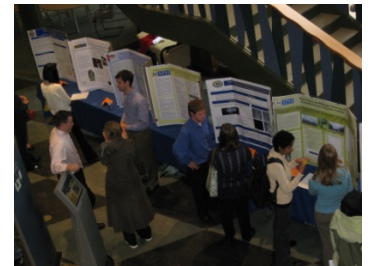


University of Michigan School of Public Health Department of Epidemiology



Sixth Annual Doctoral Program Day
Friday, February 5, 2010

Acknowledgements

Welcome to the Department of Epidemiology's Sixth Annual Doctoral Program Day!

This annual event is intended to provide an opportunity to share the diverse research-related activities engaged in by our doctoral students in a forum resembling a national conference. Many of our doctoral students will be presenting a poster or giving a talk demonstrating the depth and breadth of research conducted in our doctoral program.

We will also hear from two distinguished alumni of the program: Justin Cohen and D. Rebecca Prevots. We thank them both for their generous participation.

We would also like to welcome prospective doctoral students to the University of Michigan and the School of Public Health.

~The Doctoral Program Committee

SIXTH ANNUAL

EPIDEMIOLOGY DOCTORAL PROGRAM DAY FRIDAY, FEBRUARY 5, 2010

- 8:00-8:30am Continental Breakfast

(1680 SPH I, Community Room)

- 8:30-8:40am Greetings & Introductions

(1680 SPH I, Community Room)

- ◆ Hal Morgenstern, Chair, Epidemiology Doctoral Committee

- 8:45-10:25am Alumni Presentations

(1690 SPH I, Lane Auditorium)

- ◆ Justin M. Cohen, PhD, Clinton Foundation
- ◆ D. Rebecca Prevots, PhD, National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health

- 10:30-12:25 pm Doctoral Student Oral Presentations

(1690 SPH I, Lane Auditorium)

- ◆ Elsie Grace, 4th year student, Advisor-Allison Aiello
- ◆ Flojaune Griffin, 3rd year student, Advisor-MaryFran Sowers
- ◆ Ian Spicknall, 5th year student, Advisors-Joseph Eisenberg, James Koopman



- 12:30-1:30pm Lunch (1680 SPH I, Community Room)

- 1:30 - 3:00pm Poster Session (SPH I Lobby)

- 1:30-5:00pm Meetings with Faculty

- SPH Tours at 2pm and 3pm by appointment

WELCOME PROSPECTIVE DOCTORAL STUDENTS,
CURRENT STUDENTS & EPIDEMIOLOGY FACULTY!

2009-2010 Guest Alumni Speakers

Justin M. Cohen, PhD



Dr. Justin M. Cohen is Malaria Research Lead at the Clinton Health Access Initiative (CHAI) in Boston, MA. He also oversees the work of the Initiative's Center for Strategic Health Operations Research in East Africa and Southeast Asia, which seeks to inform decision-making about health systems and treatment programs in resource-limited settings through resource planning and allocation, forecasting of funding and commodities, and development and application of pragmatic tools and models.

In his role at CHAI, Justin applies geographic information systems, mathematical models, and statistical analyses to help policy makers and program managers develop optimal strategies for prevention and treatment of malaria. He is currently working to produce quantitative guidance for countries contemplating malaria elimination, including advising the government of Zanzibar on the feasibility of interrupting transmission and preventing reemergence, assessing the potential for a global subsidy to improve access to effective malaria treatment, and devising new methodologies for global forecasting of malaria drugs and diagnostics.

He earned his doctorate in Epidemiological Science from the University of Michigan in 2007. His dissertation examined the landscape epidemiology of malaria transmission in the western Kenyan highlands. He also earned his MPH in International Health from UM SPH in 2004, for which he analyzed determinants of household infestation by vectors of Chagas Disease in a rural Mexican village. Justin was a Rackham Graduate School Predoctoral Fellow, a UM Regents' Fellow, and recipient of a UM SPH Dean's Award and the Jan L. DeVries Scholarship for Excellence in International Health. As an undergraduate, Justin majored in molecular, cellular, and developmental biology at Yale and studied tropical biology in Costa Rica with the Organization for Tropical Studies.

Justin lives in Cambridge, MA with his wife, Dr. Sharon Greene, an epidemiologist at Harvard Medical School, who also earned her PhD and MPH at Michigan.

D. Rebecca Prevots, PhD



Dr. D. Rebecca Prevots heads the Epidemiology Unit in the Laboratory of Clinical Infectious Diseases within the Division of Intramural Research of the National Institute of Allergy and Infectious Diseases of the National Institutes of Health. The mission of the group is to lead and support epidemiologic research in infectious diseases through application of population based methods to generate and test hypotheses related to selected infectious diseases. The approaches include 1) analysis of national morbidity and mortality datasets; 2) integrated analysis of clinical and microbiologic data; 3) design of clinical and population-based studies; 4) incorporation of tools of molecular biology and genetics into population based studies to identify markers of diseases susceptibility and progression. Dr. Prevots' current research is focused on tuberculosis and nontuberculous mycobacteria, but also includes projects related to the genetic diversity of *N. meningitidis* in Brazil.

Dr. Prevots received her MPH (1988) and PhD (1991) from the University of Michigan. Upon completion of her PhD she joined the Epidemic Intelligence Service (EIS) at the Centers for Disease Control and Prevention, assigned to the Division of Immunization. She was responsible for surveillance and research related to vaccine preventable disease, and was active in the Global Polio Eradication Program. From 1993-1996 she was an investigator in the Division of HIV/AIDS prevention, where she conducted studies of prevalence and incidence of HIV in selected populations in the United States. She returned to the National Immunization Program in 1996, where she led the research and surveillance efforts for the historic policy change in 2000 from the oral poliovirus vaccine (OPV) to the injectable poliovirus vaccine (IPV). From 2000-2002 Dr. Prevots was assigned to the Brazil office of the Pan American Health Organization (PAHO), where she provided technical support to the Ministry of Health for measles elimination and rubella control activities. In 2003 Dr. Prevots joined NIAID as an epidemiologist and has headed the epidemiology group since 2006. She lives in Washington DC with her 5 year old twin boys Reuben and Gabriel.

Doctoral Student Oral Presentations

1. **Elsie Grace (4th year, Advisor: Allison Aiello)**
The role of natural hazards and social stressors in population health
2. **Flojaune Griffin (3rd year, Advisor: MaryFran Sowers)**
The Prospective Relationship between Vitamin D and Systolic Hypertension among Women
3. **Ian Spicknall (5th year, Advisors: Joseph Eisenberg, James Koopman)**
Dominant Modes of Influenza Transmission

Elsie Grace (4th year, Advisor: Allison Aiello)
elgrace@umich.edu

The role of natural hazards and social stressors in population health

J Ahern, E Grace, A Hubbard, S Galea

We previously proposed a model in which the health of human populations reflects underlying population vulnerabilities and capacities and response to intermittent stressors. Previous research found that variability in mortality rates was partially explained by the underlying vulnerabilities and capacities of populations, suggesting they exacerbate or mitigate the susceptibility to negative health outcomes. In our analysis, we examined whether intermittent natural hazards or social stressors further explained the variability in mortality rates. Health outcomes were rates of mortality from twelve causes for 3138 United States counties between 1995 and 2004. Negative binomial regression models were initially fit with a measure of socioeconomic vulnerability, median income, predicting each mortality rate. We examined changes in the variability of the mortality rates (as indicated by changes in the overdispersion of the outcome relative to the hypothesized Poisson model for mortality rates) after additionally accounting for (1) natural hazards (natural disasters and their severity), and (2) social stressors (crime rates). Little variability in all mortality rates was explained by accounting for natural hazards (mean overdispersion reduction of 3.3%). However, more substantial variability in mortality rates was explained by accounting for social stressors (mean overdispersion reduction of 14.8%). Our results are consistent with intermittent stressors affecting the variability in population health, and moreover, social stressors may be more relevant to population health than are natural hazards. Understanding the convergence of conditions that produce population health conditions may inform intervention efforts.

Flojaune Christina Griffin (3rd year, Advisor: MaryFran Sowers)
flojaune@umich.edu

The Prospective Relationship between Vitamin D and Systolic Hypertension among Women

Flojaune C Griffin, MaryFran R Sowers, Crystal A Gadegbeku

Recent cross-sectional studies suggest that vitamin D may be linked to hypertension; however resolving questions about cut points to define vitamin D (25-OH-D) deficiency and confirming the temporal sequence of vitamin D deficiency and hypertension are needed to support this theory. We examined a cohort of Caucasian women for temporal evidence of an association between serum vitamin D deficiency and risk of elevated systolic blood pressure. Data were from the population-based longitudinal Michigan Bone Health and Metabolism Study. The study group was 559 Caucasian women (87% of the population) aged 24-44 years in 1992. Annual blood pressure measurement and extensive data collection began in 1992 and continues to the present. A single-time serum vitamin D level was measured in 1993. Associations between Vitamin D deficiency (< 80 nmol/L) and systolic hypertension (≥ 140 mm Hg) identified in 1993 and in 2007 were estimated using logistic regression. The odds of having systolic hypertension in 1993 were 30% higher in women with vitamin D deficiency (Odds Ratio [OR]=1.3, 95% Confidence Interval [CI]=(0.3, 4.9)). Prospectively, women with a 1993 vitamin D deficiency had an increased risk of systolic hypertension in 2007 after adjusting for age, fat mass, anti-hypertensive medication use, and smoking (Odds Ratio 3.0; 95% CI=(1.01, 8.7)). This provides evidence that a single-time measure of vitamin D among young adult women in 1993 was associated with systolic hypertension 14 years later. These prospective results suggest that early vitamin D deficiency may increase the long-term risk of hypertension in women.

Ian Spicknall (5th year, Advisors: Joseph Eisenberg, James Koopman)
ispickna@umich.edu

Dominant Modes of Influenza Transmission

Ian H. Spicknall, James S. Koopman, Mark Nicas, Josep Serra-Pujol, Sheng Li, Joseph N. Eisenberg

Interest in intervention and control of person-to-person transmitted illnesses with multiple potential routes of transmission has increased with the emergence of SARS, H5N1 (avian influenza) virus, and most recently H1N1 influenza virus. To inform relevant influenza intervention options, we model four modes of transmission: respirable, inspirable, droplet, and contact-mediated transmission. Although a plethora of models exist, few comprehensively examine how features of the *virus strain* (infectivity, survivability, transferability, or shedding), *host population* (behavior, susceptibility, or shedding), and *environment* (host densities, surface area to volume ratios, or host movement patterns) can alter the relative and absolute contribution of each infection pathway. A discrete-event, continuous-time, stochastic transmission model was structured to explicitly describe the environmental processes through which virus passes from one person to another via different modes of transmission. This was analyzed to explore which factors increase or decrease different modes of transmission. Mode-specific transmission was highly sensitive to parameter variability. With the exception of inspiration, each other route on its own was capable of causing high transmission. Self-inoculation rate and infectivity were most important in differentiating between regions of high versus low contact-mediated transmission. Host density and infectivity were both important in differentiating between regions of high and low respiratory and droplet-spray transmission. This analysis provides a basis for inferring optimal transmission prevention measures in different situations. Depending on the specific context, one or more modes may be sufficient to cause pandemic transmission, while in other contexts no transmission may result.

Doctoral Student Poster Presentations

1. Erin Bakshis (2nd year, Advisor: Ana Diez-Roux)
County-level social environment modifies the association between serotonin transporter genotype and risk of post-traumatic stress disorder in adults
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3. Carrie Karvonen-Gutierrez (1st year, Advisor: MaryFran Sowers)
Severity of knee magnetic resonance imaging features predicts bilateral knee osteoarthritis in women
4. Kiarri Kershaw (3rd year, Advisor: Ana Diez Roux)
Educational attainment and C-reactive protein: A mediation analysis
5. Laxmi Modali (4th year, Advisor: Chuanwu Xi (EHS))
Evaluation of DNA transformation frequency in *Acinetobacter baylyi* strain BD413 biofilm and suspended growth
6. Vanessa Perez (3rd year, Advisor: Allison E. Aiello)
The Efficacy of Influenza Vaccine on Cardiovascular Events in Adults: A Meta-Analysis and Evaluation of the Literature
7. Eric Roberts (2nd year, Advisor: Allison Aiello)
Environmental conditions, political economy, and rates of injection drug use in large US metropolitan areas 1992 – 2002
8. Amanda Simanek (3rd year, Advisor: Allison Aiello)
The association between cytomegalovirus/herpes simplex virus-1 seropositivity, c-reactive protein level, and mortality in the U.S.
9. Melissa Smiley (4th year, Advisor: Ana Diez Roux)
A descriptive spatial analysis of multiple health-related resources in Baltimore, New York City, and Winston-Salem
10. Kristen Stevens (3rd year, Advisor: Stephen B. Gruber)
Children with congenital heart disease demonstrate an increased rate of pediatric cancers
11. Melissa Tracy (3rd year, Advisor: Hal Morgenstern)
Policing and accidental overdose mortality in New York City
12. Lauren Wallner (4th year, Advisors: Hal Morgenstern and Aruna Sarma)
The effect of type 2 diabetes and hypertension on longitudinal changes in prostate specific antigen (PSA) levels: Results from the Olmsted County Study

Poster # 1:
Erin Bakshis (2nd year, Advisor: Ana Diez-Roux)
ebakshis@umich.edu

County-level social environment modifies the association between serotonin transporter genotype and risk of post-traumatic stress disorder in adults

Erin Bakshis, Karestan Koenen, Allison E. Aiello, Ananda B. Amstadter, Kenneth J. Ruggiero, Ron Acerno, Dean G. Kilpatrick, Joel Gelernter, Sandro Galea

Although both genetic factors and features of the social environment are important predictors of posttraumatic stress disorder (PTSD), few studies have assessed gene and social-environment interactions in studies of PTSD. This project examined whether features of the social environment (county-level crime rate and unemployment) modified the association between the serotonin protein gene (*SLC6A4*) promoter variant (5-HTTLPR) and risk for current PTSD in a population-representative sample of 590 participants in the 2004 Florida Hurricane Study. Interviews were used to obtain individual-level risk factor measures and DSM-IV diagnoses of PTSD. DNA was extracted from salivary samples. County-level crime and unemployment rates were assessed from census data. We assessed statistical interactions between 5-HTTLPR genotype and two features of the social environment by including exposure-covariate product terms in logistic regression models with simultaneous adjustment for individual-level determinants of PTSD. We found evidence of interactions between 5-HTTLPR genotype and both county-level crime rate (odds ratio (OR) for the product term: 2.68 95% confidence interval (CI)=(1.09, 6.57)) and unemployment rate (OR for the product term: 3.67, 95% CI=(1.42, 9.50)). Stratified analyses indicated the 's' allele of the 5-HTTLPR polymorphism was associated with decreased risk of PTSD in the low-risk environments (low crime/unemployment rates) but increased risk of PTSD in the high-risk environments. These results suggest that the social environment modifies the association between 5-HTTLPR genotype and PTSD.

Poster # 3:
Carrie Karvonen-Gutierrez (1st year, Advisor: MaryFran Sowers)
ckarvone@umich.edu

Severity of knee magnetic resonance imaging features predicts bilateral knee osteoarthritis in women

Carrie A. Karvonen-Gutierrez, Jon Jacobson, Yebin Jiang, MaryFran Sowers

Those with unilateral and bilateral knee osteoarthritis (OAK) are often considered a homogeneous group, both clinically and in research studies, but their variability in terms of physical functioning and knee pain is infrequently related to differences in structural damage. Our goal was to determine the severity of magnetic resonance imaging (MRI)-defined knee abnormalities associated with unilateral vs. bilateral OAK. In 2007, bilateral radiographs and MRI-images were obtained from 360 women of the Michigan Study of Women's Health Across the Nation. Women were classified as having no OAK, unilateral OAK, or bilateral OAK using radiographs (K-L ≥ 2). MRI images were assessed for severity (in tertiles) of cartilage, bone marrow edema, osteophytes, meniscal extrusion, ligamentous damage, and synovitis (yes/no). MRI feature severity with bilateral vs. unilateral knee OA was assessed with logistic regression. The 2007 median age was 56.4 years; median BMI was 33.2 kg/m². Women were Caucasian (38%) and African-American (62%). Thirty-eight percent of women had no knee OA, 15% had unilateral OAK, and 48% had bilateral OAK. Compared to unilateral OAK, women with bilateral OAK had greater odds of being in the most severe tertile of cartilage defect (OR=4.63), bone marrow edema (OR=2.45), osteophytes (OR=6.86), meniscal extrusion (OR=3.76), and synovitis (OR=4.02) after adjustment for BMI and 1998 knee OA status (p-values from the Wald Chi-Square tests for each coefficient were less than 0.05). Following adjustment for obesity status, mid-aged women with bilateral knee OA had more severe structural damage, assessed with MRI, compared to women with unilateral knee OA.

Poster # 4:**Kiarri Kershaw (3rd year, Advisor: Ana Diez Roux)
kkershaw@umich.edu****Educational attainment and C-reactive protein: A mediation analysis**

Kiarri N. Kershaw, Briana Mezuk, Cleopatra Abdou, Jane A. Rafferty, Sha Juan Colbert, Darrell Hudson, James S. Jackson

Low socioeconomic position (SEP) has been associated with elevated C-reactive protein (CRP), a marker of systemic inflammation. Health behaviors may mediate the relationship between low SEP and CRP. This study aims to (a) estimate the contributions of behavioral mediators (cigarette smoking, a high fat and sugar diet, heavy alcohol use, and vigorous exercise) to the association between low SEP and CRP and (b) evaluate whether these mediated relationships are modified by gender and race/ethnicity. Our analysis included 6313 participants in the 2001-2006 National Health and Nutrition Examination Survey who were ≥ 40 years old. A path analysis of a series of Probit regression models was used to evaluate mediation and effect-measure modification. High serum CRP was defined as ≥ 0.3 mg/dl. SEP was measured using categorical educational attainment (less than high school (HS), high school, some college, and college or more). Statistically significant ($\alpha=0.05$) total indirect effects were found between socioeconomic position and CRP. For example, less than HS was associated with a 0.25 standard deviation increase in the predicted probit index (95% confidence interval: (0.18, 0.32)). Smoking and vigorous exercise were the strongest mediators of the SEP-CRP relationship, accounting for 45.2% and 45.6% of the total indirect effect, respectively. There was evidence of statistically significant moderation by gender for the mediation effect of exercise and by both gender and race/ethnicity for the mediation effect of smoking. These findings are consistent with the hypothesis that smoking the lack of vigorous exercise are major pathways through which low SEP affects CRP levels.

Poster # 5:**Laxmi Modali (4th year, Advisor: Chuanwu Xi (EHS))
lmodali@umich.edu****Evaluation of DNA transformation frequency in *Acinetobacter baylyi* strain BD413 biofilm and suspended growth**

Laxmi Modali, Carl F. Marrs, Carl P. Simon, Chuanwu Xi

Biofilms are aggregates of bacterial cells that are enclosed in an extracellular matrix. It has long been hypothesized that the frequency of gene transfer in biofilms will be higher than that found in corresponding planktonic counterparts. This has implications for the spread of antibiotic resistant bacteria in water distribution systems considering the high concentration of antibiotic resistance genes in the environment and the ubiquitous presence of biofilms in water system storage tanks and pipes. In order to test this hypothesis, we compared DNA transformation frequencies in the biofilm and planktonic growth of *Acinetobacter baylyi* strain BD413 with donor plasmid pWH1266 DNA carrying a tetracycline resistance marker. DNA transformation frequencies were compared in biofilm cells and overlying suspended cells grown in microtiter plates for 48 hr. and in biofilm cells grown in a flow-cell system for 12, 24, 48 & 72 hr. with planktonic cells grown in batch culture and recovered at the mid-exponential, stationary and late-stationary phases. The microtiter experiment data show the transformation frequencies of suspended cells were approximately 10-fold higher than that of the biofilm cells. Similarly, the flow system experiment data indicate that transformation frequencies of the planktonic samples at various growth stages were at least 10-fold higher than corresponding biofilm frequencies. These data suggest that DNA transformation frequencies of *A. baylyi* strain BD413 are lower in biofilm growth mode cells than in suspended and planktonic cells. Characterization of genetic mechanisms responsible for this observation is warranted for further study.

Poster # 6:**Vanessa Perez (3rd year, Advisor: Allison E. Aiello)**
perezv@umich.edu**The Efficacy of Influenza Vaccine on Cardiovascular Events in Adults: A Meta-Analysis and Evaluation of the Literature**

Vanessa Perez and Allison Aiello

Cardiovascular disease (CVD) remains the leading cause of mortality among adults. Influenza vaccination rates among individuals who have experienced a CVD event remain low. To quantify the efficacy of influenza vaccine on cardiovascular-specific events, including hospitalization and mortality, we performed a meta-analysis using random-effects modeling of all studies published up to January 2009. Search engines utilized included PUBMED, Cochrane library, and Web of Science. Forty-nine key word combinations were used which included index terms such as influenza vaccination, vaccine efficacy, cardiovascular disease, atherosclerosis, coronary artery disease, coronary heart disease, stroke, and myocardial infarction. Study design and setting, age, cardiovascular outcome(s), effect estimates and corresponding 95% confidence intervals [CI], and covariate adjustment were extracted from all studies included for analysis (N=19). Sub-group analyses were performed for studies reporting risk ratios (RRs) (n=12) and odds ratios (ORs) (n=7). Preliminary results show that vaccination resulted in a pooled reduction in cardiovascular events among adults by 21% for studies reporting RRs [RR=0.79, 95% CI: 0.75 to 0.83] and a 28% reduction for studies reporting ORs [OR=0.72, 95% CI: 0.59 to 0.86]. Methodological challenges in these studies, such as the healthy vaccine effect, should be considered in interpreting the results. This meta-analysis is the first to examine influenza vaccination on a wide-range of CVD-specific outcomes and highlights the necessity to consider selection biases before making definitive conclusions regarding use of influenza vaccination among adults at risk for experiencing a cardiovascular event. Further studies examining the possibility of healthy vaccine effects should be assessed.

Poster # 7:**Eric Roberts (2nd year, Advisor: Allison Aiello)**
ericr@umich.edu**Environmental conditions, political economy, and rates of injection drug use in large US metropolitan areas 1992 – 2002**

ET Roberts, SR Friedman, JE Brady, ER Pouget, B Tempalski, S Galea

City-specific studies suggest local environments and economic circumstances are associated with risk of injection drug use (IDU). However, no studies have assessed the relation among the quality of the local environment, economic circumstances, and IDU over time across US metropolitan statistical areas (MSAs). We estimated (a) annual numbers of IDUs in 88 large MSAs by extrapolating, adjusting, and allocating existing estimates, (b) the quality of the local environment as a composite measure of perceptions of crime, abandoned buildings, bars on windows, and litter in the street, and (c) the political economy as the unemployment rate, percent of individuals below the poverty line, and percent of households receiving public assistance. We accounted for counts of police officers, spending on police, and population size as confounders. We fit a log-linear model for IDU counts using generalized estimating equations, assuming a negative binomial distribution for the counts and an autoregressive correlation structure. IDU in year t was regressed on exposures and confounders in year t-1 to reflect the hypothesized temporal relationships. MSAs with a worse local environment increased IDU risk (risk ratio [RR]=1.03, p<0.01); similarly, a one-percentage point worsening of the MSA political economy was associated with increased IDU [RR=1.04 to 1.10 (all p<0.01)]. There was apparent heterogeneity of effect by region: The quality of the local environment was associated with IDU in the South (RR=1.12, p<0.01), West (RR=1.04, p<0.01) and Midwest (RR=1.03, p=0.04), and the metropolitan political economy was associated with IDU in the West (RR=1.05, p<0.01) and Northeast (RR=1.12, p<0.01).

Poster # 8:**Amanda Simanek (3rd year, Advisor: Allison Aiello)****asimanek@umich.edu****The association between cytomegalovirus/herpes simplex virus-1 seropositivity, c-reactive protein level, and mortality in the U.S.**

Amanda M. Simanek, Jennifer B. Dowd, Allison E. Aiello

The purpose of this study was to investigate whether seropositivity to cytomegalovirus (CMV) and Herpes Simplex Virus-1 (HSV-1) as well as high levels of C-reactive protein (CRP) are associated with all-cause mortality. We used data from the National Health and Nutrition Examination Survey III, including subjects ≥ 45 years of age who were tested for seropositivity to CMV and HSV-1, tested for CRP levels, and had data available on their mortality status. Cox proportional hazards models were used to generate hazard ratios (HR) and 95 percent confidence intervals (CI). Seropositivity to CMV and high level of CRP (≥ 3 m/l) were statistically significantly associated with risk of death at the $\alpha=0.05$ level (HR=1.33, 95% CI=(1.07, 1.66), HR=1.86, 95% CI=(1.57, 2.20), respectively) after controlling for age, gender and race. Neither seropositivity to HSV-1 nor combined seropositivity to CMV and HSV-1 were statistically significantly associated with risk of death after controlling for confounders. However, those seropositive to both pathogens and with high levels of CRP were at higher risk for death than those seropositive to one or no pathogens and with low levels of CRP (HR=1.92, 95% CI=(1.23, 2.99)), even after controlling for age, gender and race. CMV seropositivity and high levels of CRP as well as combined seropositivity and high levels of CRP predicted mortality in this nationally-representative sample. Reducing the number of persons infected with CMV and HSV-1 and lowering CRP levels may serve to reduce mortality in the U.S.

Poster # 9:**Melissa J. Smiley (4th year, Advisor: Ana Diez Roux)****mjsmiley@umich.edu****A descriptive spatial analysis of multiple health-related resources in Baltimore, New York City, and Winston-Salem**

Melissa J. Smiley, Ana V. Diez Roux, Shannon J. Brines, Daniel G. Brown Kelly R. Evenson, Daniel A. Rodriguez

Resource access may contribute to health disparities. Research has established that some resources, like supermarkets, are less prevalent in minority areas. There is little empirical evidence using spatial analytic techniques on the patterning of multiple health-related resources. We geocoded locations of supermarkets, recreational facilities, parks, and retail areas in New York City (819 block groups), Baltimore (737), and Forsyth County, NC (169). We constructed 1/2 mile kernel densities of resources as indicators of locational access to healthy foods, recreational resources, and land-use mix. Densities were analyzed individually and collectively as a summary score. Correlation coefficients and Moran's I statistics quantified statistical and spatial clustering. Spatial regression models estimated the relation between block group racial composition and resource access, while accounting for spatial correlation. After adjusting for population density, access to different resources was positively correlated (0.09 to 0.62, $p < .05$ for all) except for access to parks which was not correlated with other resources. Spatial autocorrelation varied across resource and site (Moran's I from 0.08 to 0.95) and was highest in New York. Spatial regression models showed statistically significant ($p < .05$) negative relationships between percent minority and resource access. In Baltimore, the coefficient for the summary score of all three resources (-10.2, $p < .0001$) was statistically significant, though only one of the individual resource coefficients was statistically significant. There is evidence of clustering in locational access to resources, suggesting that some areas are deficient in multiple resources. The pattern of clustering is dependent on area race/ethnicity and the metropolitan area studied.

Poster # 10:**Kristen Stevens (3rd year, Advisor: Stephen B. Gruber)
stkristn@umich.edu****Children with congenital heart disease demonstrate an increased rate of pediatric cancers**

Kristen Stevens, Amanda Klinger, Amanda King, Jeffrey Hellinger, Catalina de Valencia, Stephen B. Gruber, Peter J. Gruber

Studies have shown a co-occurrence of CHD and pediatric cancer in patients with rare genetic syndromes characterized by mutations in the *RAS/RAF/MAPK* pathway. We investigated the epidemiology of pediatric cancers among children with CHD in a retrospective cohort study at the Children's Hospital of Philadelphia (CHOP). Children included in the analysis were those less than 18 years of age when seen at the CHOP Cardiac Center for operative repair between January 2001 and July 2009 (n=5,290). Demographics, clinical variables, and comprehensive radiology data were obtained from medical records and the radiology database at CHOP. Incident cancers were identified from the CHOP cancer registry. Age-standardized incidence ratios (SIRs) were calculated using SEER incidence rates of pediatric cancer from 2000-2006, and the effect of radiation on the rate of pediatric cancer was estimated using Poisson regression. Children with CHD had increased cancer incidence compared to the US general population (SIR = 4.55, 95% confidence interval (CI)=(2.01, 10.29)), controlling for gender and known genetic syndromes. The rate of pediatric cancer was 21.3 times the US general population rate (95% CI=(1.0, 123.3)) among children with genetic syndromes and 3.8 times the US general population rate (95% CI=(1.6, 9.1)) among children without genetic syndromes. An 8% increase in the rate of cancer was observed for every 10mSv increase in radiation exposure (95% CI=(7, 9)). Both environmental and genetic exposures were associated with pediatric cancer risk among children with CHD warranting further investigation in this population and suggesting the need for close follow-up of non-cardiac diagnoses.

Poster # 11:**Melissa Tracy (3rd year, Advisor: Hal Morgenstern)
mstracy@umich.edu****Policing and accidental overdose mortality in New York City**

Melissa Tracy, Arijit Nandi, Amy S.B. Bohnert, Magdalena Cerdá, Kenneth J. Tardiff, David Vlahov, Sandro Galea

Accidental drug overdose is a major cause of mortality among drug users and a leading cause of death among young adults in New York City (NYC). Although overdoses are commonly witnessed by other drug users, fear of arrest for drug possession may discourage witnesses from seeking help for overdose victims and may be an important predictor of overdose mortality. We conducted an ecologic analysis of accidental overdose mortality in 74 NYC police precincts from 1990-1999 using data collected from the Office of the Chief Medical Examiner of NYC, the NYC police department, and the U.S. Census Bureau. Misdemeanor arrest rate was used as a proxy for police activity and potential fear of police arrest among drug users. We used Bayesian Poisson models including random spatial and temporal effects and a space-time interaction to account for clustering of overdose mortality in nearby areas and contiguous years and for changes in spatial clustering over time. An increase of one standard deviation in the misdemeanor arrest rate (50 arrests per 1,000 population) was associated with a 16% greater overdose death rate (95% confidence interval=(1.05, 1.28)), after adjusting for overall drug use and socio-demographic characteristics in the precinct. These results suggest that police activity may be an important determinant of neighborhood-level accidental overdose mortality rates. Efforts to complement increased police activity with measures aimed at reassuring those who seek help for overdose victims that they will not be prosecuted have been implemented in other cities and may reduce mortality from drug use in NYC.

Poster # 12:

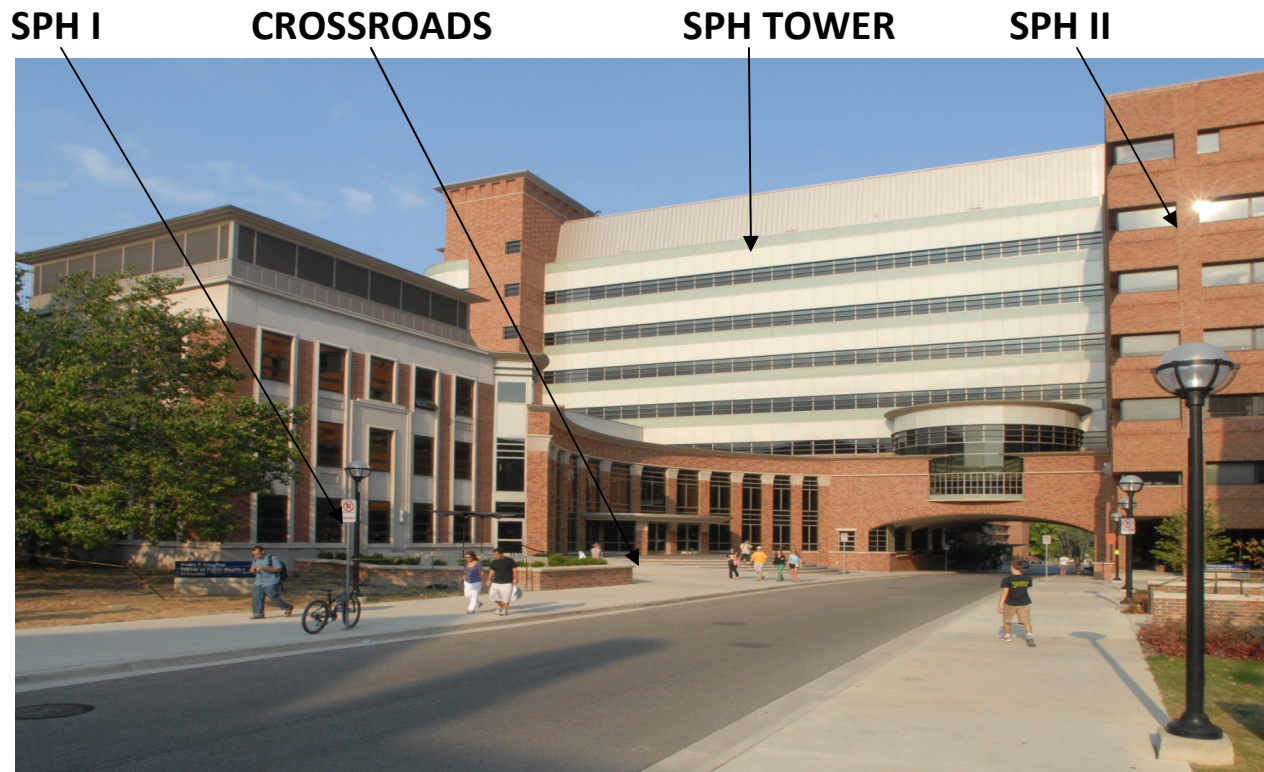
Lauren Wallner (4th year, Advisors: Hal Morgenstern and Aruna Sarma)

lwallner@umich.edu

The effect of type 2 diabetes and hypertension on longitudinal changes in prostate specific antigen (PSA) levels: Results from the Olmsted County Study

LP Wallner, H Morgenstern, ME McGree, DJ Jacobson, JL St. Sauver, SJ Jacobsen, AV Sarma

Although men with type 2 diabetes are thought to have lower prostate specific antigen (PSA) levels than non-diabetic men, the influence of diabetes on PSA changes over time remains unknown. The goal of this study was to examine associations between type 2 diabetes and hypertension and changes in PSA levels. In 1990, a randomly-selected cohort of Caucasian men, ages 40-79, from Olmsted County, MN were enrolled in a study investigating urologic health. Questionnaires including items on demographics, current medical conditions, and medications were completed biennially, with a subset of men undergoing blood draws. Exposure was defined as a physician diagnosis of diabetes or hypertension at baseline or reported use of medications to treat these conditions prior to baseline. Men with at least two PSA measurements (n=569) were included in this analysis. Multivariable mixed models were used to estimate the annual percent change in PSA associated with diabetes and hypertension adjusting for age. The overall mean change in PSA was 3.6% per year and increased with age (p-value for age coefficient=0.009). Men with diabetes experienced less annual change in PSA (1.1%) than did non-diabetic men (3.7%) after adjusting for age (p-value from t-test=0.02). Age-adjusted change in PSA did not differ by hypertension status (p-value from t-test=0.49). Our results suggest that type 2 diabetes influences the change in PSA. Diabetic men may experience less rapid increases in PSA as they age, as compared with non-diabetic men, potentially influencing the detection of prostate cancer in diabetics.



Epidemiology Faculty and Locations

Allison Aiello – SPH Tower, 3rd Floor, Room 3659

Ana Baylin – SPH II, 5th Floor, Room M5009

Matt Boulton – SPH Tower, 2nd Floor, Room 2679

Joe Eisenberg – SPH II, 5th Floor, Room M5065

Sioban Harlow – SPH II, 5th Floor, Room M5208

Katherine Hoggatt – SPH II, 5th Floor, Room M5017

Jim Koopman – SPH II, 5th Floor, Room M5053

Lynda Lisabeth – SPH Tower, 4th Floor, Room 4641

Carl Marrs – SPH II, 5th Floor, Room M5116

JoLynn Montgomery – SPH Tower, 2649 C

Arnold Monto – SPH II, 5th Floor, Room M5156

Hal Morgenstern – SPH II, 5th Floor, Room M5164

Marie O’Neill – SPH Tower, 6th Floor, Room 6631

Pat Peyser – SPH II, 5th Floor, Room M5517

Amr Soliman – SPH Tower, 5th Floor, Room 5626 (Restricted Area)

Kristin Tomey – SPH I, First Floor, Room 1867

Mark Wilson – SPH Tower, 5th Floor, Room M5507

Zhenhua Yang – SPH II, 5th Floor, Room M5124

Epidemiology Faculty



[Allison E. Aiello, Ph.D., M.S.](#)

Multidisciplinary approaches for assessing antibiotic resistance in the community, clinical, and institutional setting; lifecourse SES, social context, and infectious diseases in elderly minority populations.



[Cibele T. Barbosa-Cesnik, M.D.](#)

Reproductive and women's health, particularly infectious diseases in women.



[Ana Baylin, M.D., Dr.P.H.](#)

Nutritional Epidemiology, genetics, chronic disease, global health



[Matthew L. Boulton, M.D., M.P.H.](#)

Public health systems/services, surveillance and field investigation of infectious diseases, uses of isolation and quarantine, assessment of the public health workforce, and public health in China



[Ana V. Diez-Roux, M.D., Ph.D., M.P.H.](#)

Social determinants of health, neighborhood health effects, cardiovascular disease epidemiology, epidemiologic methods generally and methodological issues related to the presence of multiple levels of analysis.



[Joseph N.S. Eisenberg, Ph.D., M.P.H.](#)

Infectious disease, transmission modeling, risk assessment, waterborne pathogens, vectorborne disease.



[Betsy Foxman, Ph.D.](#)

Molecular epidemiology of infectious disease.



[Sonja R. Gerrard, Ph.D.](#)

Virus assembly and egress, genetic determinants of pathogenesis, viral evolution, emerging Bunyaviral diseases.

[Siobán D. Harlow, Ph.D.](#)

Womens health, occupational health, reproductive epidemiology, international health.

[Katherine J. Hoggatt, Ph.D.](#)

Epidemiologic methods, environmental epidemiology, perinatal epidemiology.



[Sharon L.R. Kardia, Ph.D.](#)

Genetic epidemiology with a focus on genetics of common chronic diseases, especially cardiovascular disease and hypertension.



[James S. \(Jim\) Koopman, M.D., M.P.H.](#)

Analysis and control of infection transmission systems, theoretical basis for epidemiological analysis, causal modeling of epidemiological processes, complex systems, networks, public health surveillance.



[Lynda D. Lisabeth, Ph.D., M.P.H.](#)

Race-ethnic and gender differences in stroke, stroke epidemiology, the genetics of ischemic stroke.



[Carl F. Marrs, Ph.D.](#)

Molecular epidemiology of bacterial pathogens with focus on Escherichia coli in UTI, Haemophilus influenzae in otitis media and group B streptococcus in neonatal disease.



[Daniel S. McConnell, Ph.D.](#)

Estrogen and androgen assays or pathways.



[JoLynn P. Montgomery, Ph.D., M.P.H.](#)

Applied epidemiology and public health practice with specialization in control of communicable diseases, disease surveillance systems, and public health emergency preparedness and response.



[Arnold S. Monto, M.D.](#)

Occurrence, etiology and prevention of infectious diseases in industrialized and developing countries, frequency and cause of respiratory infections in families living in the community.



[Hal Morgenstern, Ph.D.](#)

Musculoskeletal conditions, cancers, neuropsychiatric disorders, nonintentional injuries, cardiovascular disease, psychosocial aspects of disease, occupational and environmental health, research methods, and access to and quality of health care.



[Marie S. O'Neill, Ph.D.](#)

Environmental epidemiology, air pollution, climate change, environmental equity, international health, cardiovascular mechanisms.

[Patricia A. Peyser, Ph.D.](#)

Genetics and cardiovascular disease.



[Amr S. Soliman, M.D., Ph.D.](#)

Cancer, cancer epidemiology, international health, developing countries, special populations, field methods.



[MaryFran R. Sowers, Ph.D.](#)

Women's health, particularly the social and biological interfaces at the mid-life, endocrinology of chronic diseases including osteoporosis, the arthrides, diabetes and related inflammatory processes, impact of biological factors on functional limitations



[Kristin M. Tomey, Ph.D.](#)

Nutrition-related health factors, neighborhood effects on physical activity patterns, change in body composition during menopause.



[Mark L. Wilson, Sc.M., Sc.D.](#)

Ecology of infectious disease, spatial pattern analysis, global change and health.



[Zhenhua Yang, M.D., Ph.D.](#)

Molecular epidemiology and pathogenesis of tuberculosis.



[Lixin Zhang, Ph.D., M.S.](#)

Molecular epidemiology of infectious, genomics and bioinformatics, bacterial pathogenesis.



[H. Thomas Zheng, Ph.D., M.S.](#)

Parametric and non-parametric models; scientific computing and computer simulation; statistical filtering; signal processing; theory and application of nonlinear dynamic systems, chaos and fractal.