

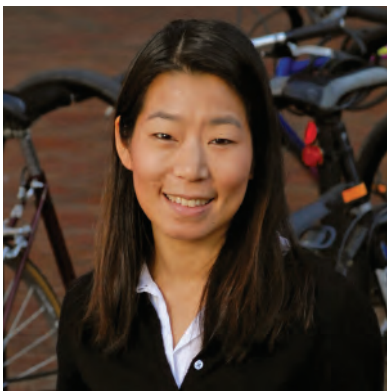


Graduate Students Serve North Carolina



Graduate Education Advancement Board

2008 Impact Awards



UNC

THE GRADUATE SCHOOL

The University of North Carolina at Chapel Hill

2008

Making a Difference, Having an Impact on North Carolina

From the mountains to the coast, Carolina graduate students' research benefits North Carolina communities. The Impact Award recognizes and encourages graduate students whose research is making a difference to our state. Impact Awards are privately funded through generous contributions from the members of the Graduate Education Advancement Board of the Graduate School and by the Graduate School.

Impact Award winners present their research, receive a cash award, and are recognized at the Annual Graduate Student Recognition event, this year on April 3, 2008, 3-6pm, at the George Watts Hill Alumni Center on the Carolina campus. A faculty review committee selected 27 projects to receive Impact awards.

This report briefly describes these research projects, which reach from one end of North Carolina to the other. They affect the economic development of our state, the quality of health and human services delivered to our citizens, and the quality of our educational systems and environmental resources. Carolina graduate students' research is clearly making a difference in the lives of North Carolinians across the state and beyond.

We hope you enjoy reading about the work of these exceptionally talented Carolina graduate students. These students, and many others like them at the University of North Carolina at Chapel Hill, are actively helping the residents of this state through their research. If you'd like to hear more about the research of Carolina graduate students, many of them are available to speak with your community group. For more information, please go to our webpage: <http://gradschool.unc.edu/> or contact us.

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The Graduate School of the University of North Carolina at Chapel Hill thanks the members of the **Graduate Education Advancement Board** for their generous financial support of these Impact Awards.

2008 GEAB Impact Award Winners

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Economic Development/Environmental

Erin P. Fraher, Health Policy and Administration

The Allied Health Workforce Tracking Project

Policymakers in North Carolina have traditionally struggled with assessing the adequacy of allied health professionals. Many allied health professionals are not licensed, there are no uniform credentialing requirements, and significant cross-training and cross-practicing occurs between disciplines, particularly in smaller and rural settings. Yet the demand for allied health services and jobs is likely to grow in the next several



Erin Fraher quantified allied health professional job vacancies and identified allied health professions facing shortages in North Carolina.

decades, fueled to a large extent by a rapidly growing and aging population.

Erin Fraher, a doctoral student in Health Policy and Administration, quantified allied health professional job vacancies by monitoring newspaper and online advertisements in North Carolina. She successfully identified allied health professions facing shortages. She also noted important differences that exist in the demand for allied health professionals across all regions of the state.

The North Carolina Governor's office used Fraher's data in its application to the National Governor's Association as evidence of the need for a statewide initiative to increase the allied health workforce. This led to an award of up to eight seed grants worth \$50,000 each, which will be used by workforce development boards to create and implement plans to address employer and worker needs in specific allied health occupations.

Ying Li, Public Policy

Estimating Community Carbon Dioxide Reductions in Chapel Hill and Carrboro

In 2006, the Town of Chapel Hill and the University of North Carolina at Chapel Hill committed to a 60 percent reduction in carbon dioxide emissions by 2050. As part of this effort, the UNC Institute for the Environment, in collaboration with the Carbon



Reduction Program at the University of East Anglia in Norwich, England, developed the Community Carbon Reduction (CRed) Program of Chapel Hill and Carrboro. The program's goal is to

Ying Li conducted a quantitative estimate of annual carbon savings that can result from more than a hundred proposed actions within the Chapel Hill and Carrboro communities.

help individuals and organizations identify and carry out effective strategies to reduce carbon emissions at the local level.

As part of the CRed Program, Ying Li, a doctoral student in Public Policy, conducted a quantitative estimate of annual carbon savings that can result from each of more than a hundred proposed actions within five sectors of Chapel Hill and Carrboro: the municipal government, UNC-Chapel Hill, the transportation sector, the residential sector, and the commercial sector.

Li's findings allow CRed Program participants to know how much of an impact their pledges and actions have on annual carbon savings. It can also be used to inform local governments, businesses and residents about some of the most cost-effective, technologically feasible and socially acceptable strategies available for reducing carbon emissions.

Kim R. Manturuk, Sociology

Assessing the Impact of Payday Lending De-authorization on Moderate-Income Households in North Carolina

In 2001, North Carolina became the first state to de-authorize payday lending by allowing the law that authorized it to expire. Some payday lending chains continued to operate under partnerships with out-of-state banks, arguing that this arrangement exempted them from state law. However, the North Carolina Attorney General successfully prosecuted one of these chains, and all other stores operated by out-of-state chains were subsequently



Kim Manturuk assessed the state of the household credit market since legal payday lending was de-authorized in North Carolina.

eliminated. Today, even Internet payday lending is subject to state law.

Kim R. Manturuk, a doctoral student in Sociology, assessed the state of the household credit market since legal payday lending was de-authorized in North Carolina. She designed focus groups and a telephone survey to collect data on the financial shortfalls people face, how they manage these shortfalls, their experiences with payday lending, and the impact payday lending de-authorization has had on their lives. She found that most people were unaffected by the ban due to the existence of alternative options.

Manturuk's findings were referenced by the North Carolina Office of the Commissioner of Banks in its policy recommendation not to re-authorize payday lending in the state. Her findings can also encourage lenders to offer alternatives to payday loans and thus expand the range of credit options available to moderate-level income families.

Lauren A. Patterson, Geography

Semi-temporal Analysis of Socioeconomic Exposure to Assess Flood Policy Effectiveness in North Carolina

Even after a century of evolving flood policies, population and property losses due to floods continue to increase. Between 1995 and 2005, five North Carolina counties suffered 44 deaths and \$13 billion in property damage. Global climate change models also predict an increase in extreme precipitation events, which could result in more



Lauren Patterson studied the movement of North Carolina's population onto and off of flood-prone areas. She showed that a number of counties are allowing people to move into the same areas that were flooded during Hurricane Floyd.

floods especially in the southeastern part of the United States.

Lauren Patterson, a Master of Arts in Geography graduate, studied the movement of North Carolina's population onto and off of flood-prone areas. She examined the potential increase in losses related to the 100-year floodplain, which defines the spatial boundary within which policies are enforced to actively reduce flood losses. Her research created a framework based on Geographic Information Sciences (GIS) — an ideal method for storing, distributing and analyzing floodplain boundaries in relation to the spatial distribution of populations and property through time — to integrate census, land cover, hydrology and other data to calculate flood exposure.

Patterson's research will be profoundly important to North Carolina's hazard and emergency management personnel as they evaluate the future development of the state.

Adam K. Walsh, Social Work

The Impact of Supportive Housing on the Homeless of North Carolina: Evaluation of Cost Effectiveness and Quality of Life

Despite the considerable amount of wealth, high level of industrialization, and countless scientific and technological advancements taking place almost every day in the United States, homelessness persists as one of

the country's most serious and devastating problems. The North Carolina Inter-agency Council for Coordinating Homeless Programs estimated that on any given night in

Adam Walsh assessed the cost effectiveness of supportive housing units in four North Carolina communities.

2005, 11,165 people in North Carolina were homeless.

Adam K. Walsh, a doctoral student in Social Work, assessed the cost effectiveness of supportive housing projects in Greensboro, Raleigh, Durham and Asheville to see if such programs can improve homeless people's quality of life. He asked persons participating in supporting housing programs what type of services they were receiving prior to entering the program, and what type of services they are receiving now that they reside in supportive housing units. Walsh's preliminary results show that supportive housing in Raleigh is a cost effective and life transforming intervention for previously homeless individuals.

Walsh's research can encourage the construction of more affordable housing units and the development of more supportive housing programs. This can tremendously improve the lives of homeless people in North Carolina.



Education

G. Rebecca Dobbs, Geography

The Indian Trading Path and Colonial Settlement Development in the North Carolina Piedmont

North Carolina's urban system is dominated by the Piedmont Urban Crescent. Running from Raleigh to Charlotte along I-85, this vital and growing "main street" leads the way in economic change, growth, innovation and creative energy. Many people have noted its similarity to the Indian Trading Path, while others have compared it to the 1856 railroad. No one,

however, had used a scholarly approach to determine how and why the Piedmont Urban Crescent appeared.

G. Rebecca Dobbs, a Geography doctoral graduate, examined the

G. Rebecca Dobbs examined the geography and evolution of the Piedmont Urban Crescent, North Carolina's vital and growing "main street."



geography of the Indian Trading Path and its possible influence on the geography of the Piedmont Urban Crescent, as well as on the evolution of the Crescent. It is sometimes taken as an item of faith that the Crescent does in fact follow the Path, and that there is a cause and effect relationship. Yet little geographic and historical work of quality and detail had been attempted to test the validity of this assumption. To this end, Dobbs transformed colonial land grant records for individual tracts into geographic information. She also incorporated an original settlement model through which information about the Crescent may be understood.

Dobbs' work makes important contributions to people's understanding of North Carolina's urban, social and political structure, and functions as a concrete step towards investigating the role of Indian landscapes in creating the state's current urban system.

Paul G. Fitchett, Education

Why Do We Leave? An Examination of Social Studies Educators' Professional Intentions

Teacher turnover is a national phenomenon that has crippling effects on the state's learning institutions.

In North Carolina, attrition rates have slowly climbed

over the last several years. Specifically, turnover among social studies teachers contributes to a decline in the quality of instruction in the field and perpetuates substandard civic and social instruction.

Paul Fitchett looked at the relationship between teachers' professional and demographic characteristics and the rate of turnover among social studies teachers.



Paul Fitchett, a doctoral student in Education, analyzed the professional and demographic characteristics of social studies teachers and how these characteristics are associated with occupational commitment. Using logistic regression analysis, his preliminary results suggest that salary is not as significant a predictor of whether to leave or stay among social studies teachers as it is among math and science teachers. He also found that among African American teachers, the odds of staying in the profession decrease in proportion to their level of dissatisfaction with school administration.

Fitchett's work provides evidence that previous efforts by the North Carolina Department of Instruction to increase salary might not serve as a blanket panacea to teacher turnover, and that state policy measures to retain social studies teachers should focus more on non-pecuniary factors such as race and social organization.

Martha King, Folklore

Madison County Project

Unaccompanied, a cappella ballads have come to signify a proud heritage among people throughout the Appalachians. Mountain ballads once served a function for Western North Carolinians in the labor and leisure of everyday living. However, the social and physical environment that nurtured the ballad tradition is gone.



Efforts to foster an environment where these old songs continue to be sung have fallen short,

Martha King designed a research thesis and a documentary video that looked at the history, nature and future of mountain ballads in Western North Carolina.

primarily because past research has been narrowly targeted towards either academics or the public. The significance of this project is that it bridges this divide.

Martha King, a Folklore Master's of Arts graduate, designed two separate but complimentary products: a traditional research thesis intended for an academic audience, and a documentary video intended for the public. Together, they formed the Madison County Project. Through ethnographic collaborative fieldwork conveyed via the medium of film, the project addressed the history of ballad study in the area, the underlying nature of this tradition, and its trajectory into the future. King is now working on curriculum materials, including teaching guides and lesson plans, to accompany the distribution of the film to schools across North Carolina.

Not only does King's research offer an updated and current treatment of a longstanding venue of academic exploration, it continues to engage the diverse population of North Carolina in a conversation regarding one of its valued cultural traditions.

Elizabeth Lanter, Speech and Hearing Sciences

Emergent Literacy in Children with Autism Spectrum Disorders

Researchers' increasing understanding of how literacy develops in children has resulted in enormously beneficial pedagogical strategies for children with typical development. However, this same level of understanding does not exist in children with autism spectrum disorders. American



Elizabeth Lanter examined how literacy develops in children with autism spectrum disorders. She also explored how these children's caregivers facilitate this development.

public schools are struggling to respond to the educational needs of children with autism, who are growing in number.

Elizabeth Lanter, a doctoral student in Speech and Hearing Sciences, examined how age, oral language abilities, non-verbal cognitive abilities and autism spectrum severities relate to the development of literacy in children with autism. She also explored how these children's caregivers feel about and facilitate this development.

Lanter's findings enriches the limited body of research that examines the specific needs of children with autism. This benefits North Carolina, where disproportionately high autism incidence rates exist in the public school system. In the United States, students with autism account for 1.4 percent of all special education students served. In North Carolina, students with autism account for 2.7 percent.

Jennifer Renn, Linguistics

Measuring Style Shift: A Quantitative Analysis of African American English

Several researchers have documented the academic gap that exists between African American students and

their Caucasian peers. Some have hypothesized that dialect may play a role in this disparity because of a mismatch between the varieties of speech that many African American children use at home and the language used in school.

Jennifer Renn, a Linguistics doctoral graduate, investigated how African American adolescents shift their speech styles by

Jennifer Renn looked at how African American adolescents shift their speech styles to adapt to a diverse array of social contexts.



examining the speech of 50 sixth-graders in North Carolina. She found that African American adolescents use more African American dialect in informal settings than in formal settings, and that they use a wider variety of African American English (AAE) features in informal situations than they do in formal ones. This suggests that at the onset of adolescence, AAE speakers have developed the ability to alternate between different language styles.

Renn's research allows for the study of linguistic style from an experimental perspective, which is a significant improvement from merely describing individual speakers' language. Such analysis may provide insight into the achievement gap between African American students and their Caucasian peers. This situation has relevance for the residents of North Carolina, where approximately 22 percent of respondents to the 2000 census identified themselves as African American.

David Silkenat, History

Suicide, Divorce and Debt in Civil War Era North Carolina

Generations of historians have explored the myriad ways in which the U.S. Civil War has left a lasting imprint in the South. They have outlined in great detail how Confederate defeat transformed the region's political, economic and social landscapes. Yet North Carolinians know that beneath these visible changes, there was also a revolution in moral sentiments.

David Silkenat explored the changing moral sentiments regarding suicide, divorce and debt among blacks and whites in North Carolina before and after the U.S. Civil War.



David Silkenat, a doctoral student in History, explored some of the changing moral sentiments in North Carolina during the Civil War. Specifically, he examined how black and white North Carolinians understood suicide, divorce and debt before and after the war. He noted that the war forced whites, who stigmatized these events during the antebellum period, to reinterpret suicide, divorce and debt within a new social, cultural and economic context. He also noted that for blacks, the war created an opportunity to reshape moral constructs that had been formed by slavery.

Silkenat's research provides a historical context within which scholars can understand important social phenomena in the state. This is significant because although Silkenat examines 19th century incidences of suicide, divorce and debt, such events continue to take place in North Carolina today.

Health and Human Services

Janne E. Boone, Nutrition

Physical Activity and Obesity in Context: Complex Behaviors and Complex Lives

Obesity and physical inactivity are growing problems in virtually every subpopulation in the United States, but even more so in North Carolina. Programs designed to prevent obesity often overlook important interactions among individuals, society and health behavior, indicating a need for new ways of examining human behaviors and factors that determine them.

Janne Boone, a doctoral student

Janne Boone conducted a series of epidemiological analyses that looked at the relationship between obesity and health behaviors among adults and adolescents.



in Nutrition, conducted a series of epidemiological analyses that looked at data from two large, ongoing studies of adults and adolescents. In adolescents, she examined the combined relationship between television viewing, physical activity and obesity, and then investigated the inter-relationship between self esteem, body weight and body image. In adults, she showed that active transportation, such as walking or biking, is more common in certain subgroups and is related to several favorable cardiovascular markers.

Boone's research generates knowledge that can inform public health efforts such as North Carolina's *Eat Smart, Move More* campaign, identifies opportunities to reduce obesity, and demonstrates useful statistical methods for further research that is particularly relevant to adults and children in the state.

Anthony Fleg, Medicine/Public Health

Native Health Initiative: A Partnership to Address Health Inequities Through Loving Service

More than 100,000 American Indians live in North Carolina, giving it the largest American Indian population of any state east of the Mississippi. Yet American Indians remain relatively invisible to policymakers and health care systems. The North Carolina Office of Minority Health and Health Disparities reported in 2005 that American Indians suffered higher rates of diabetes, hypertension, asthma and arthritis than blacks

or whites. They also experienced higher rates of infectious diseases, injury and violence.

Anthony Fleg created a partnership between American Indian communities and students in health-related fields to reduce health disparities.



Anthony Fleg, a medical student and Master's student in Public Health, examined whether a framework of health equity and loving service can help reduce health disparities between American Indians and the general population. He created the Native Health Initiative, a partnership between students in health-related fields and American Indian communities, which mobilizes resources within the context of four project areas: 1) research on health issues relevant to North Carolina's tribes, 2) health interventions in tribal communities, 3) advocacy efforts, and 4) collaborative efforts with other organizations.

The NHI is the first program that offers students the opportunity to volunteer in any of North Carolina's American Indian communities. Fleg hopes his model for crossing these historical, political, social geographic and cultural barriers may lead to a healthier life for North Carolina's American Indian communities.

Morgan W. Jones, Health Policy and Administration

An Analysis of State High Risk Pools: Policies, Politics, and Financing

Individuals with chronic health conditions are often denied health insurance or offered insurance at unaffordable rates. To help, 34 states offer High Risk Pool insurance to persons denied coverage due to chronic illness. Although North Carolina considered High Risk Pool legislation for more than two decades, the state had yet to pass such legislation at the onset of Jones' research.

Jones, a Master's of Public Health graduate in Health Policy and Administration, analyzed the characteristics that made

High Risk Pools successful and sustainable in other states. She used

Jones analyzed characteristics that made High Risk Pools successful in other states, paving the way for North Carolina to pass a law that offers coverage to chronically ill people who can't afford insurance.

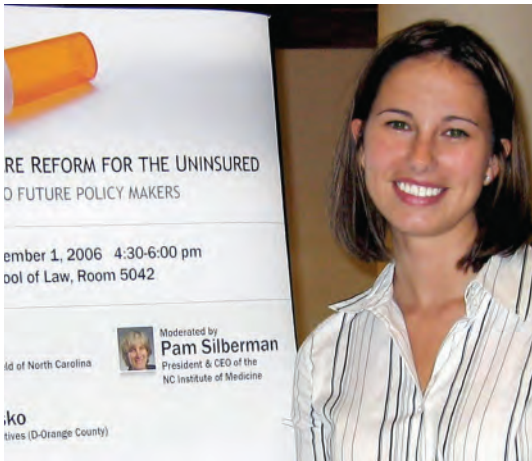


Photo provided by Morgan Jones

case studies, policy analysis and descriptive statistics of operation to provide a comprehensive analysis of High Risk Pool politics, policies and financing. Five common features of successful pools emerged: 1) the need for a strong coalition of stakeholders, 2) early consensus regarding funding mechanisms, 3) high enrollment levels, 4) designing effective benefit packages with case management to control costs, and 5) working with the largest state insurance carrier to tap into existing negotiated discounts.

Jones shared her final analysis with state legislators in May 2007. In August 2007, the North Carolina General Assembly passed a bill to enact a High Risk Pool. The Pool is estimated to cover approximately 2,000 individuals by 2009 and 14,000 by 2019. The law caps the Pool's insurance premiums between 150 percent and 200 percent of standard premium prices, which is much less expensive than the only current coverage available to high risk individuals in the non-group market in North Carolina — coverage which can be as much as 700 percent of standard premium rates. **Jone's research provided key information that helped North Carolina policy makers address this critical state issue.**

Amy E. Kalkbrenner, Epidemiology

Geographic Influences of Autism Diagnosis: Accessibility of Health Services and Exposure to Hazardous Air Pollutants

Autism is a severe, lifelong development disability characterized by impairments in communication and social interaction. It affects as many as 7,700 children under 10 years of age in North Carolina. However, the causes of autism are poorly understood. It is known that autism is partly inherited, but that environmental factors also play a role.

Amy Kalkbrenner, a doctoral student in Epidemiology, investigated the accessibility of health services

Amy Kalkbrenner investigated the accessibility of health services that allow for early identification of autism. She also studied hazardous air pollutants as potential causes of autism.



that allow for early identification of autism in children in North Carolina. She also studied hazardous air pollutants, such as metals and volatile organic compounds, as potential environmental causes of autism. She used information from an autism surveillance program in the state, a health practitioner licensure database specific to the state, and air pollutant data collected in the state and nationally.

Kalkbrenner's study provides concrete, state-specific information that can assist in the allocation of health services to ultimately increase the chances of early identification of autism in North Carolina's children. Furthermore, her examination of the relationship between hazardous air pollutants contributes to the body of knowledge on air toxins and health in North Carolina, which may ultimately assist in the design of air pollution policy that will best protect the public's health.

Jason Kim, Chemistry

Innovative Biomedical Applications Using Metal-Chelate Nanoparticles

As cases of cancer and arthritis continue to rise in North Carolina, health professionals are looking for innovative technologies to help them refine new therapies and effectively diagnose disease. In this regard, biomedical researchers have experimented with nanoparticle and metal-chelate technologies, which can be combined to create new



Jason Kim examined the novel applications of metal-chelate nanoparticles in treating cancer and rheumatoid arthritis.

materials for research and clinical purposes.

Jason Kim, a doctoral student in Chemistry, examined the novel applications of metal-chelate nanoparticles in treating cancer and rheumatoid arthritis. He synthesized metal-chelate magnetic nanoparticles to purify cancer therapeutics from cost-effective bacterial and mammalian cells. He found that in an animal model of inflammatory arthritis, fluorescent nanoparticles coated with a metal-chelate that enhances magnetic resonance imaging (MRI) contrast may be used to detect cells specific to disease activity. These nanoparticles may also be modified to target and image colon cancer cells.

The novel applications of metal-chelate nanoparticles as demonstrated by Kim have the ability to reduce costs associated with new therapeutics and foster newer and more sensitive strategies in treating the rising number of North Carolinians with chronic disease.

Kenneth H. Kolb, Sociology

Identity and Emotion Management of Staff at a Domestic Violence and Sexual Assault Agency

In North Carolina, there are 88 agencies that offer support to victims of domestic violence and sexual assault. Advocates and counselors in these agencies work under difficult circumstances. With few resources and little recognition, they interact daily with clients



who, in many cases, suffer again and again. In order to craft effective policies to assist assault victims and prevent repeated instances of abuse,

Kenneth Kolb analyzed the unique challenges that advocates and counselors for domestic violence and sexual abuse face in the course of their work.

the state must recognize the emotional challenges of those who offer them services.

Kenneth Kolb, a doctoral student in Sociology, used participant/observation techniques and in-depth interviews to collect data and analyze the unique challenges that advocates and counselors for domestic violence and sexual abuse face. He volunteered at a regional agency in North Carolina, completed 35 hours of training, and spent 250 hours over one and a half years conducting fieldwork or in-depth interviews and observing client consultations and private meetings.

Kolb's findings can help domestic violence and sexual assault agencies in North Carolina develop protocols for staff to manage their emotions when their clients suffer, understand the causes and consequences of their emotional reactions to "difficult" clients, and analyze why staff might be attracted to offering criminal justice solutions over emotional ones to domestic violence and sexual assault problems.

Sandra Irene McCoy, Epidemiology

Understanding the Care-seeking Behavior of HIV-Positive Persons in North Carolina: Factors Associated with Presentation to Medical Care



Early detection of the Human Immunodeficiency Virus (HIV) can improve the length and quality of patients' lives as well as reduce high risk behavior that exposes non-infected persons to the disease. Unfortunately, many HIV-positive adults in North Carolina receive medical care late in the course of infection. This undermines the important benefits of timely access to HIV

Sandra Irene McCoy examined the structural and individual factors that influence HIV testing and care-seeking behavior in North Carolina.

services and misses opportunities for risk reduction.

Sandra Irene McCoy, a doctoral student in Epidemiology, examined the structural and individual factors that influence HIV testing and care-seeking behavior. She described the prevalence of co-infections with other sexually transmitted diseases among people with very early HIV infection, examined the role of perceived social support received by HIV-positive patients getting care at the UNC Infectious Disease Clinic at the latter stages of their disease, and conducted a qualitative study to describe attitudes and beliefs about HIV testing and care that exist among HIV-infected persons with clinically advanced illness.

McCoy's findings elucidate barriers to early HIV testing and medical care. This translates to clinical benefits for HIV-positive patients in North Carolina and helps healthcare providers learn more effective ways of interrupting the transmission of HIV.

Nicole Ramocki, Cell and Molecular Physiology

Regulators of the Insulin-like Growth Factor System in Intestinal Cancer

Colon cancer is the second-leading cause of cancer-related deaths among men and women in the U.S.



A major risk for colon cancer is obesity, which has reached epidemic proportions in North Carolina. However, despite promising hypotheses, no concrete evidence links dietary factors such as fiber, meat and fat intake with colon cancer susceptibility. Understanding

Nicole Ramocki found that IRS-1, a molecule that mediates insulin and insulin-growth factor signaling, can be a useful biomarker in screening individuals for colon cancer risk.

the mechanisms that link obesity to colon cancer development may provide healthcare providers with more direct means of preventing colon cancer.

Through experiments with mice, Nicole Ramocki, a doctoral student in Cell and Molecular Physiology, found that levels of a molecule that mediates insulin and insulin-like growth factor signaling may determine susceptibility to colon cancer. The results of her study suggest that this molecule, called insulin receptor substrate-1 or IRS-1, may be a useful biomarker in screening individuals for colon cancer risk.

Better biomarkers for colon cancer susceptibility would allow healthcare professionals to focus cancer screening on high risk groups, which can lead to earlier diagnosis, more saved lives and reduced healthcare costs in the state.

Devon Risher, Pathology and Laboratory Medicine

Mechanisms and Consequences of the Hypermethylator Phenotype in Human Breast Cancer



Researchers have identified several distinct subsets of breast cancer that respond differently to treatment and exhibit widely variable long-term survival rates. Basal breast tumors, which are prevalent among African American women, are the most difficult to treat and account for 25 percent of all breast cancers. Most also possess a hypermethylation defect

Devon Risher analyzed tumor samples from breast cancer patients treated at UNC Hospitals and uncovered a previously undetected subset of breast cancer.

that inhibits a number of important genes.

Devon Risher, a doctoral student in Pathology and Laboratory Medicine, analyzed tumor samples from breast cancer patients treated at UNC Hospitals and uncovered a previously undetected subset of breast cancer. She found that this subset exhibits defects characteristic of hypermethylator tumors, and that such defects overlap extensively with the basal-epithelial breast cancer subtype.

Risher's findings can lead to improvements in basal-epithelial breast cancer treatment through the application of certain demethylating drugs that target these hypermethylator defects. Improved basal breast cancer therapy can benefit all women, especially African American women, who live in North Carolina.

Lynne A. Sampson, Epidemiology

Screening for Syphilis and HIV in North Carolina Jails

Syphilis is a fully curable bacterial disease that is transmitted primarily through sexual contact. In its early stages, syphilis is extremely infectious and can spread quickly. If left untreated, it can lead to serious abnormalities such as cardiovascular and nerve damage and death.



Meanwhile, the Human Immunodeficiency Virus (HIV) is an incurable infection that ultimately leads to death in all cases. However, people can greatly benefit from knowing their HIV

Lynne Sampson described the prevalence of syphilis, HIV and associated risk factors in North Carolina's jail populations.

status because modern treatments can delay the onset of illness and death by decades.

Lynne Sampson, a doctoral student in Epidemiology, described the prevalence of syphilis, HIV and associated risk factors in North Carolina's jail populations. She used descriptive analyses to assist in the design of disease prevention programs, predictive modeling to help develop screening tools, and a cost assessment study to describe the incremental costs of adding HIV screening to current jail activities.

Early detection and treatment of cases is key to controlling the ongoing spread of syphilis, which affected over 900 North Carolinians in 2006, and HIV, which 2,000 North Carolinians were reported to have in 2006. Sampson's work provides much needed information on the screening of syphilis and HIV in North Carolina jails, where the burden of disease is high but published studies are very few.

Photo by Robby Poore

Rupninder Sandhu, Pathology and Laboratory Medicine

Sensitizing Breast Tumor Cells to Chemotherapeutics in Breast Cancer Using Demethylating Agents



Breast cancer is the most common cancer among women. It is also the second leading cause of cancer-related deaths. Of all subtypes of breast cancer, basal-epithelial tumors are the most deadly. Occurring most frequently among African American women, it is characterized by aggressive clinical characteristics, short relapse-free intervals and poor response to standard treatment regimens.

Rupninder Sandhu tested the feasibility of combining demethylating drugs with standard chemotherapy as a novel treatment regimen for basal breast cancers.

Rupninder Sandhu, a doctoral student in Pathology and Laboratory Medicine, hypothesized that aberrant DNA methyltransferase activity in breast cancer tumors may be a useful target in developing novel therapies for basal breast cancer. She measured the sensitivity of breast cancer cells to standard chemotherapeutic agents after the cells were exposed to demethylating drugs that inhibit DNA methyltransferase. She found that these drugs significantly enhanced the potency of chemotherapy.

Sandhu's findings provide proof-of-concept that the effectiveness of chemotherapy as a treatment regimen for basal breast cancer may be improved by combining it with demethylating drugs. This novel treatment benefits North Carolina, which is home to a large population of African American women.

Alexia Smith, Nutrition

Altered Immune Function in Obese Mice Infected with Influenza Virus Mechanism for Immune Modulation

Obese individuals are more susceptible to the adverse effects of the influenza virus than people who are of normal weight. Influenza is the eighth leading cause of death in North Carolina. North Carolina also has one of the highest obesity rates in the country.

Alexia Smith, a doctoral student in Nutrition,

Alexia Smith researched the mechanism by which obesity alters people's immune response to the influenza virus.

researched the mechanism by which obesity alters people's immune response to the influenza virus. She proposed that chronically high levels of leptin, a hormone that plays a key regulatory

role in the immune system, will lead to leptin resistance in immune cells, resulting in dampened immune function. Obesity causes circulating leptin in the body to increase.

Obesity rates have tripled in North Carolina over the last 20 years, putting a large percentage of the population at risk for impaired immune function. The first step to preventing this is to understand how obesity alters immune function. As such, Smith's findings can help prevent influenza infections and deaths from occurring in the state.

Patrick Carlsen Smith, Medicine/Public Health

The Relationship Between Functional Health Literacy and Adherence to Emergency Room Discharge Instructions Among Spanish-speaking Patients

Studies show that in the U.S., health disparities exist between Hispanics and the rest of society. Low Functional Health Literacy (FHL) among Spanish-speakers might be one of the reasons behind these disparities. In today's modern world of increasingly complex medical care, the ability to understand verbal

and written material is vital. Patients with low FHL usually lack the skills necessary to function in the American healthcare system. As a result, they

Patrick Smith studied whether an association exists between patients' ability to understand health information and their adherence to Emergency Department discharge instructions.



have worse health outcomes compared to those with adequate literacy.

Patrick Smith, a medical student and a Master's student in Public Health, studied whether there is an association between patients' FHL and their adherence to Emergency Department (ED) discharge instructions. He found a direct association: the lower the FHL, the less likely it is for a patient to understand or comply with instructions. FHL and understanding were lower for Spanish-speaking patients, even when instructions were given by a Spanish interpreter. Rates of adherence among Spanish-speakers were also lower than those among English-speakers.

Smith's findings demonstrate a systematic deficiency in how healthcare is administered in North Carolina. It suggests that healthcare providers need to modify their methods of communication to ensure that all patients understand and follow orders. It also encourages further research geared towards finding ways to address low FHL among Spanish-speaking patients.

John A. Staley III, Health Policy and Administration

The Determinants of Firefighter Physical Fitness: An Inductive Inquiry Into Firefighting Culture and Coronary Risk Salience

Heart attack is the leading cause of death among North Carolina's firefighters. Emergency response events place considerable physiological demands such as elevated heart rate and high oxygen consumption on firefighters, which require high levels of physical fitness and cardiovascular endurance that many of them do not possess. Firefighter organizations and researchers have tried to address this problem. However, they have had little success primarily because the

John Staley developed a multi-level intervention program designed to reduce the risk of heart attack among North Carolina's firefighters.



interventions they used are based on traditional measures that are inappropriate to firefighters' lifestyles.

John Staley, a doctoral student in Health Policy and Administration, collaborated with four fire departments in North Carolina to explore what physical fitness means to firefighters. After gaining critical insights regarding fitness barriers, Staley is now developing a multi-level intervention program designed to reduce their risk of suffering a heart attack. These interventions will be administered within the fire departments Staley studied. Later, it will also be administered in 24 other municipalities in the state.

Staley's findings may be used to develop effective and sustainable interventions not only to improve the overall fitness and wellness of North Carolina's firefighters, but also to reduce the risk factors that directly contribute to their risk for heart attack and on-duty death.

Nathan Stasko, Chemistry

Minimizing Heart Surgery Complications through the Synthesis and Characterization of Nitric Oxide Delivery Systems

Sixty percent of North Carolinians who go to the Emergency Room with symptoms of a heart attack



receive potentially life-saving reperfusion therapies. Yet despite this procedure's ability to open clogged arteries, it can also damage tissue and weaken heart muscle function. Clinical trials have yet to identify an effective method for salvaging at-risk heart muscle after reperfusion takes place.

Scientific literature suggests that nitric oxide (NO) has a profound

Nathan Stasko synthesized devices that store high drug payloads of nitric oxide, which helps minimize the complications of life-saving reperfusion therapies performed on heart attack patients.

effect on preventing reperfusion injury. However, the controlled release of NO as a drug remains a challenge, and limited storage capacity has prevented its widespread clinical application. As an alternative, Nathan Stasko, a doctoral student in Chemistry, synthesized nanoparticle devices that store high drug payloads of NO. He found that these devices perform better in isolated hearts than the clinical standard used at UNC Hospitals, and that it reduces dead tissue by 75 percent more.

The proper administration of NO to damaged heart tissue after surgery represents a new strategy in minimizing the complications of reperfusion therapy. Stasko's findings may be used to attract major funding from the National Institutes of Health to develop this strategy even further and save the lives of tens of thousands of heart attack patients.

Elizabeth Torrone, Epidemiology

Late Diagnosis of HIV in Young Men in North Carolina

Early diagnosis of the Human Immunodeficiency Virus (HIV) has both individual and public health benefits, such as timely access to treatment and opportunities to intervene and prevent further transmission. As such many studies have focused on early HIV diagnosis, but few have examined patients who have had a delayed diagnosis of HIV and the barriers that cause it.

Elizabeth Torrone, a doctoral student in Epidemiology, conducted a retrospective review of state surveillance records of males aged 18-30 years who were diagnosed with HIV for the first time from 2000 to 2004. She found that among 1,117 men, more than 13 percent were diagnosed when they were already

Elizabeth Torrone reviewed state surveillance records to determine the prevalence of late diagnosis among HIV-positive young men.

suffering from Acquired Immune Deficiency Syndrome (AIDS). She also found that although the overall prevalence of late diagnosis decreased during the study period, it increased specifically among Hispanic men.

Torrone's findings indicate that while efforts aimed at early diagnosis of HIV have successfully decreased the prevalence of delayed testing over a five-year span, there are subpopulations among young men in North Carolina who are still not accessing HIV testing services before the onset of AIDS. Thus, it highlights the need for future research designed to identify and reduce barriers to asymptomatic HIV screening for populations at risk for late diagnoses.

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Danielle Haley

Release Programs for HIV-infected Inmates: Implications for North Carolina

Seth Kotch

Capital Punishment and Southern Culture in 20th-Century North Carolina

Lynette Phillips

Hormonal and Reproductive Risk Factors and Breast Cancer

David Leland Roberts

Improving Social Functioning in Schizophrenia Patients

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Social Networks and School Bullying

Kaaren Haldeman

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Jennifer Hillmann

A Possible Link between Drinking and Depression

Sheritha P. Lee

Fighting Chronic Inflammation in Sickle Cell Disease by Controlling the CD40L Protein

Margarita Machado-Casas

Narrating Education of New Indigenous/Latino Transnational Communities in the South: Migration, Life and its Effects on Schools

Meghan M. McGlenn

Documenting the American South: How One Digital Library Provides Valuable Learning Resources to North Carolina Social Studies Classes

Dorian Miller

Improving the Reading Comprehension of LD/ADHD Students through Reading Software

Lisa M. Paulin

A Critical Discourse Analysis of Latinos in English- and Spanish-language Newspapers of North Carolina

Baker Perry

Northwest Flow Snowfall in the Southern Appalachians

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Statutory Rape: Mandatory Reporting in the Title X Clinics of North Carolina

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Prison Construction: An Economic Development Option for North Carolina Counties?

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Joan R. Cates

Setting the News Media's Agenda on Youth and Sexually Transmitted Diseases

Katherine Ann Eschelbach

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Chandra L. Ford

Perceived Racism, Neighborhood Characteristics, and Human Immunodeficiency Virus (HIV) Testing Among African Americans

Sarah B. Knowles

Incidence and Severity of Injury among North Carolina High School Athletes

Maria Mirabelli

Exposure to Airborne Emissions from Industrial Hog Operations as a Trigger of Childhood Respiratory Symptoms

Mahyar Mofidi

The Impact of a State Children's Health Insurance Program on Access to Dental Care

Melissa Nelson

Obesity, Physical Activity, and the Neighborhood Environment

Matthew Savage

Early Preventive Dental Visits: Effects on Subsequent Use and Costs

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