Adjustment in Pharmacists: Is It Important?" *The Annals of Pharmacotherapy*, 2002 Sept;36(9):1478.

Carroll, C.A., Cox K.C., Santos, S.R. and Simon, S.D. Using Standard Desktop Tools to Monitor Medical Errors. *Seminars in Nurse Managers*. 2002 June;10(2):95-99.

Manley, H.J. and Carroll, C.A. The Clinical and Economic Impact of Pharmaceutical Care in End-Stage Renal Disease Patients. *Seminars in Dialysis*. 2002 Jan-Feb;15(1):45-9.

Carroll, C.A., Santos, S.R., and Cox, K.S. "Economic Assessment Comparing One Full Time Line with Two Full Time Line Managers for One Clinical Unit: Reducing Operating Costs with Non-Traditional Models, *Seminars for Nurse Managers*, **under review**.

Gartland, M.P. and Carroll, C.A. "Outcomes in Physician Reimbursement Methods: The Impact of Capitation on Physician Organization," *The American Journal of Managed Care*, **under review**.

Carroll, C.A. and Garavalia, L.S. "Evaluating Factors Contributing to Academic Achievement in a Single Professional Pharmacy Student Population Using the Goal-Efficacy Framework," *American Journal of Pharmaceutical Education*, **under review**.

Carroll, C.A., Rychlewski, W., Teat, M., Clawson, D. "An Innovative Interdisciplinary Collaborative Enhancing Entrepreneurship and Professionalism in Medical Informatics Training: The Kansas City Demonstration Project," *Journal of American Medical Informatic Association*, **under review**.

Book Chapter:

Nachtigal, J.D. and Carroll, C.A. Economic Implications of Diabetes Mellitus. In the Textbook of Diabetes Mellitus and Cardiovascular Disease. Ed. SP Marso and DM Stern. St. Louis: Lippincott Williams & Wilkins, **in press**.

Invited Speaker:

"Operational Lock-in of Physician Reimbursement Methods: The Economic versus the Institutional Manager," 2003 International Health Economic Association Biannual Meeting, San Francisco, CA, June 17, 2003.

"Fail-Safe Medication Management System Design Research Demonstration Project Results," American Society for Health-Systems Pharmacists 2002 Midyear Clinical Meeting, Atlanta, GA, December 11, 2002.

"Cost of Prevention Economic Model," Missouri Association of Health Plans Politics & Health Care Summit 2002, Kansas City, MO, October 3, 2002.

"Significantly Reducing Staff Turnover: Cost Effectiveness and Satisfaction Associated with Two Full-Time Line Managers," American Nursing Association 2002 Biennial Convention & Exposition, Philadelphia, PA, July 1, 2002.

"Keeping the Clinical Manager "Clinical": A Pilot Project that Decreases Staff Nurse Turnover," Sigma Theta Tau International 36th Biennial Convention, Indianapolis, IN, November 10, 2001.

"Estimating the Demand for Prescription Drug for A State Run Senior Prescription Benefit Program,' Expert Testimony, Missouri Senate and House Subcommittees, Jefferson City, Missouri, September 6, 2001.

"Pharmacoeconomic Education, Managed Care and the Pharmaceutical Industry-A Panel Discussion," 100TH AACP Annual Meeting, Boston, MA, July 7, 1999.

Presentations (Other):

“A Clinical and Economic Review of ACE Inhibitors for the High Risk Cardiovascular Patient,” Live Satellite Broadcast, Dallas, Texas, March 15, 2002.

“Reducing Cardiovascular Risk: A Clinical and Economic Review of ACE Inhibitors,” C.E. Program, Saint Louis, Missouri, October 30, 2001.

“Reducing Cardiovascular Risk in the Long-Term Care Setting: Evaluating New Management Options,” Satellite Symposium, American Society for Consultant Pharmacist 23rd Midyear Conference, Washington, DC, May 4, 2001.

“Reducing the Risk of Cardiovascular Complications in the Long-Term Care Setting,” Satellite Symposium, American Medical Directors Association 2001 Annual Meeting, Atlanta, Georgia, March 17, 2001.

“An Economic Analysis of Ramipril Use in High Risk Cardiovascular Patients,” Wyeth-Monarch Managed Care Advisory Group, New York City, New York, August 25-26, 2000; Phoenix September 8, 2000.

Posters (National Meetings):

"Operational Lock-in of Physician Reimbursement Methods: The Economic versus the Institutional Manager," 2003 International Health Economic Association Biannual Meeting, San Francisco, CA, June 17, 2003.

"Assessing the Economic Outcomes of a Generic-Only Drug Benefit Design on a Medicare Population: A Managed Care Perspective," 2003 Academy of Managed Care Pharmacy Annual Meeting, Minneapolis, MN, April 9-12, 2003.

"Evaluation of rheumatoid arthritis drug therapy prescribing trends in a managed care population," 2003 Academy of Managed Care Pharmacy Annual Meeting, Minneapolis, MN, April 9-12, 2003.

“Estimating Demand and Expected Expenditures for State Run Senior Prescription Benefit Programs,” 2002 Academy for Health Services Research and Health Policy Annual Research Meeting, Washington, D.C., June 24, 2002.

“Evaluating Trade-Offs Associated With Alternative Prescription Benefit Designs for State Run Senior Prescription Benefit Programs,” 2002 Academy for Health Services Research and Health Policy Annual Research Meeting, Washington, D.C., June 24, 2002.

“Baby Boomer Nurses Bearing the Burden of Care: A Four-Site Study of Stress, Strain, and Coping for Inpatient Registered Nurses,” 2002 Academy for Health Services Research and Health Policy Annual Research Meeting, Washington, D.C., June 25, 2002.

Funded Principal Investigator Grants:

Cathryn A. Carroll (PI) and Nicholas Kalaitzandonakes (Co-PI). "Assessing Dynamic Welfare Effects of Transgenic Plant Technology on Pharmaceutical Production." Investigator Initiated Grant. UM-Monsanto Protein Technology Grant Program, 2003, \$166,675, active.

Nicholas Kalaitzandonakes (PI) and Cathryn A. Carroll (Co-PI). "The Economics of Plant-Made Pharmaceutical Supply Chains." Investigator Initiated Grant. UM-Monsanto Protein Technology Grant Program, 2003, 143,590, active.

Cathryn A. Carroll (PI). "Recommendations for Cost-Effectiveness Analysis of Cardiovascular Outcomes in the HOPE Study." Investigator Initiated Grant. Monarch Pharmaceutical, 2000, \$130,625, complete.

Cathryn A. Carroll (PI). "Cost of Prevention Evaluation." Investigator Initiated Instructional Grant. Active Monarch-Wyeth Pharmaceuticals, 2000, \$50,000, complete.

Other Grant Applications Authored:

Cathryn A. Carroll (PI), Yugyung S. Lee (Co-PI), Deepankar Medhi (Co-PI) and Susan R. Santos (CO-PI). "An Integrated Pattern Discovery-System for Healthcare Decision-Making to Reduce Medication Errors," Investigator Initiated Grant. National Science Foundation, \$485,777, scored, not funded.

Cathryn A. Carroll (PI), Yugyung S. Lee (Co-PI), Deepankar Medhi (Co-PI) and Susan R. Santos (CO-PI). "A Hybrid Event Driven Decision Support System for Medication Error Pattern Recognition and Prediction." Investigator Initiated Grant. National Science Foundation, \$493,789, scored (competitive plus), not funded.

Cathryn A. Carroll (PI) and Santos, Susan R. (Co-PI). "Assessing the Impact of Information Technology on the Quality and Efficiency of Care Delivery for Rehabilitation Patients in Southwest Missouri," Investigator Initiated Grant. Missouri Foundation for Health, \$1,919,197, not funded.

Bruning, William L (PI), Cathryn A. Carroll (Co-PI), Christine Rinck (Co-PI), et al. "Rewarding Results for Improved Clinical Quality," Investigator Initiated Grant. Robert Wood Johnson Foundation, \$1,100,000, scored, not funded.

Harold J. Manley (PI) and Cathryn A. Carroll (Co-PI). "Impact of Clinical Pharmacy Service on Medication Cost and Hospitalization Rates in Hemodialysis Patients." Investigator Initiated Grant. Missouri Kidney Program, \$58,347, scored, not funded.

Cathryn A. Carroll (PI). "Evaluating the Cost-Effectiveness of Information Technology in Reducing Inpatient Medication Error Rates." Investigator Initiated Grant. Faculty Research Grant, University of Missouri-Kansas City, \$5,986.40, scored, not funded.

John Spertus (PI), Peter McCullough (Co-PI) and Cathryn A. Carroll (Co-PI). "A Prospective Study on Variations in Healthcare Resource Utilization and Mortality in

Patients with Unstable Angina and Non-Q-Wave MI in Hospital and at Follow-Up.” Investigator Initiated Grant. Pfizer, Inc. \$225,000.

Cathryn A. Carroll (PI), Linda S. Garavalia (Co-PI), Mary L. Hines (Co-PI), Angela V. Bedenbaugh (Co-PI), Antoine Richardson (Co-PI) and Patrick Bryant (Co-PI). “Interactive Pharmaceutical Consultation Series.” Investigator Initiated Grant. The Proctor and Gamble Fund, \$150,000.

Susan R. Santos (PI), Steve Simons (Co-PI), Karen S. Cox (Co-PI) and Cathryn A. Carroll (Co-PI). “Digital Dashboard for Nurse Managers to Reduce Medical Errors.” Investigator Initiated Grant. Agency for Health Care Research and Quality, \$1,025,967.

Carlos W. Poston (PI), C. Keith Haddock (CO-PI) and Cathryn A. Carroll (Co-PI). “Cardiologists as Obesity Managers.” Investigator Initiated Grant. Roche Pharmaceuticals, \$300,000.

Cathryn A. Carroll (PI). Center for Health Economic and Pharmaceutical Research. Investigator Initiated Grant. Federal Earmark Funding, \$3,500,000.

Susan R. Santos (PI), Steve Simons (CO-PI) and Cathryn A. Carroll (CO-PI). “Use of Control Chart Surveillance System to Reduce Employee Injury and Illness. Investigator Initiated Grant.” Investigator Initiated Grant. National Institute for Occupational Safety and Health, \$133,066.

Cathryn A. Carroll (PI). Global Health Leadership Fellowship. World Health Organization, \$72,000.

Cathryn A. Carroll (PI) and John Spertus (CO-PI). “Cost-Effectiveness Analysis of Reopro®” Investigator Initiated Grant, University of Missouri Research Board, \$50,000.

Cathryn A. Carroll (PI). 2000 Faculty Development Award in Pharmacoeconomics. PRMAF, \$120,000.

Supervisory Committee Participation:

Myles Gartland, Ph.D. (Completed May 2003)

TEACHING AMPLIFICATION

University of Missouri-Kansas City

2001-Present Member Graduate Faculties

2002-Present Member Doctoral Faculties

Description of Graduate Courses Taught during UMKC Appointment

Pharm 101 **Introduction to Pharmacy**

An orientation to the profession of pharmacy, including its scope and evolution.

- Pharm 300 **Management Marketing**
Analysis of the process involved in pharmaceutical marketing and management. Operation management and human resources management relevant to the profession of pharmacy is presented.
- Pharm 326 **Evidence Based Medicine I and II**
Skills necessary to assume the role of “drug expert” such as evaluation of the medical literature in an effective and efficient manner so that decisions and problem solving are conducted in a systematic manner.
- Pharm 418P **Directed Individual Rotations in Pharmacy Practice**
Directed individual study for patients interested in learning more about the economics of pharmaceutical markets through an intensive two month research rotation.
- Pharm 484P **Pharmacy Seminar**
Support Pharm.D. Candidate interested in conducting a seminar topic incorporating a clinical and/or health economic component.
- Pharm 497E **Directed Individual Study-Clinical Pharmacy**
Study of a relevant health economic topic of interest to the student.
- Econ 690 **Special Doctoral Readings in Economics**

Description of Undergraduate Courses Taught during UMKC Appointment

- Econ 202 **Introduction to Economics II**
Study of microeconomics, firm analysis, the principles of demand, supply, elasticity, price determination, costs, income distribution, market structures, trade, and other relevant social and economic concepts.
- Econ 302 **Microeconomics Analysis**
Analysis of the functioning of the individual enterprise and households as well as problems confronting business enterprises operating under different types of market situations. Analysis of the influence of prices on factors of production or methods of production. Evaluates the effects of changes in income levels and relative prices on sales of different types of goods and services.
- Econ 465 **The Economics of Health and Medicine**
An economic analysis of the development of medical markets and the structure of the existing health delivery system. The problems of medical

markets are discussed as well as the role of insurance and public policy.

Econ 499 **Special Readings in Economics**
Intensive reading and/or research in health economics.

Description of Undergraduate Courses Taught Other than UMKC:

1996 Economics 520: Intermediate Microeconomics
University of Kansas

Course Evaluations at UMKC:

Course Number and Title	Semester (Enrollment)	Instructor Overall Performance (Scale)
<u>Economics:</u>		
1. Econ 202: Introduction to Economics II	W 2002 (67)	3.90 (4.00 Scale)
	W 2003 (92)	3.70 (4.00 Scale)
2. Econ 302: Intermediate Microeconomics	W 2001 (34)	3.74 (4.00 Scale)
3. Econ 465: Economics of Health and Medicine	F 2001 (34)	4.00 (4.00 Scale)
	F 2002 (67)	4.00 (4.00 Scale)
<u>Professional Pharm. D. Program</u>		
1. Pharm 101: Introduction to Pharmacy	F 1999 (6)	Very Good (Poor-Excellent (P-E))
2. Pharm 300: Management & Marketing	W 2000 (62)	4.72 (5.00 Scale)
	W 2001 (62)	4.69 (5.00 Scale)
	W 2002 (65)	4.52 (5.00 Scale)
	W 2003 (67)	4.86 (5.00 Scale)
3. Pharm 418P: Individual Study	W 2000 (1)	Very Good (P-E)
	W 2001 (2)	Very Good (P-E)

SERVICE AMPLIFICATION

Service to the State and Kansas City Community

- 2003 Member, Community-Wide Health Workforce Steering Committee
- 2002 Economic Advisor, Cost Containment Subcommittee, Missouri Senior Prescription Commission

- 2002 Member, Argus Healthcare National Choice Committee

Member, Argus Healthcare Pharmacy Assessment Committee

2001- Member, Mid America Regional Council Metro Outlook Technical
Advisory Panel

2001-2002 Member, Data Collaborative, Colleagues in Caring

University of Missouri

2000- Reviewer, University of Missouri Research Board (UMRB)

University of Missouri-Kansas City

2003-2005 Member, Budget Advisory Committee

2003 Member, School of Nursing Dean Search Committee

2002-2003 Member, Faculty Teaching Evaluation Committee

2002-2003 Member, Center for the City Advisory Board

2000-2001 Member, UMKC Blueprint Phase II Results Team

2001 Member, UMKC Blueprint Extended Cabinet

2000 Member, UMKC Blueprint G-80

2000 Member, UMKC Great Ideas for the 21st Century Lecture Series.

University of Missouri-Kansas City School of Pharmacy

2003-2004 Delegate, American Association of Colleges of Pharmacy

2002-2003 Alternate Delegate, American Association of Colleges of Pharmacy

2002 Member, Curriculum Committee

2000-2002 Member, Performance Review Committee

2000 Member, Research Day Committee

2000 Member, Drug Information Faculty Search Committee

1999-2000 Member, Scholarship Committee

1999-2000 Chair, Biostatistics Workgroup

National Organizations

- 2003-2004 Chair, School of Pharmacy Relations Committee Diplomat Task Force,
Academy of Managed Care Pharmacy
- 2003-2004 Delegate, American Association of Colleges of Pharmacy
- 2002-2003 Alternate Delegate, American Association of Colleges of Pharmacy

Editorial Appointments:

Reviewer, Clinical Therapeutics, 2001-2002.

Reviewer, Medical Care, 2002.

Reviewer, Value In Health, 2002.

Professional Affiliations:

Current and Active Membership: Academy Health, Academy of Managed Care Pharmacy, American Association of Colleges of Pharmacy, American Economic Association

Past Membership: American Pharmaceutical Association, International Society for Pharmacoeconomics and Outcomes Research, American Society for Health-Systems Pharmacists, American College of Clinical Pharmacy, American Medical Informatics Association, Missouri Pharmacist Association.

Licensure: Registered Pharmacist (Missouri)

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