

## 2007 LDI Pilot Project Awards

### **The Organization of Emergency Medical Services for Improved Public Health**

Principal Investigator: Guy David, PhD, Assistant Professor of Health Care Systems

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### **Service Pathways Used by People with Mental Illness Leaving Jail**

Principal Investigator: Jeffrey Draine, PhD, MSW, Associate Professor Social Policy and Practices

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### **Expectations and Beliefs about Aging-Related Movement Changes**

Principal Investigator: Nabila Dahodwala, MD, Research Assistant Professor of Medicine

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### **Impact of the Medicare Modernization Act on Medicare Part B Drug Utilization and Spending**

Principal Investigator: Jalpa Doshi, PhD

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### **Developing a National Survey of Emergency Physician Knowledge and Attitudes on Regionalization of Emergency Services**

Principal Investigator: Brendan Carr, MD

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### **Evaluation of a Regionalized System of Adult Critical Care**

Principal Investigator Jeremy Kahn, MD

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### **Who is Served and Who is Serving? Race, Health Care, and Health Care Professions Training**

Principal Investigator Amy Hillier, PhD

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### **Forecasting Prescription Drug Expenditures for Medicare Beneficiaries: A Comparison between Econometric and Artificial Neural Network Models**

Principal Investigator Dan Polsky, PhD

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### **The Effect of Pay-for-Performance Hospital Measures on Vulnerable Populations**

Principal Investigator Edmondo Robinson, MD

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### **Selective Adoption: the Case of Surgeons**

Principal Investigator Mark Pauly, PhD

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## 2006 LDI Pilot Project Awards

### **Collaborative Care Pilot Intervention for Children with ADHD**

Principal Investigator: James P. Guevara, M.D., M.P.H., Assistant Professor of Pediatrics

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Attention-deficit/hyperactivity disorder (ADHD) is an important public health concern. Children with ADHD suffer academic difficulties, peer rejection, and family stress. Effective treatment exists for ADHD, yet fragmentation in the mental health system limits coordination of care between schools, mental health agencies, and primary care practices. New models of health care delivery are urgently needed to address the limitations of the current child mental health system. The specific aims of this proposal are to determine the feasibility of 1) study methods to recruit and longitudinally follow a cohort of school-age children with ADHD at urban primary care sites and 2) implementation of an ADHD intervention delivered in an urban primary care practice designed to enhance collaboration among providers and educators. Two primary care practices affiliated with the Children's Hospital of Philadelphia (CHOP) will be recruited to participate. Fifty children with ADHD, identified through electronic health records, will be recruited to participate for a six-month study period. A study nurse will implement the intervention at one site, while the other site will consist of usual care. Caregivers of study children will complete instruments concerning behavioral functioning and satisfaction with ADHD care. Providers will complete instruments measuring collaborative care processes and acceptability of the intervention. Knowledge gained from this pilot proposal can be used to improve CHOP's primary care infrastructure and will be incorporated as preliminary data in future grant applications.

### **Practice-Based Learning through Objective Resident Benchmarking**

Principal Investigator: Theodore J. Iwashyna, M.D., Ph.D., Fellow, Pulmonary and Critical Care Section

Co Investigator: Lisa M. Bellini, M.D., Associate Professor of Medicine, Department of Medicine

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There are growing concerns about a link between conventional graduate medical education and the ongoing quality gaps in American medicine. To remedy this, the Accreditation Council for Graduate Medical Education (ACGME) had mandated

a move from process-based to outcomes-based training; this has created many challenges for medical educators. ACGME's outcomes fall into one of six domains known as core competencies (patient care, professionalism, interpersonal and communication skills, medical knowledge, practice-based learning, and systems-based practice). The latter two competencies have proven difficult to teach and measure. We propose that detailed, statistically reliable, benchmarked measures of utilization and outcomes of inpatient care could be incorporated into the standard feedback that residents receive. This can be done by taking advantage of the real-time electronic administrative databases necessitated by computerized physician order entry and test reporting. Objective benchmarking of resident performance will allow residents to be more effective and efficient physicians. It will prepare them for a future of performance-based reimbursement. By providing objective utilization and outcome data during the formative training period, it enables physicians-in-training to make more conscious choices. Benchmarking offers a novel opportunity to inject objective, statistically valid, practice-level information into an arena notoriously devoid of such information. This pilot project seeks to develop "proof of concept" for implementing objective benchmarking, as a prerequisite for seeking broader funding for a thorough evaluation. That is, we seek to preliminarily develop a set of statistically robust and clinically meaningful objective benchmarks of resident inpatient resource utilization and outcomes.

### **Gender, Race, and the Treatment of Emergent Pain Proposal**

Principal Investigator: Jerry A. Jacobs, Ph.D., Merriam Term Professor; Professor of Sociology

Co Investigators: Stephanie B. Abbuhl, M.D., Vice Chair and Associate Professor, Department of Emergency Medicine; Ann K. Boulis, Ph.D., M.P.P., Department of Sociology

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We propose an interdisciplinary study of how provider gender affects the treatment of emergent pain for three specific conditions: headache, lower back pain, and renal colic or kidney stones. We hypothesize that female providers will treat the pain female patients and racial minorities of both genders more aggressively than male providers because female providers may communicate more effectively with certain groups of patients. This project will take advantage of previously collected data on patient encounters to track the administration of pain medication for patients presenting with the three selected conditions. We focus on the treatment of pain because we believe that there is more legitimate variation in how providers approach the treatment of pain than in how they approach the treatment of other medical conditions. We also suspect that the treatment of pain for these three conditions is more likely to be affected by social factors than the treatment of pain for other conditions. By focusing on the emergency room, we not only extend previous research on pain and primary care provider gender conducted by Weisse and colleagues (2001), we also take advantage of the random assignment of patients and providers. The randomization of patients and providers enables us to conduct this study without controlling for patients' pre-existing pain and thus greatly facilitates data collection. Data on disease severity will be included in the analysis. Thus, the project is uniquely situated to add to previous research on pressing policy related issues with a cost-effective research design.

### **Antibiotic Use and Misuse in Injection-Drug Users: A Potential Risk Factor for Antibiotic Resistant Infections**

Principal Investigator: Joanna L. Starrels, M.D., Robert Wood Johnson Clinical Scholar

Co-Investigators: Joshua P. Metlay, M.D., Ph.D., Associate Professor of Medicine; Frances K. Barg, Ph.D., M.Ed., Assistant Professor of Family Practice and Community Medicine

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Objectives: To investigate patterns of antibiotic use in injection-drug users and to develop a questionnaire to study the indications, sources, and frequency of antibiotic use and misuse in injection-drug users. Background: Infection with antibiotic-resistant organisms such as methicillin-resistant staphylococcus aureus (MRSA) is an important cause of morbidity and mortality in injection-drug users. It is unknown which factors increase the risk of injection-drug users to become colonized with MRSA. One potential risk factor is the frequent use and misuse of antibiotics. Methods: This is a mixed methods study using focus group methods. Questions will address participants' attitudes and behaviors regarding infections and antibiotic use, with attention to how they take antibiotics and the sources of those antibiotics. Focus groups will be transcribed and coded using a Working Coding Scheme (WCS) developed from our preliminary conceptual model and refined through iterative analysis. The WCS will then be used as an analytic tool to identify patterns in the data, answer conceptual research questions, and create a questionnaire to quantify antibiotic use and misuse. Results: A rich understanding of behavior and knowledge about antibiotics in injection-drug users and a questionnaire that can quantify antibiotic use and misuse. Implications: The findings from this project will provide pilot data and a reliable instrument for future research investigating the relationship between antibiotic use in injection-drug users and colonization with antibiotic-resistant bacteria including MRSA. Ultimately, such information can be used to inform interventional programs to improve appropriate access to and utilization of antibiotics for this high-risk group.

### **Measuring the Quality of Care at the VA**

Principal Investigator: Rachel M. Werner, M.D., Ph.D., Assistant Professor of Medicine

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The VA underwent a major reengineering in 1995 to improve the quality of care it provides. This reengineering first improved access to preventative care and, second, initiated performance measurement and feedback. While studies have documented improvements in quality of care since these changes in 1995, it is unclear what the mechanism of improved quality of care was: the improved access to outpatient care, the performance measurement, or both? The purpose of this study is to apply and validate the use of existing measures of outpatient quality of care in the VA. Once validated, these

methods can be applied to a larger, externally funded project studying the mechanism behind the VA's documented improvement in quality of care and compare changes in quality among veterans with changes in quality among Medicare beneficiaries. Specifically, this project will first apply an existing measure of quality of outpatient care (rates of preventable hospitalizations) to VA data. Second, it will identify veterans who are dual-users (veterans who use both VA and non-VA health care) in VA and Medicare administrative data. This is important for comparing unbiased estimates of the impact of performance measurement on quality at the VA and Medicare. Finally, it will explore methods to directly compare rates of preventable hospitalization between the VA and Medicare. The results from this pilot will demonstrate the feasibility of using rates of preventable hospitalizations as measures of quality in the VA. Thus, the results from this project are extremely important on the road to proposing a larger, externally funded proposal to compare changes in quality of care between the VA and Medicare.

## **2005 LDI Pilot Project Awards**

### **Re-Invention and Sustainability in Community-Professional Partnerships**

Principal Investigator: James C. Coyne, Ph.D., Professor of Psychiatry and Family Practice and Community Medicine  
Co-Investigator: John R. Kimberly, Ph.D., Henry Bower Professor of Entrepreneurial Studies; Professor of Management, Health Care Systems, and Sociology

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Background: The European Alliance Against Depression (EAAD) involves dissemination of a 4 level community-professional partnership in 17 regions in order to reduce depression and suicidality on a community basis. Regional partners attract sponsors, identify stakeholders, adapt the project to the larger sociocultural context and local conditions, and must ensure sustainability. The EAAD offers a unique opportunity to learn much that would be directly applicable in re-engineering American efforts to reduce the burden of depression and in developing systematic models of re-invention and sustainability. Objective: To complete groundwork and pilot studies to further the prospects of a large scale project. Groundwork involves selection of a subset of EAAD partnerships for study; establishing capability to meet logistical and methodological challenges of the larger study; and negotiating relationships and establishing an infrastructure. Pilot data will provide preliminary data, refinement of methods and hypotheses, and demonstration of the investigator team's capability and the feasibility of the larger project. Methods: The larger project will be a mixed method, multiple case study. Qualitative interviews will be used to interpret and integrate data concerning milestone achievement and other outcomes generated by the partners. The pilot study involves a formal explanation-building approach to qualitative interviews with key participants, stakeholders, and observers concerning English- and German-speaking regional partners with varying levels of support and stage of implementation. Results: The ground work and pilot project will provide timely contributions to securing specific extramural funding for the more ambitious work of two senior LDI Fellows who have not previously collaborated.

### **Financial Incentives and Choice of Anticancer Therapy: a Natural Experiment Addressing CMS Policy**

Principal Investigator: Patricia M. Danzon, Ph.D., Celia Moh Professor of Health Care Systems and Insurance and Risk Management

Co-Investigator: Scott J. Johnson, Health Care Systems Doctoral Student

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Understanding the role financial incentives play in a physician's choice of technology is of central interest to policy makers. According to CMS' Chief Medical Officer, who spoke at LDI in February 2005, financial incentives for anticancer agents are one of three top priorities for CMS policy review, yet no quantitative analysis has been performed seeking to identify the extent to which financial incentives matter in anti-cancer agent selection. This research uses SEER-Medicare panel data on 150,000 breast, colorectal, or lung cancer patients from 1991 to 2002 to address whether reimbursement for chemotherapy drugs influences choice of drug. Expected financial margin per anticancer drug administration varies significantly across drugs and goes directly to the administering physician. It is also a function of coverage policy, which varies across Medicare carrier jurisdiction and product label. By exploiting variation across Medicare carriers' coverage policies and reimbursement levels for off-label chemotherapeutics, we will test how financial incentives affected physician choice of therapy and patient outcomes. Patterns of use will be estimated with a discrete choice model where the dependent variable consists of the choice set of drugs available to a physician at a point in time. Outcomes differences (i.e., mortality rates) in patients who face different coverage policies will be estimated using a survival model.

### **Estimating the Cost of Capital for Pharmaceutical, Biotechnology, and Medical Device Firms**

Principal Investigator: Scott E. Harrington, Ph.D., Professor of Health Care Systems and Insurance and Risk Management

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The financing, investment, and risk management decisions of pharmaceutical, biotechnology, and medical device firms are fundamentally important to the development and availability of a wide range of treatments to enhance health outcomes and the quality of life. A full understanding of these decisions is also important for the design and administration of government review and approval of new compounds and devices. The proposed pilot study will begin a research agenda that will provide new insight into these decisions by investigating factors that influence the cost of equity capital for publicly-traded pharmaceutical, biotechnology, and medical device firms, a subject that has received very little attention in the literature. Empirical work on this subject and related issues requires detailed data on firms' product portfolios, both for

currently marketed products and products in the development pipeline. Funding of the proposed pilot project will enable acquisition, collection, and analysis of the data needed for this specific project and for a variety of related projects with strong potential for attracting external funding.

### **Repeated-Behavior Protective Measures Model (RBPM): Application to Bicycle Helmet Adherence**

Principal Investigator: Barbara E. Kahn, Ph.D., M.B.A., Dorothy Silberberg Professor of Marketing

Co-Investigator: Mary Frances Luce, Ph.D., Professor of Marketing

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Nationwide approximately twenty-seven million children ages 5-14 ride bicycles regularly. However, only 41% of those children use bicycle helmets while riding, and of those who do use the helmets, 35% use them improperly. Most of the prevention strategies to date have focused on education as to the risks and benefits associated with bicycle helmets. As such many people are aware of the advantages of bike helmets and own helmets, but still do not ensure that their children wear them every time they ride. Educational campaigns have focused on motivating initial compliance and have not focused on the repeated adherence in use every time a child rides. In this research we develop and test a theoretical model, the "Repeated-Behavior Protective Measures Model" (RBPM), that predicts why adherence declines as a function of previous bicycle helmet behavior. Specifically, we hypothesize that declines occur because (1) if there is discomfort or stress involved with wearing of the helmet and an accident does not occur, the perceived efficacy of the helmet diminishes and (2) if a helmet is not used, and an accident does not occur, perceived vulnerability to the threat diminishes. Understanding the causes of adherence declines will allow us to suggest specific strategies and tactics to reverse these declines.

### **Investigating the Relationship Between Measures of Hospital Occupancy and Length of Stay**

Principal Investigator: Scott A. Lorch, M.D., Assistant Professor of Pediatrics

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The impact of hospital occupancy on the outcomes of patients is important for the organization of hospital delivery systems and the quality of inpatient care. This question has been difficult to study because of several unique properties of hospital occupancy and length of stay. Important variables, such as (1) the decision to admit and discharge a patient and (2) daily nurse staffing decisions made in response to overcrowding, are omitted from most studies because standard population-based administrative data do not include enough data to construct these measures. Also, hospital occupancy and length of stay could be determined simultaneously and bias results obtained by conventional regression techniques. The neonatal population, though, offers a potential unique approach to the study of this issue. Using detailed data from Kaiser Permanente hospitals, this project will obtain unbiased measures of the relationship between occupancy and length of stay by (1) including information on daily staffing and severity of illness at discharge not available in most administrative dataset and (2) using various methods to account for simultaneity including time-varying models, instrumental variables, and proxy measures for length of stay. By determining valid measures of hospital occupancy and understanding how hospital overcrowding can affect length of stay, this project will serve as critical pilot data for future projects investigating the ways that hospitals and units adapt to hospital overcrowding and whether overcrowding results in early discharge of neonatal patients.

### **Quality of Nursing Care and Outcomes of Hospitalized Cancer Patients**

Principal Investigator: Julie A. Sochalski, Ph.D., RN, Associate Professor of Nursing

Co-Investigator: Jeffrey H. Silber, M.D., Ph.D., Associate Professor of Pediatrics, Anesthesiology and Health Care Systems; Director, Center for Outcomes Research

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Quality initiatives directed toward nursing have largely centered on assuring adequate nurse staffing nursing levels as the mechanism by which quality of care and outcomes are improved. However, this hypothesis—that increasing staffing levels improves the quality of nursing care and thereby outcomes—remains largely untested. This pilot study takes advantage of an existing and unique data set to determine (1) if higher levels of nurse staffing in hospitals are associated with higher quality nursing care, (2) if higher quality nursing care is associated with improved patient outcomes, and (3) if or how both nurse staffing and quality nursing care contribute to differential patient outcomes. The data set comprises 29,628 surgical cancer patients admitted to one of 162 acute care hospitals in Pennsylvania's from 1998-99 and includes hospital discharge abstracts that have been linked with death records, tumor registry records, annual surveys of hospital characteristics, and survey responses from nurses providing care in these hospitals. This pilot study seeks to build the empirical and conceptual foundation for these hypothesized relationships between nursing and patient outcomes. This foundation will support an NIH proposal that will assess the degree to which racial disparities in outcomes among cancer patients are influenced by nurse staffing levels and the quality of nursing care at the hospitals where they receive care, and the cost-quality implications for minority cancer patients and hospitals of investing in improvements in nursing care.

## **Toward the Strategic Management of Healthcare Resources in the ED to Treat Intimate Partner Violence**

Principal Investigator: Douglas J. Wiebe, Ph.D., Instructor of Epidemiology

Co-Investigators: Elizabeth M. Datner, M.D., Assistant Professor of Emergency Medicine; Michael R. Elliott, Ph.D., Assistant Professor of Biostatistics; Edna B. Foa, Ph.D., Professor of Psychiatry; Therese S. Richmond, Ph.D., M.S.N., Associate Professor of Trauma and Critical Care Nursing; David S. Riggs, Ph.D., Assistant Professor of Psychology in Psychiatry

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The Emergency Department (ED) is one of the few places where victims of intimate partner violence (IPV) have contact with the healthcare system, and can be provided services that may prevent abuse in the future. This issue requires a critical evaluation. Each year approximately 250,000 victims receive ED treatment for IPV-related injuries; in addition, 37% of female and 13% of male ED patients presenting for other medical problems report abuse by an intimate partner in the past year (Abbott et al. 1995, Mechem et al. 1999). Surprisingly, few EDs adhere to an IPV screening protocol and many clinicians do not screen patients (Abbott et al. 1995, Dodge et al. 2002, Morrison 1988). Clinicians cite lack of time and frustration that resources are not available when they do identify victims as reasons for not screening for IPV (Abbott et al. 1995, Morrison 1988). Our concern is this may result in missed opportunities to prevent subsequent abuse. Little is known, however, about how quickly and how often patients are re-abused after ED discharge (Muelleman and Liewer 1998). In this pilot, we propose to enroll a cohort of 20 female and 20 male ED patients with a history of IPV, and measure repeat abuse that occurs after discharge by means of an Interactive Voice Response (IVR) telephone system (Corkrey and Parkinson 2002). This pilot will serve to develop a protocol to be used in the near future in a large-scale study, where goal will be to measure the incidence of IPV that is sustained by patients shortly after being discharge from the ED, and in turn, motivate administrative changes to how healthcare resources are managed in the ED to better care for patient victims of IPV.

## **2004 LDI Pilot Project Awards**

### **Potential Impact of the Medicare Drug Benefit Legislation on Medicare Beneficiaries with Employer-Sponsored Retiree Drug Coverage**

Principal Investigator: Jalpa A. Doshi, Ph.D., Health Services Research Scientist

Co-Investigator: Daniel E. Polsky, Ph.D., M.P.P., Research Associate Professor of Medicine

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The passage of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA, P.L. 108-173) has created unintended incentives for employers to drop or scale-back retiree drug benefits. This project aims to explore the net effect of the new drug legislation on Medicare beneficiaries who currently have employer sponsored retiree-drug coverage. Using the Medicare Current Beneficiary Survey (MCBS) Cost and Use Files we will first examine the total prescription spending patterns (including share paid out-of-pocket and share paid by employer) among Medicare beneficiaries with employer-sponsored drug coverage stratified by their socioeconomic and health characteristics. Next, holding total drug spending constant we will model how the share paid by beneficiary, by employer, and by Medicare would vary under a set of plausible scenarios of how employers will change retiree drug benefits when the Medicare Part D coverage begins. Lastly, we will explore how a reduction in drug coverage generosity could potentially impact medication use and hence quality of care among retirees. Our long term goal is to examine the effect of change in drug benefit policy on drug use and health outcomes of Medicare-eligible retirees.

### **Using Operative Time to Estimate Unobserved Severity**

Principal Investigator: Jeffrey H. Silber, M.D., Ph.D., Associate Professor of Pediatrics, Anesthesiology and Health Care Systems; Director, Center for Outcomes Research

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When comparing hospitals one often is faced with selection bias, which may lead to differences in unobserved severity. This project aims at using surgical operative time as a tool to explore the extent of selection bias in Medicare claims studies and as a test of our ability to reduce unobserved severity. We propose to take advantage of a natural experiment that occurs when the same surgeon has operating privileges at more than one hospital. We will compare the operative time for the same surgeon across different hospitals, adjusting for patient characteristics and procedure. Data will be from all Pennsylvania Medicare patients undergoing general surgery and orthopedic procedures in 1995 and 1996. The null hypothesis is that there should be no difference in operative time within the same physician across different hospitals. The alternative hypothesis is that there is a significant difference. Rejecting the null hypothesis suggests inadequate severity adjustment or unobserved severity. Furthermore, should we detect differences within surgeons across hospitals, we can then use that measure as a method to estimate the extent of unobserved severity associated with operative time. Should there be no difference, we could use this information to conclude that there is little evidence for unobserved severity in the standard model using Medicare data. The analysis will include a standard and Bayesian approach, with and without inclusion of hospital fixed and random effects. This work has the potential to greatly influence state-of-the-art methodology associated with hospital comparisons, and provides a basis for postoperative failure-to-rescue severity adjustment.

### **Economic Consequences of Technology Acquisition in the Veterans Health Administration**

Principal Investigator: Peter W. Groeneveld, M.D., M.Sc., Assistant Professor of Medicine

Co-Investigator: Mark V. Pauly, Ph.D., Bendheim Professor and Chair, Department of Health Care Systems

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The costs of acquiring major new medical technologies and procedural capabilities by Veterans Health Administration (VA) medical centers, including both initial and downstream capital and labor costs, have not been previously quantified. These costs and/or perceptions of these costs are likely to greatly influence VA policymakers making decisions about the acquisition of major new medical technologies. We will use the VA's recently-developed Decision Support System (DSS) cost database to assess the costs incurred by VA medical centers after the adoption of selected new medical and surgical procedures during 1999-2003. The DSS is a comprehensive, national VA database that contains clinical and patient demographic and utilization data at the patient-encounter level with direct and attributable indirect local labor and capital costs derived from VA accounting databases. "Difference-in-difference" multivariate regression models controlling for age, sex, race, clinical comorbidity, and hospital characteristics will be constructed to compare the costs of care at centers that acquired new medical technologies compared to centers that did not innovate, among patients who were potential candidates for new procedures. This pilot study will validate the use of the DSS for quantifying the cost of innovation in the VA, measure the variation in the cost of innovation among VA medical centers, and examine the relationship between acquisition cost and service availability, particularly for historically vulnerable populations. Results of this study will serve as the basis for a future, comprehensive proposal examining the cost, cost-effectiveness and health care equity consequences of VA medical technology acquisition.

### **Cancer-Related Information Seeking and Scanning Behaviors among Vietnamese Immigrants**

Principal Investigator: Robert C. Hornik, Ph.D., Professor of Communication

Co-Investigator: Giang T. Nguyen, M.D., M.P.H., Clinical Instructor and Research Fellow, Department of Family Practice and Community Medicine

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Cancer prevention/screening is integral to health, but disparities exist between immigrants and the general population. Asian American/Pacific Islander (AAPI) immigrants are at risk for missing public health messages due to language, poor access to care, and their misperception as a model minority. Little is known about how immigrant AAPI's obtain health information. In order to create mass media public health efforts that will reach this population, it is important to understand the context in which AAPI immigrants view potential sources of information. OBJECTIVE: To characterize attitudes/behaviors regarding cancer-related health information from the perspective of Vietnamese immigrants, and compare that to parallel information gathered from a general population sample. DESIGN: Qualitative study; semi-structured interviews in the native language of participants (Vietnamese immigrants recruited at community sites and primary care offices); purposeful sampling to ensure diversity of sex, region of origin, year of immigration. Thirty 1-hour interviews will be conducted concerning sources of information about health (colon/breast cancer, specifically); what sources are trustworthy/relevant; and how respondents link information sources to their behavior. Interviews will be transcribed/translated into English and then coded using NUD\*ist software. Grounded theory will be used for analysis. At completion, a set of themes and specific items will be generated in order to create a model to understand better the relationship between public information sources and cancer-related attitudes and behaviors among Vietnamese immigrants. Future work will include development of large scale quantitative studies of information searching behaviors in this population as well as comparative studies with the general population.

### **Child Maltreatment and Mental Health Disorders Among Detained Adolescent Girls: A Pilot Study**

Principal Investigator: Donald F. Schwarz, M.D., Mary D. Ames Associate Professor of Pediatrics; Chief, Division of Adolescent Medicine

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Research findings have shown that adolescent girls detained in juvenile justice facilities have significantly higher rates of both mental disorders and histories of childhood maltreatment than their counterparts in the community at large. The proposed study has two aims, both of which are necessary steps toward implementing a more comprehensive future study of mental health prevention and intervention strategies for incarcerated adolescent girls. The first aim is to carry out a pilot study of methods and procedures for the study of sensitive personal information concerning self-reported histories of child maltreatment. The second is to collect descriptive data on mental disorders and child maltreatment necessary for calculating effect sizes for a future study. A cross-sectional survey of 35 adolescent girls detained at the Youth Study Center (YSC) in Philadelphia will be interviewed. A trained interviewer will administer a face-to-face psychiatric diagnostic questionnaire to consenting respondents. Subsequently, respondents will complete an audio computer-assisted self interview (ACASI) designed to elicit personally sensitive information about child maltreatment. Statistical analyses will be descriptive. Information developed as a result of the proposed research will be incorporated into a future comprehensive research proposal aimed at developing interventions for this population. The envisioned long-term study will build on the findings we expect from the proposed study, including an understanding of the dynamics of computer-assisted interviewing for collecting data on child maltreatment and a preliminary assessment of the association between types of childhood maltreatment and mental health disorders.

## **2003 LDI Pilot Project Awards**

### **The Value of Choice in Insurance Purchasing Decisions**

Principal Investigator: Jonathan Baron, Ph.D., Professor of Psychology

Co-Investigator: Helena Szrek, Health Care Systems Doctoral Student

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How much is choice worth to people when they are purchasing insurance? Do employees value having a wider selection of plans to choose from and are they willing to pay for choice? In standard economic theory, the main benefit of choice is that individuals can make the trade-offs that most suit their needs. Thus, consumers ought to be willing to pay more when choice enables them to receive better outcomes. This study investigates whether there are other ways in which choice may have value or affect individual outcomes. In particular, we ask: do individuals value the chosen outcome more when it is offered as a choice? If individuals are choosing between insurance plans A and B, A may have more value than when it is presented alone. Furthermore, if a choice-frame leads to a higher valuation of a product, this could lead to higher enrollment in insurance plans. Preliminary evidence indicates that choice significantly affects value. We recruited subjects via the internet to test our hypotheses. Individuals were randomized across choice and no-choice conditions. We asked individuals how much they were willing to pay and how likely they were to enroll in different insurance plans. Comparing across conditions for each of several hypothetical policies, choice increased the value of the plans ( $t=2.52$ ,  $p=.0126$ ) supporting our hypothesis. Enrollment was higher in the conditions where individuals were presented more than one plan, whether or not they had choice.

### **Nurse Staffing, Clinical Expertise and Patient Safety**

Principal Investigator: Eileen Lake, RN, Ph.D., Assistant Professor of Nursing

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To better understand why patient outcomes vary across hospitals, researchers have examined the effect of nurse staffing on patient outcomes, such as complications and mortality. Differences in nurses' clinical expertise have not been studied, however, for lack of suitable measures. The principal investigator developed the Clinical Nursing Expertise Survey (CNES) as part of a program of research that delineates the mechanisms whereby nursing influences patient outcomes. The proposed study examines the relationships among nurse staffing, clinical nursing expertise and patient adverse events (patient falls and pressure ulcers). A prospective cross-sectional observational design will be used to study staff nurses and patients on 60 acute care nursing units in three community hospitals. This study will establish the feasibility of an innovative 25-hospital data collection procedure involving web-based nurse surveys matched to detailed patient adverse event reports at the level of the nursing unit. The CNES will also undergo psychometric refinement with this large, diverse sample of nurses. The products of this study are: an efficient data collection protocol based on pilot testing, enhanced understanding of the effect of nursing expertise on patient safety; a refined, generalizable instrument measuring nursing expertise; and data for use in preliminary studies for an R01 submission to the National Institute of Nursing Research.

### **The Impact of CABG Report Cards on Racial Disparities**

Principal Investigator: Mark V. Pauly, Ph.D., Bendheim Professor and Chair, Health Care Systems Department

Co-Investigator: Rachel M. Werner, M.D., Health Care Systems Doctoral Student

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Racial and ethnic disparities in quality of health care are well documented and reducing disparities has become an important research priority. One area that has not been well researched is the impact of "report cards" on health disparities. In Pennsylvania, the quality of surgeons and hospitals has been published for over a decade. On one hand, these report cards may have improved the overall quality of care for CABG patients and could potentially have a greater impact on the quality of care for groups that have historically experienced poor outcomes, such as racial and ethnic minorities. On the other hand, CABG report cards may have led to selection effects whereby cardiac surgeons preferentially treat healthier patients over sicker patients, and racial and ethnic minorities are often perceived as sicker than white patients. Finally, CABG report cards may be differentially used by persons of higher SES. As racial and ethnic minorities have lower SES on average, this could increase outcome disparities. Because of these competing effects, the impact of CABG report cards on the health care of racial and ethnic minorities is ambiguous. We propose to study the impact of CABG report cards on treatment of racial and ethnic minorities by high quality surgeons and hospitals in the state of Pennsylvania. Using Pennsylvania discharge data, we will study the sorting of patients by race and ethnicity to high versus low quality surgeons and hospitals. The results of this study could impact future interventions reducing racial and ethnic disparities in health care.

### **Adoption and Diffusion of Medical Innovation: Development of a New Analytical Approach**

Principal Investigator: J. Sanford Schwartz, M.D., Professor of Medicine

Co-Investigators: Mark V. Pauly, Ph.D., Bendheim Professor and Chair, Health Care Systems Department; John R.

Kimberly, Ph.D., Henry Bower Professor of Entrepreneurial Studies; Professor of Management, Health Care Systems, and Sociology

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Background: The appropriate adoption (and disadoption) and diffusion of medical innovation is central to the practice of high quality, cost-effective medical care. The gap between knowledge and practice - that many "good" innovations simply do not diffuse far enough or fast enough - frequently is cited as a major problem facing U.S. health care. Objective: The

objective of the proposed pilot study is to develop the methodologies, collect pilot data and refine the hypotheses required to develop conduct a comprehensive examinations of the adoption, disadoption and diffusion of medical innovations across clinical domains, specialties, categories of innovations and time. The pilot study will focus on: identifying innovations in cardiovascular disease; assessing their rate and degree of diffusion, the importance (from multiple perspectives), of facilitating and inhibiting factors, and the appropriateness of diffusion; and refining and assessing the relative strengths and weaknesses of alternative methodological approaches. Methods: (1) Critical review of the literature; (2) Conduct of a series of focus groups and in-depth interviews with key technology decision makers (physicians, hospital, payers, patients); (3) Design, conduct and analysis of a pilot survey of general internal medicine, family medicine, general and interventional cardiology and cardiovascular surgeon physicians. Results: Beside the insights provided and resulting publications, successful completion of the proposed pilot project will inform and guide development of a grant proposal of a more comprehensive multi-disciplinary examination of a broader set of medical innovations, while stimulating creation of an active multi-disciplinary medical innovation working group of LDI investigators.

### **Financial Incentives for Smoking Cessation**

Principal Investigator: Kevin Volpp, M.D., Ph.D., Assistant Professor of Medicine

Co-Investigators: David A. Asch, M.D., M.B.A., Robert D. Eilers Professor of Medicine, Health Care Management and Economics; Caryn E. Lerman, Ph.D., Mary W. Calkins Professor; Andrea D. Gurmankin, M.A., Psychology Doctoral Student

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Smoking cessation programs have been associated with increasing quit rates but are underutilized. An estimated 70% of smokers want to quit smoking, but quit rates hover at around 5% per year. In this pilot study, I propose to use financial incentives to test a.) whether modest financial subsidies are effective in increasing enrollment in and completion of smoking cessation, b.) whether increasing enrollment in smoking cessation using financial incentives leads to higher quit rates; c.) the degree to which financial incentives to attend smoking cessation are cost-effective and possibly even cost-saving; d.) which patient characteristics (personal health history, personal motivation, time preferences, personal perception of risk) predict response to incentives and enrollment in and completion of smoking cessation classes. This study will provide the basis for developing a larger scale externally funded project that will test different types of financial incentives to determine the best structure and the cost-effectiveness of different types of incentives programs. Funds are requested from LDI to supplement existing pilot project funding from CHERP and the Tobacco Use Research Center for staff support to complete the pilot data collection and analysis.

## **2002 LDI Pilot Project Awards**

### **Social Capital, Income, Inequality and Health Disparity**

Principal Investigator: Li-Wei Chao, M.D., Ph.D., Assistant Professor of Anesthesia and Health Care Systems

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Health disparities between different socioeconomic groups have existed for centuries, and questions about their causes and remedies have come to the forefront of health policy debate. Disparities in healthcare delivery and in access interact in complex ways with behavioral, environmental, and societal-wide factors. The term "social capital" has been loosely coined to include the network of societal institutions and relationships that together have a positive influence on the function of communities and individuals. This pilot project (1) tries to study the health impact of personalized social capital (measured by a person's access to social networks, family, and friends), economy-wide social capital (measured by the geographic-specific levels of civic engagement, trust, and helpfulness), and their interactions with each other as well as with socioeconomic status, (2) tries to study the impact of these social capital measures on contemporaneous health and on future mortality, (3) tries to settle the debate about the health impact of income inequality, (4) helps identify specific behavioral and social determinants of health which intermediate between socioeconomic status and health to result in the health gradient, and (5) tries to identify vulnerable population subgroups that are most likely to suffer negative health consequences from low levels of social capital.

### **International Comparison of Vaccine and Drug Procurement**

Principal Investigator: Patricia M. Danzon, Ph.D., Celia Moh Professor of Health Care Systems and Insurance and Risk Management

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Vaccines are among the most cost-effective means of reducing morbidity and mortality in both developed and developing countries. However in the US there are major concerns about pricing and procurement mechanisms, the supply of existing vaccines and number of vaccine producers; in LDCs, concerns relate to prices and late access to existing vaccines and low R&D effort to develop vaccines for malaria, HIV-Aids and other LDC diseases. This project will provide a detailed review of procurement policies for vaccines and essential drugs in the US, the UK, several LDC governments and non-government organizations (NGOs) such as UNICEF. We will review academic literature on procurement, including theoretical analyses and evidence from other industries, and proposed procurement processes for the Global Fund. The analysis of these processes will assess their likely effect on prices to suppliers and patients; promptness of access; product quality; incentives for future R&D; and competition in the vaccine/drug supply industry. The empirical analysis will use data on prices and quantities, number of suppliers etc. for a subset of procurement programs, to test hypotheses and

draw conclusions about welfare effects. The review of the theory and evidence on procurement processes, combined with the pilot data analysis, will provide the groundwork for a larger grant application to study the design of coordinated push (supply-side subsidies) and pull (demand-side subsidies), especially procurement, to encourage the development of new vaccines and sustainable supply. These findings should be relevant to both industrialized and developing countries.

### **Evaluation of APR-DRG as a Method of Risk Adjustment for Inpatient Pediatric Care**

Principal Investigator: Henry A. Glick, Ph.D., Assistant Professor of Medicine

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Pediatric studies that use mortality as a measure of quality of care have been limited by an inability to adjust for severity of illness. The All Patients Refined Diagnosis-Related Groups (APR-DRG) uses pediatric discharge data for the classification of DRG groups, severity of illness, and mortality risk. No evaluation of APR-DRG has been performed on pediatric inpatients. The goal of this study is to examine the ability of the APR-DRG system to predict the risk of mortality and resource use for pediatric inpatients. The specific aims of this study are to: 1) Assess the criterion validity of the APR-DRG system for predicting mortality in pediatric inpatients, and 2) Assess the ability of the APR-DRG system to predict resource use based on severity of illness in pediatric inpatients. We will test the discriminative ability of the APR-DRG risk of mortality classification using ROC curves, and the calibration of the system using the Hosmer-Lemeshow chi-squared statistic. We will test the relationship of the APR-DRG severity of illness classification to the hospital cost using correlation coefficients and linear regression. If the APR-DRG is a valid predictor of risk of mortality and resource use, then it will be used for risk adjustment in a larger study measuring the quality of care, cost, and cost-effectiveness provided by different types of hospitals to a large population of pediatric inpatients. A valid risk adjustment method for pediatric inpatients will strengthen the grant application for the larger study and increase the likelihood of its funding by AHRQ.

### **Physician Learning and Best Practice Adoption: An Application to Cesarean Sections**

Principal Investigator: Sean Nicholson, Ph.D., Assistant Professor of Health Care Systems

Co-Investigator: Andrew Epstein, M.P.P., Health Care Systems Doctoral Student

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Small area variation studies have demonstrated that people receive a substantially different amount of medical care depending on where they live, controlling for differences in prices, income, and health. One explanation for why physicians in different markets appear to have such divergent views regarding the efficacy and appropriateness of medical care is that physicians learn from their peers, and may ultimately imitate their peers' behavior rather than using their own information. We test a model of physician learning using a data set that contains the universe of hospital admissions in Florida over a 9-year period and consistent physician identifiers that allow us to characterize a physician's practice and his peer group. Specifically, we examine the extent to which an obstetrician's c-section rate, adjusted for patient characteristics, is affected by his peer group's c-section rate. Physicians appear to have distinct and persistent styles of care; there is considerably more variation in the mean c-section rate across physicians within a region than there is between regions. We find evidence that physicians respond to the practice style of their peer physicians, but this effect is fairly small. These results are consistent with physicians forming their medical styles in residency training and adhering to those styles rather than imitating a local standard, such as the average treatment rate among a physician's colleagues. If so, this would indicate that herding behavior is not the primary cause of the large inter-regional variation in the c-section rate.

## **Malpractice Premiums and the Supply of Obstetricians**

Principal Investigator: Daniel E. Polsky, Ph.D., M.P.P., Research Assistant Professor of Medicine

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Policy makers are especially concerned about the availability of obstetrical services because of the well-established link between comprehensive obstetric care and both maternal and infant health. Research suggests that women residing in communities with limited numbers of obstetrical service providers receive less prenatal care and implies that they may ultimately be at risk for inadequate services during delivery. There is a sizeable literature investigating the relationship between obstetrical service providers and physician liability. Much of this research suggests that obstetricians, who are faced with exorbitant malpractice premiums, have an increased risk of limiting their practices to gynecology or withdrawing from clinical medicine completely. However, while the research on malpractice is informative, the literature is somewhat conflicting. The one study which focuses on physician behavior rather than physician intentions fails to find a relationship between the level of increase in liability insurance between 1980 and 1989 and the likelihood of discontinuing obstetric practice. We propose to address the gap in the literature by conducting an analysis of the relationship between malpractice premiums and the supply of obstetrical service providers. Our analysis will rely on data from the AMA Masterfile, health care market data from the Area Resource File and physician liability data from the Medical Liability Monitor. We will create a subset for the 1991 and 2001 AMA file that included active physicians whose primary specialty fell into the broad category of obstetrics-gynecology. We estimate that there are approximately 35,000 physicians who would qualify for this subset. The analysis will have two phases. First, we will estimate multivariate regression models to examine the change between 1991 and 2001 in the number of FTE generalist and specialist physicians practicing in 316 Metropolitan Statistical Areas in the U.S. The purpose of the analysis will be to determine how the effect of the level and rate of growth in malpractice premiums influenced the changes in the number of FTE physicians. Then, we will assess how malpractice premiums relate to the odds that any specific obstetrician-gynecologist will eliminate obstetrical services from his or her practice.

## **2001 LDI Pilot Project Awards**

### **Determinants of R&D Success in Biotech and Pharmaceuticals**

Principal Investigator: Patricia M. Danzon, PhD, Celia Moh Professor of Health Care Systems and Insurance and Risk Management

Co-Investigator: Sean Nicholson, Ph.D., Assistant Professor of Health Care Systems

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The purpose of the proposed research is to develop empirical estimates of how characteristics of biotech and pharma firms affect the likelihood and timing of success in developing new drugs. Previous studies of pharmaceutical R&D have reported overall industry-wide average estimates of success rates of drug candidates, based on data from a subset of large pharma firms in the 1980s. Our research will use more recent, time series data (1990-1999) for the universe of biotech and pharma companies. We will estimate overall average success rates and examine how success rates and length of R&D are influenced by firm and product characteristics. Specifically, we will use multivariate analysis to estimate specific hypotheses related to economies of scale and scope in biotech/pharmaceutical R&D; evidence of learning for small firms; values of alliances between firms; and differences between biotech and large pharma firms. This research will be of interest in its own right but will also serve as input to future projects in which we plan to examine alliances and deals between biotech and pharma firms, specifically focusing on the efficiency of the market for such deals.

### **Neonatal Screening for Medium-Chain Acyl CoA Dehydrogenase Deficiency by Tandem Mass Spectrometry: A Cost-Effectiveness Analysis**

Principal Investigator: Henry A. Glick, Ph.D., Health Economist, Division of General Internal Medicine

Co-Investigators: Edward Kaye, M.D., Chief, Section of Biochemical Genetics; Charles P. Venditti, M.D., Ph.D., Human Genetics Fellow

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Inborn errors of metabolism (IEM) represent common genetic diseases in humans and have a cumulative incidence of approximately 1 in 1,500 births. As recently as three decades ago, many of the disorders were lethal or associated with significant morbidity, but now they are routinely diagnosed and treated with special diets and vitamin or cofactor supplementation. Tandem mass spectrometry (MS) is an analytical chemical method that can be used to detect abnormal metabolites and identify individuals with aminoacidopathies, some organic acidemias, and fatty acid oxidation defects. A pilot study using tandem MS to analyze plasma derived from blood on almost one million newborns has been performed by Neo Gen Screening, Inc., and the results suggest that this technology may represent the most effective tool yet described for population-based screening for newborn errors of metabolism. However, because there are no laws mandating such screening be offered to all newborns and this technology has inherent expenses, it is not offered to all babies born in the US. The proposed study will examine the feasibility of mass screening for one of the most common metabolic disorders, medium-chain acyl coenzyme A dehydrogenase deficiency (MCAD), via cost-effectiveness analysis. MCAD is a common and potentially lethal disorder of fatty acid metabolism that can be treated easily with alterations in the diet and vigilant care during intercurrent infections in early childhood. We will develop a decision-analytic model incorporating both costs and effects of treatment for a cohort of patients diagnosed over the past thirty years at Children's Hospital of Philadelphia. This analysis will assess the addition of the MCAD test into Pennsylvania's current screening

program, and the results should provide an unbiased perspective useful in the development of state and national legislation related to population screening for inborn errors of metabolism by tandem MS.

### **The Impact of Health Care Services on Life Expectancy Differentials between Men and Women: A Cross-Sectional International Comparison**

Principal Investigator: Jean H. Lemaire, Ph.D., Professor of Insurance and Actuarial Science

Co-Investigator: Narumon Saardchom, Insurance and Risk Management Doctoral Student

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This project will use spatial regression techniques to analyze life expectancy differentials between males and females, to determine to what extent health care services contribute to the widening gender gap. Studies of life expectancies are usually longitudinal, tracking the evolution of the female advantage over time in one country. This research will be cross-sectional: we will collect data from over 165 countries, and perform a regression study that explicitly accounts for spatial correlation between neighboring regions. Over fifty explanatory variables will be tested, measuring behavior (smoking prevalence, for instance), the degree of economic modernization (passenger cars, illiteracy rate), social/cultural/religious beliefs (divorce rate, children per woman) and the quality of health care (hospital beds, infant mortality, immunization rates). Selection techniques of regression analysis will be applied to select a unique model, maximizing the explanatory power of the regressors. The model will enable us to: 1) Forecast the evolution of the female advantage in each country. This directly affects many social and demographic factors such as chances of marriage, expected duration of widowhood, financial security of social security systems, construction of actuarial tables, and structure of health care insurance; 2) Measure the importance of the quality of health care in survival rates. This might provide answers to health care public policy questions such as: (i) Is it more efficient to devote limited resources to a vast immunization program, or to increase the number of physicians? (ii) Will a reduction in the female illiteracy rate affect the improvement in life expectancies more than an extension of the hospital network?

### **Influence of Hypertension Research on Clinicians' Practices**

Principal Investigator: Peter A. Ubel, M.D., Assistant Professor of Medicine

Co-Investigators: Scott D. Halpern, M.D., Ph.D., Fellow, Center for Clinical Epidemiology and Biostatistics; Raymond R.

Townshend, M.D., Associate Professor of Medicine

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**Background:** Despite tremendous advances in outcomes research, the translation of the knowledge gained into improved clinical care has been poor. The pharmacologic management of hypertension is emblematic of this broader problem. Physicians' reluctance to incorporate the results of clinical trials of antihypertensive agents into their practices may stem largely from: 1) their dissatisfaction with the value of the information provided by standard placebo-controlled trials of novel agents, and/or 2) their concerns regarding the ethical propriety of such trials. **Objectives:** To determine physicians' views regarding the morality, value, and potential influence of different types of clinical trials of antihypertensive agents. **Methods:** We will conduct a national mail survey of cardiologists, nephrologists, and primary care providers, identified by a stratified random sample of the American Society for Hypertension's and American Medical Association's mailing lists. Each of two randomly assigned survey versions will assess physicians' willingness to enroll hypertensive patients in placebo-controlled trials of novel antihypertensives, physicians' views regarding the ethics of such trials, and the trial characteristics most important in influencing physicians' prescribing practices. We will determine the validity and reliability of these instruments, use several means of optimizing the survey response rate, and assess the potential for non-respondent bias. **Discussion:** This survey study should improve our understanding of physicians' views on the utility and appropriateness of randomized trials of novel antihypertensive agents. Such insights should help identify interventions likely to improve the translation of clinical research into clinical care, and provide empirical support for the ethical problems associated with placebo-controlled trials of antihypertensive agents. The data will also provide a strong foundation from which we may garner external support to more deeply investigate these issues in relation to other diseases.

## **The Impact of Progression on Health Utilities**

Principal Investigator: Andrew D. Siderowf, M.D., Assistant Professor of Neurology

Co-Investigator: Peter A. Ubel, M.D., Assistant Professor of Medicine

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To obtain utilities for cost-effectiveness analyses, healthy individuals are often presented with vignettes describing expected health outcomes. One area of controversy in this process is whether utilities should be captured using generic or disease-specific descriptions. In neurodegenerative diseases like Parkinson's Disease (PD), progression is an important disease-specific factor that may not be included in generic health state descriptions. For example, when evaluating the utility of mild PD, people familiar with the disease might consider the likelihood that symptoms will progress, and provide lower utilities than would have occurred solely based on the provided description. By contrast, description of a similarly disabling "unspecified" disease might yield higher utilities, because people do not assume the illness will progress. Our aims are to determine if utilities for PD are lower than utilities for similarly severe generic diseases, and if the difference is due to the disutility of disease progression. We propose to develop four vignettes, describing progressive and static health states in both generic and disease-specific cases, and to present these vignettes to a general population sample. Responses will be analyzed to determine how disease-specific information influences utilities, and what fraction of the effect is due to the disutility of the disease progression.