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Acknowledgements

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Short Course Agenda ♦ April 16, 2007

7:30 am – 5:00 pm Registration

8:30 am – 12:00 pm Course #1 – Bayesian Small Area Estimation

Dr. Don Malec, Census Bureau

This course will provide a view of small area estimation from a Bayesian perspective. The Bayesian paradigm of automatic estimation is based on specifying a model, prior and loss function. This paradigm will be emphasized as both a concept and through examples. The commonality of many Bayesian and non- Bayesian models will be reviewed. Real applications utilizing standard Bayesian methods such as MCMC methods and Gibbs sampling using Winbugs will be presented.

12:00 pm – 1:00 pm Lunch (on your own)

1:00 pm – 4:30 pm Course #2 – Introduction to GIS for Eliminating Health Disparities

Dr. Andrew Curtis, Louisiana State University

This course will begin with a brief introduction as to what a GIS is, both conceptually and practically in terms of being introduced to a popular software package. Attendees will be introduced to a common method of data entry, joining data tables to existing geographic boundary files. Attendees will be shown how to make graduated color maps of these data, and how the type of political boundary chosen can affect mapped results. This point will be further elaborated on by introducing how spatial aggregation can affect spatial analysis. Attendees will be given a brief introduction how to access boundary files (zip code and census units) and socioeconomic data. Attendees will be shown how to bring in aerial photography, how to georegister (import a paper map into the GIS) and how to “heads-up digitize” (using the mouse to extract information, such as building footprints) from an image. Attendees will be briefed as to the importance of collecting primary geospatial data. The geocoding of addresses and the importing of coordinates from a GPS, will be taught – along with the associated pitfalls. Attendees will also be shown how still and video cameras enabled with a GPS can be used to “map” neighborhood risks. A spatial filtering package (DMAP), kernel density and LISA approaches will be briefly presented as methods to identify health “hotspots”. The session will end with a discussion about how to preserve spatial confidentiality in map displays, and suggestions will be made as how to “mask” spatial data display. This will all be couched in terms of HIPAA compliance.

Symposium Agenda ♦ April 17, 2007

7:30 am – 5:30 pm	Registration	
8:15 am - 8:30 am	Welcome and Introductory Remarks	
Decatur A		
8:30 am - 10:35 am	Invited Session 1	
Decatur A	Health Disparities, Social Inequalities, and Human Rights Chair: Mark Stevens	
8:35 am - 9:15 am	Health Disparities: Historical Perspectives	Walter Williams
9:15 am - 9:55 am	Human Rights Advocacy and Statistical Objectivity: An Environmental Justice Application	Fritz J. Scheuren
9:55 am - 10:35 am	Understanding the Joint Effects of Socioeconomic Status and Race/Ethnicity in Health Disparities Policy Analysis	David Williams
10:35 am - 10:50 am	Break	
	Contributed Session 1	
10:50 am - 12:15 pm Mary Gay Room	Addressing Racial and Ethnic Disparities Chair: Karen Davis	
10:55 am - 11:15 am	The Health Impacts of Subjective and Objective Social Status Among Asian Immigrants	Fang Gong
11:15 am - 11:35 am	High School Student Responses to Different Question Formats Assessing Race/Ethnicity	Danice Eaton
11:35 am - 11:55 am	Modeling Diabetes Prevention Costs in the District of Columbia in the Context of Racial Disparities	Ann Goldman
11:55 am - 12:15 pm	Ethnic and Geographic Distribution of Human Papillomavirus Related Anogenital Cancers in the U.S.	Margaret Watson
10:50 am - 12:15 pm Swanton Amphitheater	Causality in Modeling Chair: Andrew Autry	
10:55 am - 11:15 am	Causal Effects of Race and Medical Indigency for Patients Hospitalized for Stroke	Megan Price
11:15 am - 11:35 am	Dealing with the Ambiguities of the IOM's Definition: A Statistical Conceptual Framework	Naihua Duan
11:35 am - 11:55 am	Estimating Marginal and Conditional Disparities: A Semi-parametric Approach	Xiao-Li Meng
11:55 am – 12:15 pm	Disparities in Mental Health Care: Results from NCS-R/NLAAS and Their Policy Implications	Margarita Alegria

Symposium Agenda ♦ April 17, 2007

10:50 am - 12:15 pm **Clustering Effects, Time Series, and Estimations Strategies for Hard-to-reach Populations**

Henry Oliver Room Chair: Tim Green

10:55 am - 11:15 am	Hired Farm workers: Tracking an Elusive Population	Andrea Steege
11:15 am - 11:35 am	Estimating Size of Hard-to-reach Populations	Yang Zhao
11:35 am - 11:55 am	Estimates of Intraclass Correlation for Variables Related to Behavioral HIV/STD Prevention	Sherri Pals

12:15 pm - 1:40 pm **Poster Session 1**

Rotunda

1. Multiple-instrument Quality Control for the Age-related Eye Disease Study	Samuel P. Caudill
2. Using SAS PROC GLIMMIX to Conduct Within-subjects Analyses with Categorical Outcomes	Merle Hamburger
3. Adjusting for Confounders Related to Disparity in Clinical Genetic Studies	Michael Brimacombe
4. Explaining Racial Disparities in HIV/AIDS Among Women in the U.S.: A Literature Review	Kristen Tillerson
5. Self-efficacy and Work-readiness of Disadvantaged Females	Linette Deloatch Anthony
6. Inferences in Censored Cost Regression Models with Empirical Likelihood	Gengsheng Qin
7. Ecological Inference Issues in Geodemographic Segmentation for Health Communication and Marketing	William Pollard
8. Categorizing Measures of Health Disparity by Difference Detection Methods	Megan Price
9. Epilepsy Rate Disparities Among Multiple Races in Philadelphia	David Wheeler
10. The U.S. Socioeconomic, Racial and Ethnic Disparities in Health Insurance: A Geography Perspective	Xingyou Zhang

Contributed Session 2

1:40 pm - 3:05 pm **Reliability/Precision**

Mary Gay Room Chair: Tsezan Lee

1:45 pm - 2:05 pm	On Testing the Equivalence of Several Treatments in the Presence of Correlation	Hubert Chen
2:05 pm - 2:25 pm	Comparing Confidence Intervals for a Ratio of Poisson Parameters	Lawrence Barker
2:25 pm - 2:45 pm	Minimum Relative Detectable Differences in Disparity	Jeffrey Pearcy
2:45 pm - 3:05 pm	Differential Infant Mortality Rates by Socioeconomic Status: 1995-2002	Jay H. Kim

Symposium Agenda ♦ April 17, 2007

1:40 pm - 3:05 pm Swanton Amphitheater	Strategies for Missing Data Chair: Owen Devine	
1:45 pm - 2:05 pm	An Imputation Strategy for Incomplete Longitudinal Ordinal Data	Hakan Demirtas
2:05 pm - 2:25 pm	Multiple Imputation Under Multivariate Fleishman Polynomials	Hakan Demirtas
2:25 pm - 2:45 pm	Effect of Incomplete Provider Ascertainment on Estimates of Racial/Ethnic Vaccination Coverage Rates	Philip Smith
1:40 pm - 3:05 pm Henry Oliver Room	Small Groups and Strategies for Improving Estimates Chair: Jieru Chen	
1:45 pm - 2:05 pm	Using the Kalman Filter to Improve Precision for Small Racial/Ethnic Subgroups in Health Surveys	Marc Elliott
2:05 pm - 2:25 pm	Innovative Sample Design Techniques for Measuring the Health of Small Racial/Ethnic Subgroups	Marc Elliott
2:25 pm - 2:45 pm	Weakness of Current Weighting Matrix Collapsing Approach and Proposal of Alternative Approaches	Jay J. Kim
2:45 pm - 3:05 pm	Systematic Review Methods to Address Disparity Issues: An Overview of Methods	Theresa Ann Sipe
3:05 pm - 3:15 pm	Break	
3:15 pm - 5:20 pm	Invited Session 2	
Decatur A	Implications of Measuring Health Disparities: Distribution, Coverage, and Origins of Causation Chair: Betsy Gunnels	
3:20 pm - 4:00 pm	What's the Difference? Evidence on the Distribution of Wealth, Health and Health Insurance Coverage	Arthur Kennickell
4:00 pm - 4:40 pm	Small Area Random Effect Models for Capture/Recapture Methods with Applications to Estimating Coverage Error in the U.S. Decennial Census	Donald Malec

Symposium Agenda ♦ April 18, 2007

7:30 am – 3:40 pm	Registration	
8:30 am - 10:35 am	Invited Session 3	
Decatur A	Drilling Down to Solutions: Applications of Geospatial, GIS and Mapping Techniques Chair: Zhen Zhao	
8:35 am - 9:15 am	Title Statistical Challenges in Assessing the Relationship Between Environmental Impacts and Health Outcomes	Linda J. Young
9:15 am - 9:55 am	Area-based Socioeconomic Measures for Monitoring and Mapping Health Disparities	Jarvis Chen
9:55 am - 10:35 am	From Healthy Start to Hurricane Katrina: Six Years of Using GIS to Eliminate Disparities in Perinatal Health	Andrew Curtis
10:35 am - 10:50 am	Break	
	Contributed Session 3	
10:50 am - 12:15 pm Mary Gay Room	Mapping Geographic Disparities Chair: Shahul Ebrahim	
10:55 am - 11:15 am	Mapping At-risk Populations by Geographic Location: Persistent Clusters of Morbidity in the U.S.	Ronald Cossman
11:15 am - 11:35 am	Mapping At-risk Populations by Geographic Location: Persistent Clusters of Mortality in the U.S.	Jeralynn Cossman
11:35 am - 11:55 am	Mapping At-risk Populations: “Rural Health” vs. “Unhealthy Places” as a Dominant Geographic Variable	Arthur G. Cosby
11:55 am - 12:15 pm	Using Small Area Analysis to Inform Health Policy: Diabetes Care in the District of Columbia	Sean Cleary
10:50 am - 12:15 pm Swanton Amphitheater	GIS Applications Chair: Zahava Berkowitz	
10:55 am - 11:15 am	Using GIS to Explore Inequalities in Access to Community Water Fluoridation in Massachusetts	Wanda Wright
11:15 am - 11:35 am	Assessing Community Access to Services in a Hazardous Substance Emergency Event: Issues of Spatial Data and Methods	Janet Heitgard
11:35 am - 11:55 am	A GIS Approach to a Breast Cancer Patterns of Care Study in Oklahoma	Anne Bliss

Symposium Agenda ♦ April 18, 2007

10:50 am - 12:15 pm

Henry Oliver Room

Access/Availability of Healthcare

Chair: Anindya De

10:55 am - 11:15 am

The Impact of Health Service Availability and Accessibility on Health Outcomes in Central Appalachia

Timothy Hare

11:15 am - 11:35 am

Accessibility to Sexual Health Services in Toronto

Eleni Kefalas

11:35 am - 11:55 am

Provider Availability and Race-ethnic Disparity in Accessing Primary Care Service

Huey Chen

11:55 am - 12:15 pm

Racial/Ethnic Disparities in Location and Quality of Care for Chronic Health Conditions

Rhonda BeLue

12:15 pm - 1:40 pm

Rotunda

Poster Session 2

1. Measurement Properties of Neighborhood Characteristics Using an Observational Method

Marc Elliott

2. Simulation-based Sampling to Achieve Racial-ethnic Targets through the Selection of Entire Schools

Marc Elliott

3. Factors Affecting Enrollment in Two Literacy Studies in English and Spanish Speaking Cancer Patients

Hongyan Du

4. Reliability and Validity of Self-report Measures: A Comparison Between English and Spanish Versions

Kaori Fujishiro

5. Influence of Nativity and Race/ethnicity on Mortality Among Los Angeles County Residents

Alex Ho

6. Quality Assessment of Interpreters Conducting Health Surveys with Language Isolated Adults

Michael Link

7. Diagnosis-based Disease Associations—Toward Health Data Mining with a SAS Program

Yao-Hua Luo

8. A Proportional Hazards Model Analysis of Risk Factors for HIV Prevalence Among Female Sex Workers in Ghana

Clement Ahiadeke

Symposium Agenda ♦ April 18, 2007

1:40 pm - 3:40 pm	Invited Cosponsor Session	Biostatistics Department, Emory University
Decatur A	Disparity in Disparity: Disparate Measures from Different Fields Chair: Lance Waller	
1:45 pm – 2:10 pm	Flexible Modeling of Health Disparity: A Disaggregation Approach to Spatial Modeling of Areal Unit Categorical Data	Eric C. Tassone
2:10 pm – 2:35 pm	Discovering Outbreaks in Live Spatial Surveillance: How Do Methods Differ?	Ken Kleinman
2:35 pm – 3:00 pm	Measuring Disparities using Relative Spatial Distributions with Application to Stream Networks	Mark S. Handcock
3:00 pm – 3:25 pm	Detecting Differential Patterns of Activation in the Human Brain	F. Dubois Bowman
3:40 pm - 3:55 pm	Closing Remarks	
Decatur A		

Invited Session 1

**Health Disparities, Social Inequalities,
and Human Rights**

Tuesday, April 17, 2007

8:30 – 10:35 am

Decatur A

Invited Session 1

Health Disparities: Historical Perspectives

Walter Williams

**Associate Director for Minority Health
Director, Office of Minority Health and Health Disparities
Centers for Disease Control and Prevention**

Health disparities exist within a broader historical and social context. Factors such as racism and discrimination (both historical and current); socioeconomic status (including income, wealth, and education); exposures to environmental hazards; violence; and individual's experiences with the health care system have all interacted in powerful ways to have a major impact on the health of minority groups in America. Comprehensive approaches that target the roots of disparities must be adopted for progress.

Invited Session 1

Human Rights Advocacy and Statistical Objectivity: An Environmental Justice Application

Fritz Scheuren, NORC, University of Chicago; Past President, American
Statistical Association

Cory Fleming, Senior Project Manager, ICMA

There is always a tension between advocacy and statistical objectivity. That tension is at its height when human justice abuses are present. In such settings, to win listeners from all sides, it is the data that have to speak. Only these can persuade someone who has not understood, yet, what may be painfully obvious to an advocate.

This talk develops that theme using short examples in the spirit of the soon-to-be released Springer book, tentative title *Human Rights and Statistical Objectivity*, co-edited by Jana Asher, David Banks and Fritz Scheuren. The bulk of the paper, though, is taken up with a fully developed treatment of an environmental justice application that did not get included in the Springer book.

The precautionary principle holds that when an activity raises threats of harm to human health then environment, precautionary measures should be taken, even if some cause-and-effect relationships are not fully established scientifically. Along these lines, the use of collaborative partnerships for addressing environmental justice issues focuses on taking action to find solutions to such problems. Often, of course, it is the poorest members of society who are differentially exposed to such potential hazards.

What can and should be done? Initial research based on face-to-face interviews with stakeholders in such partnership has yielded findings that have important implications in forming policies for addressing environmental and health disparities. These ideas will be featured in the talk's concluding remarks, along with the statistical hypotheses that, if tested, might convince an objective observer to act.

Invited Session 1

Understanding the Joint Effects of Socioeconomic Status and Race/Ethnicity in Health Disparities Policy Analysis

David Williams, Harvard School of Public Health, Department of Society,
Human Development and Health

There are large and persistent racial and ethnic differences in health. Understanding and effectively addressing these racial differences in health requires a clear understanding of what race is and how it might affect health. Researchers' conceptualization of race can determine which questions are asked and which questions remain un-asked. It is widely recognized that there is overlap between race and socioeconomic status (SES). A growing body of evidence suggests that these associations are complex: race and SES appear to be related but distinctive systems of social stratification that can affect health. This presentation reviews some of the evidence of these complex relationships and considers their implications for analysis and presentation of health disparities research, as well as, for understanding and reducing health disparities.

Invited Session 2

**Implications of Measuring Health
Disparities: Distribution, Coverage
and Origins of Causation**

Tuesday, April 17, 2007

3:15 – 5:20 pm

Decatur A

Invited Session 2

What's the Difference? Evidence on the Distribution of Wealth, Health and Health Insurance Coverage

Arthur Kennickell, Federal Reserve Board

There is a literature of long standing that considers the relationship between income and differentials in mortality and morbidity, but information on differentials over the distribution of accumulated wealth have been far more scarce and subject to measurement problems. This paper provides evidence from the Survey of Consumer Finances, which is designed as a survey of wealth, on the distribution of wealth and income and how those distributions have shifted in recent years. Particular attention is paid to the distribution of wealth across minority groups and across age groups. The paper also examines the relationship between health status and health insurance coverage and wealth.

Opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Federal Reserve Board or its staff.

Invited Session 2

Small Area Random Effect Models for Capture/Recapture Methods with Applications to Estimating Coverage Error in the U.S. Decennial Census

Donald Malec, Statistical Research Division, U.S. Census Bureau

Population counts obtained from the U.S. Census have many uses.

In Public Health, Census counts are often used as the denominators to compute mortality and morbidity rates and as components in small area estimates. Post-censally, the census counts are used as starting points for intercensal population estimates. Although efforts are made to accurately count every person in the U.S., errors in this count can occur. For the past several decades, census coverage errors (i.e., errors in missing people and errors in counting erroneous census records) have been evaluated at the national level using capture/recapture-type approaches.

Estimates of coverage at subnational levels have been made using a synthetic estimation approach, whereby the national-level error rates within large population strata are assumed to be homogeneous across smaller levels. This talk will discuss recent work to assess the variability ignored by the synthetic estimate by incorporating logistic random effects models at a small area level. The resulting model is highly parameterized.

Bayesian methods are employed to evaluate variance components, in the model, and draw inference about coverage variability at the small area level. For efficiency reasons, the capture recapture data were not collected via a simple random sample but, instead, came from a scientific oversample of potentially error-prone areas and other special areas.

Problems and the solution implemented to account for an informative sample design will be covered. Lastly, alternative approaches based on what has been learned will be covered as well as suggestions for model validation.

Invited Session 3

Drilling Down to Solutions:
Applications of Geospatial, GIS and
Mapping Techniques

Wednesday, April 18, 2007

8:30 – 10:35 am

Decatur A

Invited Session 3

Statistical Challenges in Assessing the Relationship Between Environmental Impacts and Health Outcomes

Linda Young and Jie Yang, Department of Statistics, University of Florida
Carol A. Gotway, Office of Workforce and Career Development
Centers for Disease Control and Prevention
Greg Kearney and Chris DuClos, Division of Environmental Health, Florida's
Department of Health

Citizens are increasingly interested in understanding how the environment impacts their health. To address these concerns, a nationwide Environmental Public Health Tracking program has been created. This, and many other efforts to relate environmental and health outcomes, depend largely on the synthesis of existing data sets; little new data are being collected for this purpose. Generally, the environmental, health, and socio-demographic data needed in such studies have been collected for different geographic or spatial units. Further, the unit of interest may be different from the sampling units. Once a common spatial scale has been established for the analysis, the question as to how best to model the relationship between environmental impacts and public health must be addressed. In this paper, these and other statistical challenges of relating environmental impacts to public health will be discussed. A general analytic approach will be presented. Efforts to model the relationship in myocardial infarction and air quality in Florida will illustrate the challenges and potential solutions.

Invited Session 3

Area-based Socioeconomic Measures for Monitoring and Mapping Health Disparities

Jarvis Chen, Department of Society, Human Development and Health, Harvard School of Public Health

The documentation of health disparities is an important function of public health surveillance. Geocoding and linkage to area-based socioeconomic measures permits analysis of socioeconomic, in addition to racial/ethnic, health disparities. Given patterns of racial/ethnic and socioeconomic residential segregation, these disparities are also reflected in geographic disparities in health between neighborhoods. I will present the results of work by the Public Health Disparities Geocoding Project to develop a multilevel analytic framework for monitoring and mapping socioeconomic disparities in health. Using geocoded mortality and cancer incidence data from Massachusetts in conjunction with census tract poverty data, I will illustrate our use of a generalized linear mixed model framework for partitioning variation at neighborhood and sub-neighborhood levels and smoothing unstable small area rates. I will also show how posterior estimates of model parameters can be used to calculate useful epidemiologic quantities for mapping, including model-based age-standardized incidence rates and population attributable fractions. Finally, I will consider additional methodologic issues, including denominator instability and temporal sensitivity, which affect use of these methods for routine surveillance of disparities.

Invited Session 3

From Healthy Start to Hurricane Katrina: Six Years of Using GIS to Eliminate Disparities in Perinatal Health

Andrew Curtis, World Health Organization Collaborating Center
for Remote Sensing and GIS for Public Health
Louisiana State University

The “geography” of a neighborhood consists of multiple interlinking spaces, including social, economic, political, and environmental layers that converge in the expression of the built environment. Although similarities between neighborhoods can be found in terms of measures of social vulnerability, each community is still unique in terms of the risks it faces. GIS provides us a tool to combine these different risks as we search for a holistic understanding of community vulnerability.

This paper will provide an example of such a neighborhood level investigation by drawing on the experiences of a six-year collaboration between Louisiana State University and Baton Rouge Healthy Start to reduce racial disparities in perinatal health. GIS was used in the initial grant proposal to identify neighborhoods of risk, and it has since been central to the data storage and analysis of program participant data. This paper will illustrate the advantages of such a participatory GIS. Examples of ongoing investigations and research will include analyses of neighborhood patterns of risk (for example the role that mother mobility plays), development of new geospatial technologies (GPS encoded digital video), and the importance of spatial confidentiality. The paper will then show how the creation of such a community-based GIS allows for research into externalities, such as the impact of Hurricane Katrina on Baton Rouge. Not only can such a GIS support disaster response operations, but it can also provide insight into the impact that a catastrophe can have on community psychopathology and pregnancy outcomes.

Invited Cosponsor Session
Biostatistics Department
Emory University

Disparity in Disparity:
Disparate Measures from Different
Fields

Wednesday, April 18, 2007

1:40 – 3:40 pm

Decatur A

Invited Abstracts

Flexible Modeling of Health Disparity: A Disaggregation Approach to Spatial Modeling of Areal Unit Categorical Data

Eric C. Tassone and Marie Lynn Miranda

Duke University, Nicholas School of the Environment and Earth Science,
Children's Environmental Health Initiative

Alan E. Gelfand, Duke University, Institute of Statistics & Decision Sciences

Measurement of disparities in health-related outcomes between sociodemographic subpopulations is of increasing interest in both public health research and U.S. public health policy. The goals of Healthy People 2010 (HP2010) specifically include reference to the elimination of racial and geographic disparities in health outcomes, and recent guidance from the CDC has reinforced this by making specific recommendations concerning statistical methods for measuring such health disparities. We provide an example of the type of statistical model required to fully elucidate the complex etiology of health disparities in accord with the recommendations of HP2010 and the CDC. We develop novel Bayesian statistical methodology that: 1) accommodates individual-level data in a multilevel modeling framework (needed to measure contextual effects such as whether the effect of race at the individual level differs for areas with differing racial demographics); 2) incorporates spatial information, resulting in more reliable and precise estimates that identify geographic differences in racial disparities; and 3) produces flexible joint probabilities, which allows inference about all marginal and conditional probabilities associated with the model, including alternative measures of disparity (e.g., absolute and relative) and subgroup-specific component rates of disparity.

In our disaggregation approach to Bayesian spatial modeling of categorical data, we develop novel methodology for spatial modeling of subgroups within areal units. Typical Bayesian mapping models use areal unit counts aggregated over subgroups, with subgroups sometimes partially accounted for via covariates or expected counts. Our approach disaggregates these aggregated counts, using individual-level data to form areal unit subgroup cell counts in a spatially smoothed, multilevel loglinear model. We apply this method to develop birth outcome mapping with data disaggregated to the individual level, a generalization of well-established disease mapping methods. Advantages include: a richer class of available models; dimension reduction; and not having to specify a response variable (i.e., not being confined to the typical conditional probability statements). Indeed, joint probability modeling enables inference regarding arbitrary joint, marginal, and conditional probabilities. This enables assessment of the spatial variation in incidence rates, relative risks, odds ratios, or other disparity measures given a set of risk factor levels, as well as any aggregation across these levels. This flexible framework permits us to answer subtle questions about health disparities and even to reconsider fundamental concepts of the measurement of health disparity, in accord with the goals of HP2010 and CDC guidance.

We illustrate our approach with county-level North Carolina Detailed Birth Record data from 1999–2003, focusing on several variables, including low birth weight (LBW), maternal race, maternal tobacco use, and infant sex. Findings highlight geographic differences across counties in the association of these variables. The flexibility of our approach allows posterior inference regarding various quantities of interest, such as overall and subgroup-specific rates of LBW and racial disparities in LBW incidence. We demonstrate the potential of our model to answer policy questions and inform intervention and mitigation strategies.

Invited Abstracts

Discovering Outbreaks in Live Spatial Surveillance: How Do Methods Differ?

Ken Kleinman

Harvard Medical School, Department of Ambulatory Care and Prevention

Recent developments in technology have enable the real-time collection of disease and symptom data that includes location. Several methods for using this data to perform spatial surveillance for public health have been proposed. But how do the methods differ? How can we describe their performance in a way that enables the users of surveillance (local, state, and national public health agencies) to decide which methods best suit their needs? I will discuss some issues in this question and propose some options.

Invited Abstracts

Measuring Disparities using Relative Spatial Distributions with Application to Stream Networks

Mark Handcock

Department of Statistics, University of Washington

Many questions of social inequality or disparity take the form, usually implicitly, of the comparison of distributions across different groups. For example, consider comparing the pollution levels of an area with predominantly lower socioeconomic status to one with predominately higher status. This is fundamentally a distributional question - how does the distribution of the pollution level of the lower socioeconomic area compare to that of the higher. This presentation will describe the concept of a relative spatial distribution to address such questions. We illustrate these ideas by comparing the biological integrity of watersheds in the United States Mid-Atlantic Region by combining information from separate spatial-temporal stream monitoring surveys, available contextual information on watersheds and remote sensing information. We develop hierarchical spatial statistical models for environmental indicators on the streams and rivers that capture the spatial variation in the measures. We use this spatial model to predict spatial distributions and relative spatial distributions for a watershed. Here we draw on methods developed for measuring the spatial distribution of environmental indicators (Handcock 2007) and relative distribution methods for measuring economic inequality (Handcock and Morris, 1999).

Invited Abstracts

Detecting Differential Patterns of Activation in the Human Brain

DuBois Bowman

Department of Biostatistics, Emory University

Functional magnetic resonance imaging (fMRI) is a powerful noninvasive tool used to characterize behavior-related changes in brain activity and to investigate associations in neural activity between different regions. Functional neuroimaging is also useful for addressing important scientific questions regarding *differences* in distributed neural processing between subgroups of individuals, e.g. cocaine addicts and healthy controls. Many challenges are involved in analyzing functional neuroimaging data including the massive amount of data collected, the large number of spatial locations (voxels), and the complex patterns of spatial and temporal correlations in the brain, to name a few. In this talk, we develop a modeling approach in which the second stage specifies a Bayesian hierarchical model for fMRI data that captures spatial correlations between voxels within a given brain region as well as inter-regional correlations. We demonstrate the applicability of our model using a study of response inhibition among cocaine-dependent subjects. We also discuss potential links of our Bayesian hierarchical model to investigate health disparities in other contexts.

Contributed Session 1A

Addressing Racial and Ethnic Disparities

Tuesday, April 17, 2007

10:50 am - 12:15 pm

Mary Gay Room

Contributed Session 1A

The Health Impacts of Subjective and Objective Social Status Among Asian Immigrants

Fang Gong
Centers for Disease Control and Prevention

Despite mounting evidence on socioeconomic (SES) gradient in health, research is limited on the SES-health linkage among immigrants. Traditional SES indicators such as education and income may not fully capture the important stratifying dimensions of status among immigrants. Understanding the validity of SES measures across racial and ethnic groups will significantly contribute to the health disparity research. Using a cohort of nationally representative sample from the National Latino and Asian American Study (NLAAS) (N = 1,509), this study examines the impact of objective and subjective SES upon self-rated health among Asian immigrants. Subjective SES is measured by self-perception of one's social status relative to other reference groups. Findings from logistic regression analyses indicate that controlling for a range of demographic and risk factor variables, conventional SES indicators are not significantly related to self-rated health. Subjective social status, in contrast, independently predicts the health outcome above and beyond traditional SES markers, suggesting that relative status bears more health consequences for Asian immigrants than objective measures of SES.

Contributed Session 1A

High School Student Responses to Different Question Formats Assessing Race/Ethnicity

Danice Eaton, Nancy Brener, and Laura Kann
Centers for Disease Control and Prevention
Vicki Pittman, Office of Specialized Services

In 2005, the format for assessing race/ethnicity on the national Youth Risk Behavior Survey (YRBS) was changed from one to two questions. The 2005 Chicago YRBS included the single-question and two-question formats, providing an opportunity to identify how the change affects reporting of race/ethnicity. Students in grades 9-12 (n=808) were asked at the beginning of a 91-item questionnaire, “How do you describe yourself?” with “Hispanic or Latino” as one of several response options. At the end, students were asked, “Are you Hispanic or Latino?” and then “What is your race?” Using standard algorithms to categorize students, 10.6% were classified as white, 46.2% as black, 33.2% as Hispanic/Latino, 9.2% as other, and 0.9% as missing based on the single-question format. The two-question format yielded a similar distribution: 10.3% white, 41.1% black, 34.8% Hispanic/Latino, 8.2% other, and 5.7% missing. Regardless of the format used, 91.2% of students were classified the same. Self-reported race/ethnicity among high school students is similar regardless of question format, and the changed format will not affect the ability of YRBS data users to conduct trend analysis by race/ethnicity.

Contributed Session 1A

Modeling Diabetes Prevention Costs in the District of Columbia in the Context of Racial Disparities

Ann Goldman, Hala Nsouli, Gary Puckrein, and Sean Cleary
National Minority Health Month Foundation

Objective: We estimated costs for the status quo as well as the implications of potential diabetes prevention efforts to reach the Healthy People 2010 objectives over a period of 10 years in the District of Columbia in the context of racial disparities of diabetes prevalence at the zip code level.

Methods: Per person costs were obtained from the literature and combined with zip code-level population data including, prevalence estimates for diabetes and its principal risk factors such as obesity, and its consequences, such as blindness and amputations, calculated by age (18-49, 50-64, 65+) gender (male, female), and race/ethnicity (white non-Hispanic, black non-Hispanic, Hispanic). Sources for the estimates included the diabetes module of the 2005 Behavioral Risk Factor Surveillance System (BRFSS), the NCHS National Health and Nutrition Examination Survey (NHANES) between the years of 1999-2004, and the NIDDK-sponsored Diabetes Prevention Program, which demonstrated that lifestyle and medical interventions can have a significant effect on preventing the onset of diabetes. These were applied to age-, sex-, and race/ethnicity-specific zip code-level resident populations obtained from the U.S. Census (2000) and entered into a model to estimate the “status quo” as well as the recent results of diabetes-related prevention programs.

Results: The model examined the status quo and projected the consequences of retaining it over the next ten years versus diabetes-related interventions using medication and lifestyle changes in Washington, D.C. where the prevalence of diabetes is above the national average (7.0%).

Conclusions: The ability to explore these differences at the zip-code level makes it possible to target prevention programs so that they are more cost efficient in achieving the desired results.

Contributed Session 1A

Ethnic and Geographic Distribution of Human Papillomavirus Related Anogenital Cancers in the U.S.

Margaret Watson and Mona Saraiya
Centers for Disease Control and Prevention

Objectives: Human Papillomavirus (HPV) is responsible for 100% of cervical cancers, 90% of anal cancers, and 40-50% of vulvar and vaginal cancers worldwide. Disparities in the distribution of the virus, screening and treatment programs, health-related behaviors, socioeconomic status and other factors may lead to disparities in the distribution of HPV-related cancers. This study seeks to examine existing disparities among national and regional populations with regard to rates of HPV-related cancers among women.

Methods: Using data from 39 registries in the Center for Disease Control's (CDC) National Program of Cancer Registries and/or the National Cancer Institute's (NCI) SEER Program for cases diagnosed from 1998-2003, covering 83% of the U.S. population, we assessed the epidemiology of invasive cervical and in situ and invasive vaginal, vulvar, and anal cancers by race and U.S. region. Geographic distributions of the data were represented among four U.S. regions: Northeast, South, Midwest, and West. Incidence rates were age-adjusted to the 2000 U.S. standard population and are expressed per 100,000.

Results: Rates for white females are highest for both anal 1.59, and vulvar cancer 2.40. Rates for cervical cancer are highest among Hispanics (14.73); blacks have the highest rates of vaginal cancer (1.1). Hispanics have the greatest burden of cervical cancer in each of the four regions. For anal cancer among women, whites suffer the greatest burden in the South and West, while Hispanics living in the Northeast and Midwest present the highest rates. For vulvar cancer, akin to national data, whites have the highest rates of cancer in all four regions. Among vaginal cancers, rates among blacks are highest in all four regions as are the national rates.

Conclusion: Racial and geographic disparities currently exist in the distribution of HPV related cancers. These disparities highlight groups who may benefit most from targeted screening, vaccination and education programs.

Contributed Session 1B

Causality in Modeling

Tuesday, April 17, 2007

10:50 am - 12:15 pm

Swanton Amphitheater

Contributed Session 1B

Causal Effects of Race and Medical Indigency for Patients Hospitalized for Stroke

Megan Price, Michael Frankel, Vicki Hertzberg and Kerri Krompf
Emory University

Background

In non-randomized studies, direct attribution of causality to a given factor is not possible. A propensity score, the probability of factor status conditional on observed covariates, can be used as an additional covariate in regression analyses, allowing for the causal inference of the factor's effect.

Objective

To determine effect of medically indigent status and race using propensity scores in an observational study of patients hospitalized for stroke.

Methods

The effects of race and medically indigent status were considered on the change in Barthel Index (BI) from hospital discharge to 90 day follow-up. Propensity scores were calculated and subsequently included in linear regression models estimating the difference in BI change, separately for each factor. These results were compared to traditional linear regression models controlling for covariates.

Results

Covariates identified by traditional model building for the relationship between medically indigent status and outcome were discharge Rankin score and high school education with effect size estimated as -7.52 (medically indigent versus not). Covariates identified via the propensity score method included discharge Rankin score, smoking, age, and race, with effect size estimated as -6.68.

Covariates identified by traditional model building for the relationship between race and outcome were discharge Rankin score and smoking status with effect size estimated as -13.4 (blacks versus whites). Covariates identified via the propensity score method included those covariates as well as medically indigent status, diabetes, low density lipoprotein, and peripheral vascular disease, with effect size estimated as -16.9.

Conclusion

Propensity score analyses do not change the observed relationship between outcome and factor. However, estimates of effect size are altered, and reveal additional mediating covariates that were not identified using traditional tools.

Contributed Session 1B

Dealing with the Ambiguities of the IOM's Definition: A Statistical Conceptual Framework

Naihua Duan, UCLA/NPI Health Services Research Center
Margarita Alegria, Center for Multicultural Mental Health Research
Chih-nan Chen, Boston University
Julia Lin, Cambridge Health Alliance
Xiao-Li Meng, Harvard University

The IOM defines disparity in health care as "racial or ethnic differences in the quality of healthcare (Q) that are not due to access-related factors or clinical needs, preferences, and appropriateness of intervention." (IOM, 2002). This implies that when we contrast two populations for the purposes of measuring disparities, we need to adjust for some variables such as health status (H), but not others, such as social-economical status (S). Depending the causal relationship between H and S, the needed adjustment will take several rather different forms. If H has a causal impact on S, then we should adjust for the marginal distribution of H, while keeping the conditional distribution of S given H intact, then examine the disparity as measured by the difference in the adjusted Q across groups ?we label this conditional disparity. (We assume throughout that both H and S have causal impacts on Q.) If S has a causal impact on H, then we need to adjust for the conditional distribution of H given S, while keeping the marginal distribution of S unchanged. We label this as marginal disparity. If H and S have a reciprocal causal relationship, then we need to adjust the joint distribution for H and S ?we label this joint disparity. We discuss the distinction among the three forms of disparity, and conjecture that the marginal disparity and conditional disparity bound the joint disparity under reasonable conditions. In comparison to the adjustments based on the corresponding causal models, the usual adjustment that adjusts the marginal distribution of H but keeps the marginal distribution of S does not appear to have an easy causal interpretation.

Contributed Session 1B

Estimating Marginal and Conditional Disparities: A Semi-parametric Approach

Xiao-Li Meng, Harvard University

Margarita Alegria, Center for Multicultural Mental Health Research

Chih-nan Chen, Boston University

Naihua Duan, UCLA/NPI Health Services Research Center

Julia Lin, Cambridge Health Alliance

This talk presents a class of semi-parametric methods for estimating marginal disparity and conditional disparity, as defined in the first talk, based on survey data. The general method consists of three steps.

The first step is to fit a parametric or semi-parametric regression model to estimate the relationship between the outcome of interest, such as expenditures, and the predictors, such as health status (H) and social-economical status (S), for each of the two populations being compared, say Latino (population of interest) and White (reference population). The second step is to average the regression function of the population being adjusted for (say, Latino) over a counterfactual population that corresponds to the type of disparity of interest. The actual construction depends on which disparity measure is of interest, but both of them can be done via importance sampling, which amounts to introducing “disparity adjustment weight” to account for the difference in density between the original population (e.g., Latino) and the counterfactual population (e.g., a Latino population but with the marginal density of H the same as the White population). In the third step we take the difference between the result from the second step and that of the reference population to calculate the disparity. We also show that for conditional disparity a simpler and more robust approach exists.

Contributed Session 1B

Disparities in Mental Health Care: Results from NCS-R/NLAAS and Their Policy Implications

Margarita Alegria, Center for Multicultural Mental Health Research

Chih-nan Chen, Boston University

Naihua Duan, UCLA/NPI Health Services Research Center

Julia Lin, Cambridge Health Alliance

Xiao-Li Meng, Harvard University

The combined National Comorbidity Survey Replication (NCS-R) and the National Latino and Asian American Study (NLAAS) include one of the largest, nationally representative data set with rich diagnostic and service use information that includes Latinos, Asians, African Americans and Whites. Nearly 5,000 variables, including constructed ones, are measured. It therefore provides one of the best datasets available to study disparities in many aspects. In this talk we focus on estimating disparities in both the access to health-care and health-care expenditures using the combined NCS-R/NLAAS data. Using the approaches described in the second talk, we present the marginal and conditional disparities in terms of predicted probability for accessing any mental health care in the past twelve months, and predicted expenditure for those with any past twelve month psychiatric disorder for Latinos, Asians, and African Americans compared to whites. The marginal and conditional disparities yielded quite different results, which underline the importance of establishing the purposes of the disparity calculation and the assumptions underlying the mechanisms for changing these disparities.

Contributed Session 1C

Clustering Effects, Time Series, and
Estimations Strategies for
Hard-to-reach Populations

Tuesday, April 17, 2007

10:50 am - 12:15 pm

Henry Oliver Room

Contributed Session 1C

Hired Farmworkers, Tracking an Elusive Population

Andrea Steege and Sherry Baron
Centers for Disease Control and Prevention/NIOSH

The agricultural industry poses occupational risks due to variable environmental conditions, chemical use and high physical demands. The estimated 1.8 million hired farmworkers are especially vulnerable, yet are often not captured through traditional surveillance systems due to their job mobility. Since 1999, NIOSH has collaborated with the US Department of Labor to collect health data on a representative sample of hired farmworkers through the National Agricultural Workers Survey (NAWS), a workplace-based multistage random sample of hired farm workers in the US. The sample is chosen to account for both seasonal and geographic variability in the size of the workforce. Data are analyzed using SAS Survey Procedures accounting for strata, cluster, and unequal weights. Preliminary analysis has shown that the population is predominately male (75%), foreign born (76%), undocumented (52%) and poor (mean family income <\$20,000). Only 24% reported having any health insurance. Workers were more likely to report unavailability of hand washing water in the field if they worked on small farms (<50 workers), if they did not speak English well, and when they worked for a labor contractor.

Contributed Session 1C

Estimating Size of Hard-to-reach Populations

Yang Zhao, University of Regina
Shenghai Zhang, Public Health Agency of Canada

This presentation describes some statistical methodologies for estimating the size of hard-to-reach population, such as injecting drug users (IDUs) and men who have sex with men (MSM). To estimate size of IDU population, it is designed to use the information of number of needles distributed in the needle exchange programs (NEPs) centres. The approach involves using respondent-driven sampling design to collect a sample of IDUs who appear at NEPs in a certain period of time and to obtain retrospective self-report data on the number of friends among the IDUs and number of needles exchanged for each sampled injecting drug user. A methodology is developed that estimates the size of injecting drug users who have ever used the NEPs during the fixed period of time, and which allows us to estimate the proportion of injecting drug users in the group of using NEPs. One of classical methods of estimating size of hard-to-reach population is the capture recapture method. The heterogeneity of capture probabilities on the estimation of population size using capture-recapture data is considered in this article. A generalized estimating equation approach to the problem of estimating capturing probabilities by considering the heterogeneity of the study population is formulated. Resulting probabilities, then serve as denominators for calculating the size of the population.

Contributed Session 1C

Estimates of Intraclass Correlation for Variables Related to Behavioral HIV/STD Prevention

Sherri Pals and Samuel Posner
Centers for Disease Control and Prevention
Brenda Beaty and Sheana Bull
Colorado Health Outcomes Program

Introduction: Studies to evaluate HIV/STD prevention programs often involve random assignment of groups to treatment conditions. Investigators who design group-randomized trials (GRTs) must take the intraclass correlation coefficient (ICC) into account in sample size estimation to have adequate power. Few published ICC estimates exist for HIV/STD prevention studies.

Methods: POWER (Prevention Options for Women Equal Rights) was a GRT designed to evaluate a campaign to increase awareness and use of condoms among young African-American and Latino/Hispanic women. We used POWER data to estimate ICCs for sexual behavior and other variables pre and post intervention implementation, unadjusted and adjusted for covariates.

Results: The ICC for any unprotected sex in the last 90 days was about 0.01. With 200 members per group, this ICC results in a variance approximately 3 times the variance expected with independent observations.

Conclusions: Ignoring the ICC in planning a GRT can result in a design unable to detect intervention effects. This study provides estimates of ICCs from an HIV/STD prevention trial and demonstrates sample size estimation that takes the ICC into account.

Contributed Session 2A

Reliability/Precision

Tuesday, April 17, 2007

1:40 pm - 3:05 pm

Mary Gay Room

Contributed Session 2A

On Testing the Equivalence of Several Treatments in the Presence of Correlation

Hubert Chen
National Cheng Kung University

When there are only two treatments, the two one-sided tests (Schuirmann, 1987, J. Phar. & Biophar.) for equivalence and bioequivalence of the treatments become increasingly important and are a must in the field of pharmaceutical industry for drug development and medical studies. In situations where there are three or more treatments under study when their corresponding treatment populations are correlated, no test on equivalence or bioequivalence of these treatments has been seen in the literature except for independent case by Chen, Xiong and Lam (1993, JSPI), Chen and Chen (1999, Technometrics), Giani and Finny (1991, JSPI) and Wen and Chen (2006, COMSTA).

In this research three types of measures of equivalence or bioequivalence are proposed in the presence of correlation among responses. The first one is the maximum deviation of the treatment means from the grand mean, the second one is the average deviation of the treatment means, and the third one is the range of the treatment means. Three types of distance test statistics corresponding to the measures of equivalence are proposed to test the hypothesis of equivalence of treatments. Since the probability of rejection region by a test is a function of all unknown parameters, it is necessary to find a configuration of means (CM) to guarantee the maximum level at a null hypothesis and a CM to guarantee the minimum power at an alternative hypothesis. By a preliminary study the level and the power of the test are fully independent of the unknown means and variances. For a given level and a given power, the critical value of the test and its required sample size for an experiment can be simultaneously determined. An example is given to illustrate use of the test procedure.

Contributed Session 2A

Comparing Confidence Intervals for a Ratio of Poisson Parameters

Lawrence Barker and Betsy Gunnels
Centers for Disease Control and Prevention

Calculating confidence intervals for the ratio of two independent Poisson processes' arrival rates is a basic problem in health and environmental statistics. If both processes have moderate to large numbers of arrivals, asymptotics make this problem easy. If one or both processes have few arrivals, the problem becomes more difficult, and many solutions have been proposed. We computationally compare seven nominal 95% confidence intervals for ratios of two Poisson parameters (Wald, exact, log-linear, Taylor linearization, scores, and two Bayes intervals, interpreted in a frequentist manner.) Intervals are compared, for a range of parameter values, through: achieved probability of true parameter coverage and median interval length (median instead of mean because some intervals can have infinite length). We determine, among those intervals which achieve nominal coverage of at least 95%, circumstances under which each interval outperforms its competitors. This work will assist practitioners in choosing confidence intervals that best meet their needs, while maintaining nominal coverage.

Contributed Session 2A

Minimum Relative Detectable Differences in Disparity

Jeffrey Percy, Zakia Coriarty-Nelson, and Kenneth Keppel
Office of Analysis and Epidemiology, National Center for Health Statistics,
Centers for Disease Control and Prevention

Minimum detectable differences are a function of the size of the sample or population being considered, and by how common or rare the health outcome is. Our purpose is to illustrate through examples how population size affects our ability to make conclusions regarding reductions in or elimination of disparity. We used National Vital Statistics System data to ensure only random variation was present and that the size of numerators and denominators limit our ability to detect differences. Using a one-tailed test with a 0.05 level of significance we calculated the minimum relative detectable difference (MRDD) for Asian or Pacific Islanders (API), Black non-Hispanics (BnH), Hispanics (Hisp), American Indian or Alaska Native (AIAN), and White non-Hispanics (WnH) for seven types of cancer mortality at the national level. We also calculated the MRDD for API, BnH, Hisp, AIAN, WnH rates of low birth weight at the state level. For all cancers the group with the best rate in 2004 (110.5 per 100,000) was API. The minimum detectable difference from this rate ranged from 1.7 % for WnH to 4.3 % for AIAN. For cervical cancer the group with the best rate in 2004 (2.09 per 100,000) was WnH. The MRDD for this site ranged from 12.8 % for Hisp to 34.2 % for AIAN. For low birth weight in 2003 at the national level the MRDD for the race and ethnic groups was 1.5 %. However, for AIAN nationally the smallest detectable difference was 4.5 %. From state to state the MRDD varied greatly. The MRDD ranged from 3.3 % (Hisp) in California to 70.4 % (WnH) in Vermont. The average MRDD was 16.2 % for all states and the District of Columbia. Discussions of disparity and its elimination rarely include precise definitions of what that elimination means. If elimination means no statistically significant difference between groups, these results show that even very large differences may not be statistically significant.

Contributed Session 2A

Differential Infant Mortality Rates by Socioeconomic Status: 1995-2002

Jay H. Kim, Joe Fred Gonzalez, Jr., and Rong Wei
National Center for Health Statistics
Bimal Sinha, Sinha Statistics Consulting

In our first investigation in 2006, it was observed that infant mortality rates (IMRs) in the United States have been declining slowly and steadily between 1995-2000. Since our first investigation, two more years of data have become available from the national vital statistics program to extend the study period from 1995 to 2002. Among the social and economic variables from the 2000 Census, 14 county variables were selected as indicators of social and economic status, such as median household income and educational level. After the 3,141 counties in the US were merged into 805 health service areas (HSAs), the 14 characteristics were averaged within each HSA for analysis by principal components method to construct five socioeconomic status groups (SES). IMRs by sex, race, and year will be calculated by SES groups and will be compared. These results will also be analyzed by ANOVA to test for significant differences in rates among SES groups. Maps by HSA will be included.

Contributed Session 2B

Strategies for Missing Data

Tuesday, April 17, 2007

1:40 pm - 3:05 pm

Swanton Amphitheater

Contributed Session 2B

An Imputation Strategy for Incomplete Longitudinal Ordinal Data

Hakan Demirtas
University of Illinois at Chicago

Missing data are the norm rather than the exception in longitudinal biomedical studies. Multiple imputation (MI) is an increasingly employed missing-data procedure with a sound statistical basis. MI for ordinal data has not been as well-studied as MI for continuous outcomes, and several of the proposed approaches that have appeared in the literature have serious drawbacks. In this work, we propose a new imputation strategy for correlated ordinal responses borrowing ideas from random number generation. The essential idea is to first collapse the ordinal categories to binary ones, and then to find the marginal expectations for the dichotomized data, along with an iterative scheme for computing the corresponding binary correlations. Once this information is available, one can convert the correlated binary outcomes to multivariate normal outcomes in a sensible way so that re-conversion to the binary scale, after performing MI, yields the original marginal proportions and correlations. The conversion process ensures that the correlations are transformed reasonably which in turn allows us to take advantage of well-developed imputation techniques for Gaussian outcomes. When the binary data are simulated, a further conversion to the ordinal scale can be done using the original relative proportions that are given by the specified marginals. Alternatively, a direct ordinalization is possible via thresholds of underlying continuous variables that were created in the intermediate step. Plausibility of the proposed methodology is examined by applying it to simulated data sets that reflect alternative assumptions on complete data populations and missing-data mechanisms. We also present an application using a longitudinal data set from psychiatric research.

Contributed Session 2B

Multiple Imputation Under Multivariate Fleishman Polynomials

Hakan Demirtas
University of Illinois at Chicago

Multiple imputation (MI) is often perceived as a viable model-based approach to deal with incomplete data, which is a common phenomenon in health sciences. Recently, there has been growing interest in generalized classes of distributions in statistical theory and practice due to their flexibility in model formation. Multiple imputation under such distributions that span a broader area in the symmetry-elongation plane in comparison to MI under the assumption of multivariate normality appears to have the potential of better capturing real incomplete data trends. In this work, we perform MI on simulated data that are generated based on a real psychiatric data set under multivariate Fleishman polynomials. In this approach, any random variable is expressed in terms of linear combinations of powers of standard normal variates. The methodology hinges upon identifying the distributional features of the observed data, finding the estimated coefficients of Fleishman polynomials for each of the variables in the system along with association parameters, and finally filling in missing portions of the data by simulating pseudorandom draws from these polynomials. Our conclusion is that the proposed method is a promising tool for handling incomplete health-related outcomes under ignorable nonresponse mechanisms.

Contributed Session 2B

Effect of Incomplete Provider Ascertainment on Estimates of Racial/Ethnic Vaccination Coverage Rates

Philip Smith

National Center for Immunization and Respiratory Diseases

BACKGROUND:

The National Immunization Survey (NIS) uses provider-reported vaccination histories to obtain estimates of vaccination coverage. Among children with 2 or more vaccination providers, when some providers do not respond to the NIS, children may have an “incompletely ascertained” immunization history, and estimated vaccination coverage may be inaccurately low.

METHODS:

To adjust for incomplete ascertainment, we used a weighting class methodology. In our work, a child is up-to-date if they received 4+ doses of the DTaP vaccine, 3+ doses of the poliovirus vaccine, 1+ doses of the MMR vaccine, and 3+ doses of the Hib vaccine.

RESULTS:

Children with an incomplete ascertainment vaccination history were significantly more likely to belong to a minority racial/ethnic group. For the 2002 NIS, when coverage estimates are corrected for incomplete ascertainment, estimated vaccination coverage increased by 13.0% for American Indians and Alaska Natives, 3.7% for non-Hispanic Blacks, 3.2% for Hispanics, 2.9% for non-Hispanic whites, and 2.2% for Asians. Estimated disparities between non-Hispanic whites and other racial/ethnic groups decreased after estimates were corrected for incomplete ascertainment.

CONCLUSIONS:

When incompletely ascertained immunization histories affect racial/ethnic groups differentially, estimates of vaccination coverage may also be underestimated in a differential manner.

Contributed Session 2C

Small Groups and Strategies for Improving Estimates

Tuesday, April 17, 2007

1:40 pm - 3:05 pm

Henry Oliver Room

Contributed Session 2C

Using the Kalman Filter to Improve Precision for Small Racial/Ethnic Subgroups in Health Surveys

Marc Elliott, David Klein, Nicole Lurie, and Daniel McCaffrey
RAND Corporation
Brian K. Finch, San Diego State University

Elimination of health disparities is a major U.S. policy goal. However, national health data is currently inadequate for assessing health disparities for small racial/ethnic subgroups such as Chinese and American Indian/Alaska Native (AI/AN). Given limited budgets, making efficient use of existing data for small groups is a necessity, suggesting the use of analytic strategies that involve pooling of data over time. This research, funded by the Office of Minority Health (DHHS), evaluates simple unweighted pooling strategies and compares them to a modified Kalman Filter (MKF) that considers autocorrelation and trends over time. The Kalman Filter was first developed as an iterative updating algorithm to “filter” out “noise” in engineering applications, but can be applied to repeated cross-sectional health data. Using NHIS data, we find that the MKF improves analytic precision without the bias that simple pooling can entail in the presence of trends. Gains from the MKF vary by outcome and subgroup. This low-cost approach can be combined with alternative sample design techniques to further improve the precision of estimates for small racial/ethnic subgroups in national health surveys.

Contributed Session 2C

Innovative Sample Design Techniques for Measuring the Health of Small Racial/Ethnic Subgroups

Marc Elliott, Do Diem Phuong, David Klein, Nicole Lurie and Sai Ma
RAND Corporation

Brian K. Finch, San Diego State University

Elimination of health disparities is a major U.S. policy goal. However, national health surveys are currently inadequate for assessing health disparities for small racial/ethnic subgroups such as Chinese and American Indian/Alaska Native (AI/AN). Simply scaling up the sample size of current surveys proportionately, to obtain needed health information on hard-to-reach subpopulations, is costly and inefficient. This research, funded by the Office of Minority Health (DHHS), evaluates alternative sampling strategies to assess the health of Chinese and AI/AN in a cost-effective and accurate manner in national probability samples. We explore three techniques in detail, using NHIS and census data to perform pilot calculations: exhaustive sampling within households, combining listed samples with area samples through disproportionate stratification, and oversampling select census tracts as mechanisms for increasing the effective sample size (ESS) of a national probability sample of a targeted subgroup. Our findings suggest that these sampling techniques can be combined to cost-effectively increase ESS for small sub-groups by a factor of five—greatly improving measurement accuracy.

Contributed Session 2C

Weakness of Current Weighting Matrix Collapsing Approach and Proposal of Alternative Approaches

Jay J. Kim and Linda Tompkins
National Center for Health Statistics

To be able to discuss health disparities among different race and ethnicity groups, we need to have the best possible estimates for health characteristics for all race and ethnic groups. In sample weighting, most surveys combine small race groups such as American Indians, Asians, and Native Hawaiian and Pacific Islanders with Whites. One problem with this approach is that Whites have a much higher coverage ratio than the smaller race groups. Consequently, Whites are overestimated and smaller race groups are underestimated. For example, in 2003 National Health Interview Survey (NHIS), the number of American Indians was underestimated by 42.25 percent and Whites younger than one year of age were overestimated by 7 percent. The reason is that the coverage ratio for Whites is 76 percent, while that for American Indians is only 50 percent. This phenomenon also has an adverse impact on percents. Kim (2004), Kim, et al (2005), Gonzalez, et al (2005, 2006) and Tompkins, et al (2006) proposed alternative approaches for collapsing weighting matrix cells. In this talk, we will review the impact of the current approach of combining cells with disparate coverage ratios, the alternative approaches of cell collapsing and compare their performances.

Contributed Session 2C

Systematic Review Methods to Address Disparity Issues: An Overview of Methods

Theresa Ann Sipe and Randy W. Elder, Community Guide
Centers for Disease Control and Prevention

A systematic review is a process of reviewing and analyzing a body of literature in a systematic manner to determine the effectiveness of interventions and contribute to an evidence base. The Task Force on Community Preventive Services is an entity that conducts systematic reviews of research on a community level and makes recommendations based on the evidence. These recommendations are compiled in the Guide to Community Preventive Services (the Community Guide). An overview of the steps in a systematic review including conceptualizing a review, searching the literature, applying inclusion and exclusion criteria, abstracting the data, analyzing the data and interpreting the results will be provided. Two additional steps of assessing generalizability and making recommendations about the effectiveness of interventions are unique to the Community Guide. The various methods to assess generalizability will be explored. In particular, ways that systematic reviews can be used to address health disparities will be detailed. These include: 1) Directly evaluate interventions designed to reduce health disparities, 2) Assess effect modification where the effect of demographic or other characteristics of disparate populations are explored 3) Assess characteristics of the intervention that may have differential effects on the outcome for different populations. Examples of systematic reviews will be used to illustrate each of these methods.

Contributed Session 3A

Mapping Geographic Disparities

Wednesday, April 18, 2007

10:50 am – 12:15 pm

Mary Gay Room

Contributed Session 3A

Mapping At-risk Populations by Geographic Location: Persistent Clusters of Morbidity in the U.S.

Ronald Cossman, Arthur B. Cosby, Jeralynn Cossman and Wesley L. James
Mississippi State University

Chronic diseases account for more than 60% of total medical expenditures in the U.S., and 70% of all deaths. Yet, morbidity rates for the vast majority of chronic illnesses are not reported at the county level and even those diseases with county-level reports are typically not collected nationwide (e.g., the cancer registries). Public health officials are limited to chronic disease data from national surveillance surveys (e.g., the Behavioral Risk Factor Surveillance System) to estimate local prevalence of chronic disease. We validate an alternative data set of prescriptions-filled that could supplement the BRFSS, based on the findings that 77% of adults diagnosed with heart disease, 97% of adults diagnosed with high blood pressure, and more than 85% of adults with diagnosed diabetes reported taking prescription medication for their illness. We map high and low prescription rates for heart disease, diabetes and stroke for counties across five years. There is a persistent geographic pattern for both high and low prescriptions, and these spatial patterns are statistically significant. Virtually all states revealed great inter-county variation in prescriptions-filled for chronic diseases. The most informative patterns at the county-level are low prescription-fill rate counties in states with overall high prevalence rates, high prescription-fill rate counties in states with overall low prevalence rates, and “very high” or “high” prescription-fill rate counties adjacent to “low” or “very low” prescription-fill rate counties. These geographic patterns suggest several processes at work to determine access to drug treatment for chronic diseases. This methodology could be a powerful tool for targeting and intervention strategies designed to reduce the burden of these diseases, especially in the under-monitored rural areas of the nation.

Contributed Session 3A

Mapping At-risk Populations by Geographic Location: Persistent Clusters of Mortality in the U.S.

Jeralynn Cossman, Arthur B. Cosby, Ronald Cossman and Wesley L. James
Mississippi State University

Research has identified socioeconomic and environmental effects on mortality, but these approaches have tended to be a-spatial, ignoring how place may contribute to mortality. Research has also shown that community factors influence mortality beyond individual factors. Given these spatial correlates, we map all-cause mortality rates to identify place-based mortality patterns. There is a persistent geographic patterning of both high and low county-level mortality rates in the United States spanning at least 35 years, consistent with previous research. Both high and low mortality counties were predominantly rural and experienced younger population out-migration and economic decline. Mapping highlights the persistence of these patterns despite regional population restructuring, advances in medicine, and policies aimed at alleviating socioeconomic and health disparities. These mortality patterns have important implications for proper research model specification and for health resource allocation policies.

Contributed Session 3A

Mapping At-risk Populations: “Rural Health” vs. “Unhealthy Places” as a Dominant Geographic Variable

Arthur B. Cosby, Jeralynn Cossman, Ronald Cossman, Neal Feierabend, Holly Hitt, Wesley L. James and Tonya Thornton-Neaves
Mississippi State University
David Mirvis, University of Tennessee Medical Center

Rural health is a dominant concept in extant analyses of geographic health disparities. The utility of this concept is seen as diminishing with the U.S. demographic shift from a largely rural to a predominantly urban population. Rural-urban differences are now less pronounced. Advances in health data and spatial technologies (Geographic Information Systems, Global Positioning Systems, spatial statistics, and remote sensing) allow a more direct measure of geographic health disparities under the rubric of “healthy and unhealthy places.” Spatial research technologies can be used to identify clusters of healthy and unhealthy places that are readily identifiable, persistent over time, and exhibit profound differences in health outcomes—health disparities that far exceed those detected in most rural-urban contrasts. Using both static and trend data, this paper contrasts and discusses gains in knowledge about geographic disparities that result from an empirical analysis of healthy and unhealthy places. Variables used include life expectancy, mortality rates (including infant mortality), disabilities, teenage pregnancy, poverty, and population growth rate. The analysis of healthy and unhealthy places reveals clusters that correspond to social and cultural regions; document geographic regions with growing health disparities; and provide opportunities for greater precision in policy development, healthcare delivery, and programmatic interventions.

Contributed Session 3A

Using Small Area Analysis to Inform Health Policy: Diabetes Care in the District of Columbia

Hala Nsouli, Sean Cleary and Gary Puckrein, NMHMF
Ann Goldman, National Minority Health Month Foundation

Objective: To examine racial disparities in diabetes preventive care services in the District of Columbia through mapping to facilitate health policy and intervention development at a local level.

Methods: Questions from the diabetes module of the 2005 Behavioral Risk Factor Surveillance System (BRFSS) were used. The zip code-level proportion of persons reporting diabetes preventive care, having a glycosylated hemoglobin (HbA1c) measurement at least once per year (HP2010 target 50%), an annual dilated eye examination (HP2010 target 75%), and an annual foot examination (HP2010 target 75%), were estimated by applying the age- and sex-specific District prevalence to the corresponding zip code-level populations (U.S. Census, 2000). Data were mapped using ArcMap 9.1 (ESRI, 2004).

Results: Diabetes preventive care disparities, defined as the difference in proportion receiving care between blacks and whites in each zip code, were greatest for annual HbA1c (disparity mean = -16.8%) and eye (disparity mean = -12.8) exams. The proportion receiving annual foot exams was higher among blacks (disparity mean = 3.13%). Examination of the maps indicated that the pattern of preventive care disparities varies considerably by diabetes prevalence and percent minority at the zip code level.

Conclusions: In the District of Columbia disparities in diabetes preventive care disparity are related to the prevalence of diabetes and density of minorities. In addition, the pattern of disparities across preventative services was found to vary. Thus, health care planning and targeted diabetes care interventions based only on District-level measures will be inadequate. To achieve the HP2010 diabetes objectives for preventive care services and reduce health care disparities, significant effort needs to be made to incorporate geographic analysis to inform health policy decisions.

Contributed Session 3B

GIS Applications

Wednesday, April 18, 2007

10:50 am – 12:15 pm

Swanton Amphitheater

Contributed Session 3B

Using GIS to Explore Inequalities in Access to Community Water Fluoridation in Massachusetts

Wanda Wright, Michelle Henshaw and Russell Lopez
Boston University

Introduction: Dental caries remains the most common chronic childhood disease, disproportionately affecting low income and minority children. Studies have demonstrated that community water fluoridation (CWF) not only reduces the prevalence and severity of caries, but also reduces disparities between SES groups. The aim of this project was to explore oral health disparities in Massachusetts residents based on the fluoridation status of the community.

Methods: We used Geographical Information Systems (GIS) to compare the demographics of the 351 fluoridated and non-fluoridated communities in Massachusetts. We used data from the 2000 U.S. Census, Claritas, and the Massachusetts third grade oral health survey results. We identified 135 fluoridated and 154 non-fluoridated communities in Massachusetts (the remaining 62 communities cannot be fluoridated because they lack community water supplies). We characterized these communities based on demographics to explore the hypothesis that communities with higher proportions of racial/ethnic minorities, or higher poverty levels, are more likely to lack fluoridation.

Results: Odds ratios (ORs) revealed that Hispanic populations were less likely to live in a community with fluoridated water (95% Confidence Interval, 1.03, 1.22). Individuals with higher median household incomes were more likely to live in fluoridated communities (95% Confidence Interval, 1.02, 1.06).

Conclusion: This analysis suggests that populations already at increased risk of oral diseases (minorities and low income), are less likely to receive the benefits of fluoridated water. CWF is recognized by the CDC as one of the 10 greatest public health achievements of the 20th century and increasing access to it is a Healthy People 2010 objective. To help eliminate oral health disparities, increasing access to CWF should remain a public health priority.

Supported by NIH/NIDCR U54 DE014264 and Massachusetts Blue Cross/Blue Shield Foundation

Contributed Session 3B

Assessing Community Access to Services in a Hazardous Substance Emergency Event: Issues of Spatial Data and Methods

Janet Heitgerd, ATSDR/DHS/GRASP

Norys Guerra, Maureen Orr and Wendy Wattigney, ATSDR/DHS

Researchers and other public health professionals have increasing access to Geographic Information Systems (GIS) software and data. This represents an important gain for advancing an understanding of the importance of place as a determinant of health status and access to public health resources. GIS technology allows the researcher to bring together disparate data sets that share location in common. However, there are also some cautions that are warranted in conducting spatial analyses. In this presentation, we will review some of the conceptual, data, and methodological considerations in conducting a GIS analysis to ascertain whether minority and low-income communities are less likely to have access to emergency and medical resources in the case of an accidental release of toxic substances.

The data on accidental releases are from ATSDR's Hazardous Substances Emergency Events Surveillance (HSEES) system which is a comprehensive, state-based surveillance system of acute hazardous substance releases and their public health consequences. The system captures information on those acute releases of hazardous substances requiring remediation or neutralization according to federal, state, or local law. The data to characterize communities are from the US Census Bureau, USDA Economic Research Service, and Health Resources and Services Administration (HRSA). Finally, data on emergency and medical service resources is from the Homeland Security Infrastructure Program (HSIP).

Contributed Session 3B

A GIS Approach to a Breast Cancer Patterns of Care Study in Oklahoma

Anne Bliss and Dana Lloyd
Oklahoma State Department of Health

Breast cancer is the number one cancer diagnosed in women in Oklahoma. It is also one of the few cancers that can be detected early and subsequently treated more effectively, thereby ideally lowering mortality. In Oklahoma, a patterns of care (POC) study was conducted to determine how women were being treated and to preliminarily identify characteristics that may put them at greater risk of not receiving the most appropriate care available. Those cases diagnosed in 2003 were identified in the Oklahoma Central Cancer Registry (OCCR) and then re-abstracted to obtain the most complete treatment data available. The OCCR is part of the National Program of Cancer Registries (NPCR) and is funded by the Centers for Disease Control and Prevention (CDC). To date, this project is the only POC study conducted by a NPCR-funded registry that was accomplished unfunded.

One of the aspects of this project was to identify geographic patterns that may help identify different patterns of care in women who reside in rural areas versus those that reside in more urban areas. Oklahoma is a largely rural state, with two large metropolitan areas and one smaller one. As is often the case in rural areas, access to cancer treatment facilities may be a major barrier. Therefore, in addition to reviewing the demographic results, they were also mapped using a Geographic Information System. Initially, the data was analyzed geographically by county. However, because of the exclusion criterion and the fact that this initial study only used one year of cancer cases, the number of cases was too small to sufficiently identify any existing geographic trends at the county level. Therefore, the data was aggregated to regions identified as sub-state planning districts, which contain several counties combined. While the results of the study are preliminary, it is hoped that they will help to identify where interventions are needed and where access to care may be of greatest concern.

Contributed Session 3C

Access/Availability of Healthcare

Wednesday, April 18, 2007

10:50 am – 12:15 pm

Henry Oliver Room

Contributed Session 3C
The Impact of Health Service Availability and Accessibility on
Health Outcomes in Central Appalachia

Timothy Hare
IRAPP, Morehead State University

Limitations on travel and accessibility have long been associated with Appalachian underdevelopment. In recent years, the availability of and accessibility to some types of health care services has declined throughout Appalachia, but the current literature is unclear as to the impact this change is having on health outcomes. I examine the relationship between access and outcome related to several types of health care services across the five states encompassing central Appalachia. The Appalachian portions of these states manifest clusters of elevated mortality and health facility utilization rates. Do these areas with the highest mortality rates correspond to zones with the most limited access to health care services? I use data from the US Department of Health and Human Services Area Resource File, American Hospital Association Annual Survey, the Compressed Mortality File, and selected hospital discharge databases to examine travel times to service facilities and explore the geographic clustering of mortality and utilization rates. I assess these patterns using exploratory spatial data analysis and spatial regression. These analyses reveal large underserved areas in central Appalachia that are roughly associated with areas of high mortality rates. These patterns also correspond to high levels of socio-economic deprivation. The findings suggest the need for greater accessibility for several types of facilities and further interventions to alleviate poverty in the affected regions. Future research is also needed to better understand how people determine their utilization of health care services and their relationships to gaps in service delivery.

Contributed Session 3C

Accessibility to Sexual Health Services in Toronto

Eleni Kefalas, Camille Achonu, Effie Gournis, Rita Shahin and Barabara Yaffe
Toronto Public Health

Background: As part of its mandate, Toronto Public Health (TPH) supports the provision of sexual health services at a number of locations across the city. Services include condom distribution, counseling and education, and sexual health clinic services. To be most effective, services should be accessible throughout the city and available in areas with high rates of sexual transmitted infections (STIs). Spatial techniques to assess the distribution of both services and rates of STIs, can be a useful method to identify priority areas for future planning.

Objective: To examine the spatial relationship between sexual health services and cases of sexually transmitted infections within Toronto neighbourhoods.

Methods: Postal code data collected for all chlamydia and gonorrhea cases reported to TPH from 2002 to 2005 were extracted from Ontario's communicable disease information system (iPHIS). Valid postal codes were geocoded to Statistics Canada census tracts and then aggregated to TPH neighbourhood planning areas. Invalid postal codes were excluded. STI period rates per 100,000 population were compiled for each neighbourhood. Postal codes for sexual health services supported by TPH were geocoded and service period rates per 100,000 population were also calculated for each neighbourhood. Pearson correlation between STI period rates and sexual health service period rates was calculated. A point map of sexual health services was overlaid with a point map of STI clients. A 4km buffer at 1km intervals was placed around each sexual health service and the number of STI clients within each 1km buffer away from the service was calculated.

Results: From 2002 to 2005, there were 32,331 cases of gonorrhea and chlamydia reported to TPH. Of these, 30,700 (95%) cases had a valid residential postal code and of those, 25,899 were unique clients. STI period rates over the four years ranged from 216 to 4161 cases per 100,000 among the 140 Toronto neighbourhoods. Sexual health service period rates ranged from 0 to 145 locations per 100,000 population. Correlation analysis indicated a significant positive correlation between high STI period rates and the availability of sexual health services ($r=0.585$, $p<0.01$). Ninety-nine percent of STI clients lived within 3km of a sexual health service.

Conclusion: Sexual health services appear to be concentrated in areas of high disease incidence in Toronto. Whether high disease rates indicate highest need still warrants consideration. Given the majority of STI clients lived within 3km of a sexual health service location, questions around transportation within these areas can give a better understanding of factors that may help maximize effectiveness of services. Planning for future service locations should consider several of these factors.

Contributed Session 3C

Provider Availability and Race-ethnic Disparity in Accessing Primary Care Service

Huey Chen
Georgia State University

Background and Purpose: Minorities experience more barriers in accessing health care, receive lower quality of care with a higher mortality, and have a lower health service utilization rate. Provider availability is one of factors that related to health disparity. The Purpose of this study is to examine the effect of geographical distribution of the Medicaid primary care providers on disparity of accessing primary care by the Medicaid beneficiaries of different backgrounds.

Study Design & Method: The study included adult enrollees who were older than 20 and younger than 65 during the study period using Florida Medicaid eligibility and claims data as well as Medicaid provider data from July 1, 2003 to June 30, 2004. Geographic Information System (GIS) technology was used to map geographical distributions of providers and Medicaid beneficiaries. Partial correlation is also used to examine the relationship between the geographical distribution of primary care providers and services used by Medicaid beneficiary of diverse background.

Conclusions and Implication: Medicaid primary physicians were more likely to be located in the central Florida areas while Medicaid Primary care nurse practitioners were scattered throughout the state, and only few physician assistants provided services to Medicaid MediPass beneficiaries. No significant relationships were found between the geographic location of primary care providers (either physicians or nurse practitioners) and White adult Medicaid beneficiaries. However, geographic location of Black Medicaid adults were significantly negatively related to the geographical location of primary care physician but positively correlated to nurse practitioners; located. Strategies to increase provider availability in the geographical location of minority may reduce disparity in accessing primary care services.

Contributed Session 3C

Racial/Ethnic Disparities in Location and Quality of Care for Chronic Health Conditions

Rhonda BeLue
The Pennsylvania State University

Inequities exist in multiple domains of quantity and quality of care. Variation exists in racial disparities across geographic areas and care settings. It has been shown that elderly Blacks and Whites are treated at racially homogeneous facilities. It has also been shown that elderly Blacks as compared to Whites are treated at facilities that disproportionately: 1) provide more charity care, and 2) have a higher percentage of revenue from Medicaid; they are also likely to receive care from physicians who 1) are more likely to practice in a low-income neighborhood and 2) are less likely to be board certified in their primary specialty. Physicians treating mostly white patients are more likely to indicate that they could confidently provide quality care and access to referrals, specialty care, and ancillary services.

In this study, we investigate the relationship between characteristics of the health care setting and quality of care received for chronic disease in Whites, Blacks, and Hispanics aged 18-65. The National Ambulatory Care Medical Survey 2004 was used for this investigation. Classification and Regression Trees are used to describe the effect of care setting on quality of care received (appropriate or not) for chronic conditions. Preliminary results indicate: 1) racial/ethnic variation by geographic regions in ambulatory care, 2) Whites being treated for chronic disease are more likely to be seen at facilities in which the physician is an owner of the practice as opposed to an employee, 3) Blacks are more likely to be seen for chronic disease at a facility where referral to specialty care is often difficult, and 4) Hispanics are more likely to be treated at a free standing clinic or urgent care center as compared to Whites and Blacks. Results on disparities in source of practice setting revenue, patients' clinical and neighborhood factors, characteristics of care providers and their effect on treatment received for chronic conditions will be examined.

Poster Session 1

Tuesday, April 17, 2007

12:15 pm – 1:40 pm

Rotunda

Poster Session 1

Multiple-instrument Quality Control for the Age-related Eye Disease Study

Samuel P. Caudill, CDC/NCEH/DLS/CCB
Rosemary L. Schleicher, CDC/NCEH/DLS/ITN

The Age-Related Eye Disease Study (AREDS) was a major clinical trial sponsored by the National Eye Institute designed to: 1) learn more about the natural history and risk factors of age-related macular degeneration (AMD) and cataract; and 2) evaluate the effect of high doses of antioxidants and zinc on eye disease progression. AMD and cataract are leading causes of visual impairment and blindness in the US. The frequency of both diseases increases dramatically after age 65. Participants were randomly assigned to receive daily tablets containing either antioxidants or no antioxidants. Blood was drawn annually from a subset of patients, and levels of lipids and fat-soluble micronutrients were measured in the Division of Laboratory Sciences at the National Center for Environmental Health.

Because of the complexity of the analytical methods, and the possibility of instrument error due to failure of any one of many component parts, several different instruments were used for a given analyte. In addition, to assure that the measurement systems were performing adequately across a wide range of concentrations, multiple control pools were monitored, often with analyte concentrations at low, medium, and high levels. Because of the need for comparability of measurements across all specimens and because the multiple instruments for a given analyte were essentially identical with interchangeable modular components, we used a QC system capable of generating one uniform set of QC limits for each chemical agent and QC pool while at the same time insuring separate monitoring of each instrument. In this presentation we illustrate the automated statistical QC system used during the later part of the trial (AREDS Phase III). This system is a multi-rule quality control system (MRQCS) designed to provide uniform monitoring of multiple analytes measured by one or more instruments so that measurements obtained from different instruments can be combined.

Poster Session 1

Using SAS PROC GLIMMIX to Conduct Within-subjects Analyses with Categorical Outcomes

Merle Hamburger and Lawrence Barker
Centers for Disease Control and Prevention

Measures of self-reported frequencies of youth physical violence victimization and perpetration are typically skewed, with many respondents reporting no violence and a few reporting more frequent involvement. As a result, normalizing transformations may not be possible; thus, data are often dichotomized (ever/never). When violence victimization and perpetration data are collected from the same person, it is common to analyze an individual's victimization or perpetration experiences separately, thereby ignoring their correlated nature. Instead, we treat an individual's victimization/perpetration experiences as within-subjects data. SAS PROC GLIMMIX allows repeated measures analysis of dichotomous outcome data. Using data from a survey of 4,131 adolescents from a high-risk school district, we dichotomized outcomes (never/ever experienced physical violence) and treated ROLE (victim vs. perpetrator) and CONTEXT (dating vs. peer violence) as within-subjects variables, and GENDER (male vs. female) as a between subjects variable. Using PROC GLIMMIX, we found a significant ROLE x CONTEXT x GENDER interaction ($p < 0.001$), indicating that male and female reports of physical violence vary across both context of and role in event. We conclude that analyzing these types of data using the within-subjects approach may better reflect the factors that contribute to violent victimization and perpetration.

Poster Session 1

Adjusting for Confounders Related to Disparity in Clinical Genetic Studies

Michael Brimacombe
New Jersey Medical School – UMDNJ

Many genetic studies of rare illnesses develop cohorts through the collection and assimilation of samples drawn from multiple sites, with little control of behavioral or background demographic data. It is often the case that racial and ethnic disparities arise and may affect the assessment of genetic prevalence and genetic-environmental factors, especially where the onset or detection of the illness in question is affected by environmental or behavioral conditions. In such cases, the use of propensity score and instrumental variable based adjustments may be necessary to properly interpret the relative significance of genetic factors. The genetics of TB resistance is discussed where sampling is related to case status and confounding by indication a possibility.

Poster Session 1

Explaining Racial Disparities in HIV/AIDS Among Women in the U.S.: A Literature Review

Kristen Tillerson
Spelman College

Surveillance data indicate that HIV incidence among Black women is more than 20 times that of White women. Several studies have examined HIV risk factors by race/ethnicity including: high-risk sex, drug use, inconsistent disclosure of same-sex behavior by male partners, and sexually transmitted diseases. We formed these risk factors into 4 hypotheses that attempt to explain the higher incidence of HIV infection among Black women. Then we conducted a literature review by searching 3 online databases for studies published between 1985 and 2006 addressing the 4 hypotheses. Literature suggests that Black women are no more likely to have unprotected sex, have multiple partners or use drugs than women of other racial/ethnic groups. However, some studies suggest that Black women are more likely to have risky sex partners and STDs. We also found that Black men are less likely to disclose their same-sex behavior to female partners. Results are inconsistent for these hypotheses explaining the greater burden of HIV among Black women. Future investigations should continue to explore these and other social and behavioral factors to explain racial/ethnic disparities in HIV incidence.

Poster Session 1

Self-efficacy and Work-readiness of Disadvantaged Females

Linette Deloatch Anthony

FMO at Centers for Disease Control and Prevention

The Personal Responsibility and Work Reconciliation Act (PRWORA, HR 3734), passed by the 104th U.S. Congress in 1996, replaced Aid to Families with Dependent Children (AFDC) with Temporary Assistance for Needy Families (TANF). TANF requires all welfare recipients, except the elderly and disabled, to enroll in a workforce welfare program after receiving government assistance for 24 months. The passage of PRWORA shifted the emphasis of federal policy away from cash assistance toward a Work First or employment approach. The Work First approach to welfare raises important training considerations that need to be addressed to better position TANF recipients for employment. Specifically, counselors responsible for training TANF recipients need to know what key factors are most important in identifying training participants' job-readiness. Job-readiness as indicated by an individual's ability to demonstrate the technical skills and interpersonal behavior necessary for employment (Overtoom, 2000).

Using correlational research design, the relationship of perceived employment self-efficacy and other selected factors to job readiness for TANF recipients was examined. Based on Bandura's Social Cognitive Theory, a significant relationship between perceived employment self-efficacy and job-readiness was expected.

Participants in this study were 94 female students enrolled in the New Connections to Work (NCTW) program. Results indicate a statistically significant relationship between perceived employment self-efficacy, education and job-readiness. Thus, training and counseling activities with disadvantaged females would be enhanced by including a measure of perceived employment self-efficacy to assess job-readiness.

Poster Session 1

Inferences in Censored Cost Regression Models with Empirical Likelihood

Gengsheng Qin

Department of Math & Statistics, Georgia State University

In many studies of health economics, we are interested in the expected total cost over a certain period for a patient with given characteristics. Problems can arise if cost estimation models do not account for distributional aspects of costs. Two such problems are 1) the skewed nature of the data and 2) censored observations. In this paper we have proposed an empirical likelihood (EL) method for constructing a confidence region for the vector of regression parameters and a confidence interval for the expected total cost of a patient with the given covariates. We have shown that this new method has good theoretical properties and have compared its finite-sample properties with the existing method. Our simulation results have shown that the new EL-based method outperforms the existing method, particularly when cost data are highly skewed. Finally, we illustrate the application of our method in a real data set.

Poster Session 1

Ecological Inference Issues in Geodemographic Segmentation for Health Communication and Marketing

William Pollard
Centers for Disease Control and Prevention

With the growing recognition of the role of behavior change for the prevention of lifestyle-related illnesses, the use of persuasive communication has become increasingly important for improving the health of at-risk and underserved populations. In recent years the adaptation of concepts and techniques from the field of commercial marketing for public health for this purpose has been advocated. A key concept adapted from marketing is segmentation: dividing the market or audience into subgroups with different needs and characteristics that require different marketing approaches. A widely-used segmentation method in commercial marketing is geodemographic segmentation in which small geographic areas in census and postal geographies are grouped together on the basis of a combination of demographic variables into segments, called clusters, which differ in lifestyle, media habits, and consumer behavior. The cluster classification for areas provides a basis for decisions about targeting and marketing approach in a GIS context. The units of analysis here are areas, and the data are aggregate statistics for areas. Some uses of the data may involve inference about individual-level characteristics and relationships from the aggregate-level data. This type of cross-level inference is known as ecological inference, and because of information loss in aggregation, it can lead to erroneous conclusions known as ecological fallacies. The purpose of this paper is to outline within a multilevel inference framework the nature of the problem and the conditions under which it occurs in this type of application. This is illustrated with comparisons of characteristics and relationships of communication- and health-related variables using area-level geodemographic segmentation data and individual-level national consumer survey data from 2005-2006. Similarities and differences in commercial and health marketing are noted, and guidelines for avoiding ecological fallacies presented.

Poster Session 1

Categorizing Measures of Health Disparity by Difference Detection Methods

Megan Price and Lance Waller
Emory University

Research has established that health disparities exist across a wide range of health outcomes. Although progress has been made toward standardizing health outcomes measurements, standard definitions of disparity indices based on such measurements have not been established.

We conducted a literature review and organized studies by health outcomes under investigation, the type of data considered, and measures of health status and disparity. The categorization reveals key differences between approaches regarding available data and questions addressed as well as providing a critical comparison between the original questions of interest and those questions answered by available data. The typology provides important insight into which types of research questions a given class of tools may be most suitable in addressing.

Lack of specificity when referencing analytical tools used to determine health disparities can lead to vague and inaccurate language in reports of observed health disparities. A better understanding of the data requirements and types of questions addressable by different disparity measures can clarify conclusions both for researchers and their scientific and lay audiences, leading to more accurate, reliable, and comparable reporting of results.

Poster Session 1

Epilepsy Rate Disparities Among Multiple Races in Philadelphia

David Wheeler, Emory University
John Elliott, Ohio State University Comprehensive Cancer Center

The Centers for Disease Control and Prevention (CDC) defined epilepsy as a public health issue in a recent 2003 report, *Living Well with Epilepsy*. The report highlighted the dearth of and emphasized the importance of epilepsy studies in minorities and people of low socioeconomic status (SES), where SES is comprised of measures of education, income, and occupation and is noted to be a risk factor for epilepsy by researchers (Hesdorffer et al. 2005). In response to this call for more attention to the epidemiology of epilepsy in low income and minority areas, we describe in this poster an investigation of inequality in epilepsy rates among African American, Hispanic, and Caucasian populations in the city of Philadelphia, Pennsylvania. Certain neighborhoods in the study area are predominantly populated by racial minorities and are low income. We analyze inpatient and outpatient epilepsy data for years 2002 through 2004 from the five hospitals in the Temple University Health System (TUHS) at the neighborhood (ward) level and inpatient epilepsy data for the same time period from the Pennsylvania Health Care Containment Council (PHC4) system at the ZIP Code level. A local indicator of spatial association (LISA) analysis shows there is significant positive spatial autocorrelation in both the raw and smoothed neighborhood epilepsy rates and that there are both low-rate and high-rate groups of neighborhoods. Maps of the smoothed and raw epilepsy rates by race show different patterns of spatial variability in rates, depending on the race. We perform and present results of a small area estimation of the neighborhood epilepsy rates using covariates related to income, race, education, and certain health risk factors to explain spatial variability in rates.

Poster Session 1

The U.S. Socioeconomic, Racial and Ethnic Disparities in Health Insurance: A Geography Perspective

Xingyou Zhang, The Robert Graham Center for Policy Studies in Family Medicine and Primary Care

Michelle Proser, National Association of Community Health Centers, Inc.

Health insurance is often a prerequisite to access primary and preventive care or medications. It has been thoroughly documented that health insurance status and types are associated with a variety of health conditions outcomes and their disparities among different socioeconomic, racial and ethnic groups. However, few studies of health disparities address such difference across regions at different scale. Identifying the spatial disparities in health insurance among these sociodemographic groups are important for delivering policy solutions to reduce the persistent and increasing health and health care disparities, because serious residential segmentation exist across US. Different sociodemographic groups, such as African Americans and Hispanics, non-Hispanic whites tend to live in quite different places or neighborhoods. A better understanding of geographic disparities in health insurance at multiple levels, from region to state to local county, a core measure of health care access, could contribute to eliminating health and health care disparities. Reducing geographic disparities is likely to have a first-order impact on improving the equities in health care and health outcomes.

In this paper, we used combined 2000-2003 CPS estimates of health insurances coverage at state and county level to illustrate the geographic disparities in health insurance by type and by demographic and economic groups. The combined three years are used to improve the statistical power, since single year survey data do not often give enough observations to obtain reliable estimates across counties. We applied spatial cluster analysis and Bayesian Hierarchical Spatial Models for both state and county level health insurance coverage with aim to detect the significantly spatial cluster of low and high insurance coverage regions by insurance types and sociodemographic groups. Our preliminary data shows very significant difference in health insurance coverage. For example, the uninsured population varies from 5.25~42.2% between counties, 7.6~22.9% between states, although the uninsured for whole US is 14.7%. These geographic disparities in health care access may require different local policy solutions to effectively address the disparities in health care and health outcomes. Also statistically the incorporation of spatial dimension would provide a more valid empirical approach documenting the health care access disparities, which is often ignored in most relevant studies.

Our further research will combine these health insurance measures with other health care access measures, such as health care facilities and physician workforce, and link with local area health outcomes.

Poster Session 2

Wednesday, April 18, 2007

12:15 pm – 1:40 pm

Rotunda

Poster Session 2

Measurement Properties of Neighborhood Characteristics Using an Observational Method

Marc Elliott, and Marika Suttorp RAND Corporation
Luisa Franzini, University of Texas, Houston School of Public Health
Janice Gilliland, University of Alabama at Birmingham
Steven Kinchen, Tim McManus, Tariq Qureshi
National Centers for Disease Control and Prevention
Narayan Sastry, University of Michigan
Mark Schuster, UCLA/RAND Center for Adolescent Health Promotion
Eliana Turk, University of Texas, Houston
Michael Windle, Rollins School of Public Health, Emory University

Two trained observers rated 64 aspects of the residential blockfaces of 650 randomly sampled 5th graders from 21 schools in 3 sites as part of the Healthy Passages study. An urban blockface is the portion of a residential block between 2 street corners. Observers rated physical (e.g. condition of private and public spaces) and social characteristics (e.g. types of people present). Factor analysis of the former suggested 3 normally distributed scales: “commercial activity” (CA) (e.g., traffic flow on street), “residential decay” (RD) (e.g., condition of residential buildings), and “protective activity” (PA) (e.g., neighborhood watch groups) with alphas of 0.7-0.9 and Spearman-Brown reliabilities of 0.9-1.0. Social observations depended on the time of observation and did not support reliable scale development. CA, RD, and PA scales correlated with HH income, but not race-ethnicity or parental education except through income. School-level RD was a risk factor for and PA was protective with respect to victimization, inactivity, and low Peds QL after controlling for race-ethnicity, education, and income.

Poster Session 2

Simulation-based Sampling to Achieve Racial-ethnic Targets through the Selection of Entire Schools

Marc Elliott and Marika Suttorp RAND Corporation

Sandra Berry, RAND Health/UCLA-RAND PRC

Jo Anne Grunbaum, Steve Kinchen, Centers for Disease Control and Prevention

David Helms, Charles Katholi and Sijian Zhang

University of Alabama Birmingham, PRC

Steve Kelder and Susan Tortolero, University of Texas, Houston

Mark Schuster, UCLA/RAND Center for Adolescent Health Promotion

Michael Windle, Rollins School of Public Health, Emory University

Healthy Passages, a CDC-sponsored community-based, multi-site longitudinal study of adolescent health needed a sampling design that maximized the power to compare health outcomes, trajectories, and associations among African-Americans, Hispanics, and non-Hispanic Whites in a probability sample of public school 5th-graders from Birmingham, Houston, and Los Angeles. Subsampling within selected schools by race/ethnicity was not permitted. We randomly selected schools with probabilities proportionate to a weighted measure of the scarcity of students in that school relative to the race/ethnic targets for the city in question. Simulation was used to optimize school selection and to derive weights. The selected schools corresponded closely to racial/ethnic targets, with minimal design effects. In particular, targets for individual race/ethnicity were matched more closely than would have been possible in a simple stratified random sample of schools. This new simulation-based technique can effectively achieve targets at the individual level purely through the selection of higher-level units, eliminating screening.

Poster Session 2

Factors Affecting Enrollment in Two Literacy Studies in English and Spanish Speaking Cancer Patients

Hongyan Du, Evanston Northwestern Healthcare/CORE
David Cella and Elizabeth Hahn, Northwestern University

Background: Socio-demographic and healthcare system factors may affect patients' willingness to participate in research studies. Participation bias could impact inferences regarding outcomes. **Methods:** Two health-related quality of life studies were conducted in English- and Spanish-speaking patients (pts) at several cancer care centers including public hospital/safety-net facilities. Pts had a range of literacy skills and each enrolled pt received \$20 for participation. **Results:** 651 En-speaking pts were approached with 420 enrolled (64.5%). 455 Sp-speaking pts were approached with 414 enrolled (91.0%). Using logistic regression, recruiting site was the only factor predictive of enrollment in Sp-speaking pts. Age, gender, education and recruiting site were important predictors in En-speaking pts. **Conclusions:** Sp-speaking pts enrolled at a much higher rate than En-speaking pts. Two literacy-related factors (age and education) did not affect enrollment in Sp-speaking pts suggesting no selection bias. Recruiting sites with more pts in need have higher enrollment, suggesting that monetary incentives and healthcare system factors are important considerations in study participation.

Poster Session 2

Reliability and Validity of Self-report Measures: A Comparison Between English and Spanish Versions

Kaori Fujishiro, NIOSH

Valid and comparable measures are imperative to identify health disparities. This study compares the reliability and validity of self-report measures between English- and Spanish-speaking employees (n=408 for English, 62 for Spanish) in the job stress context. Measured variables included low back pain (LBP) symptoms as well as perceived characteristics of the job and workplace. Measures addressing the nature of social interactions at work (e.g., social support) and well-being (e.g., pain, perceived job stress) had high reliability for both languages. However, measures assessing characteristics of work (e.g., workload) had low reliability for Spanish-speaking employees. Among the measures with acceptable internal consistency (Cronbach alpha >.70), the self-reported LBP symptom score was highly correlated with an objective measure of back functioning obtained from lumbar motion monitoring for English-speaking employees but not for Spanish-speakers. Self-report measures of social environment at work are highly correlated with a perceived job stress score for English-speaking employees but not for Spanish-speakers. Recommendations for future survey studies will be discussed.

Poster Session 2

Influence of Nativity and Race/Ethnicity on Mortality Among Los Angeles County Residents

Alex Ho, Aida Angelescu, David Kwan, Margaret Shih and Paul Simon
Los Angeles County Department of Public Health

Objective: To examine differences in mortality rates in Los Angeles County residents by nativity (country of birth) and race/ethnicity.

Data sources and methods: We examined 236,756 LAC resident death certificates recorded over a 4-year period from 1999 to 2002. The four major racial/ethnic groups examined, non-Hispanic white, non-Hispanic black, Hispanic and Asian/Pacific Islander, comprised over 97% of LAC's 9.5 million residents, among whom about 37% were identified as being born outside the country. By utilizing the Census of Population and Housing, Public Use Microdata Sample (PUMS), race/ethnicity specific age-adjusted mortality rates of all major diseases were computed by birthplace (US-born versus foreign-born). The foreign-born Hispanic group was further stratified by country of birth into Mexican-born versus non-Mexican born.

Findings: Overall mortality for US-born residents substantially exceeded that for foreign-born residents. (950 per 100,000 population per annum versus 737). However, a foreign-born overall mortality advantage was found among Hispanics (665 per 100,000 foreign-born versus 828 US-born), while among non-Hispanic blacks, mortality was higher among those who were foreign-born (1,583 per 100,000 foreign-born versus 1,265 US-born). Among foreign-born Hispanics, higher mortality rates were found among Mexican-born Hispanics compared to non-Mexican-born Hispanics for all major causes of death, except for colorectal cancer and homicide.

Conclusion: Our study identified substantial racial and ethnic disparities in mortality within the highly diverse population of Los Angeles County. Despite its relatively small size, the foreign-born Hispanic non-Mexican group contributed most notably to the 'Hispanic paradox' evidenced in the study. In contrast to the foreign-born mortality advantage found among Hispanics, a mortality disadvantage was found among foreign-born non-Hispanic-black.

Poster Session 2

Quality Assessment of Interpreters Conducting Health Surveys with Language Isolated Adults

Michael Link and Ali Mokdad
Centers for Disease Control and Prevention

Real-time interpretation during a survey can expand the number of languages in which surveys are offered. There are questions, however, about the quality of the interpretation process given that the interview is typically not pre-translated. A detailed assessment of the quality of this approach is provided using behavior coding of interviews conducted with respondents who otherwise would have been finalized as “language barrier nonrespondents.” Interviews were recorded and behavior coded, quantifying for each question (1) the accuracy of the question interpretation, (2) the accuracy of the interpreted response, (3) the degree of difficulty administering the question, (4) the number of times the question needed to be repeated, and (5) the number of times the interpreter and respondent engaged in dialogue that was not relayed to the interviewer. The approach produced favourable results, with less than a 4% error rate for interpretation of the questions and a 1.4% error rate in interpretation of survey responses.

Poster Session 2

Diagnosis-based Disease Associations – Toward Health Data Mining with a SAS Program

Yao-Hua Luo, Northrop Grumman/ Centers for Disease Control & Prevention
Information Technology Services & DACH (Division of Adult and Community
Health)/National Center for Chronic Disease Prevention and Health Promotion
Matthew M. Zack, DACH (Division of Adult and Community Health)/National
Center for Chronic Disease Prevention and Health Promotion

We developed a SAS program to examine associations among diseases identified with ICD-9 or ICD-10 diagnostic codes in existing data sources such as the U.S. National Hospital Discharge Survey and U.S. Mortality data. This program requires specifying ICD codes, their corresponding disease names, demographic characteristics, time periods, and the statistical significance level. This program then automatically extracts and manipulates the data; calculates odds ratios, measures of disease associations; tests these associations for statistical significance; and writes an easily readable layout that facilitates deeper exploration of new hypotheses suggested by these associations. The program's flexible settings also make it easy to examine confounding factors that may account for previously unsuspected disease associations. Our preliminary study of associations among epilepsy, osteoarthritis, and other diseases have suggested new research hypotheses and health prevention strategies for epilepsy and osteoarthritis. The results will be improving and integrating procedures for health prevention further studies.

Poster Session 2

A Proportional Hazards Model Analysis of Risk Factors for HIV Prevalence Among Female Sex Workers in Ghana

Clement Ahiadeke
University of Ghana

Common goals in epidemiologic studies of infectious diseases include identification of the infectious agent, description of the modes of transmission, and characterization of factors that influence the probability of transmission from infected to uninfected individuals. In the case of acquired immunodeficiency syndrome (AIDS), the agent is identified as the human immunodeficiency virus (HIV), and transmission is known to occur through various contact mechanisms including unprotected sexual intercourse which contributes about 85% of HIV prevalence in sub-Saharan Africa. However, not much is known about the role which various cofactors play in aiding or suppressing transmission. Yet knowledge of infectivity and its relationship to other factors is important in understanding the dynamics of the AIDS epidemic and in suggesting appropriate measures to control its spread particularly, in sub-Saharan Africa, where HIV is most widespread. In a retrospective cross-sectional study involving female sex workers, we aimed to estimate the risk factors of HIV infection in relation to the behavioral conditions of the work environment of sex workers. Lacking randomization and prospective design, a careful analysis can still assess causality or association. Temporal sequence, plausible mechanisms, dose-response relations and elimination of other alternatives are all indications of causation and attempts were made to employ these approaches in the analysis of the sex worker data to determine behavioral factors associated with high levels of HIV prevalence among sex workers.