I. Public Health GIS (and related) Events:
SPECIAL NCHS/CDC GIS LECTURES

Please join us **September 27, 2005**, for **"GIS Analysis of African American Public Health Disparities, Cleveland, Ohio," 2:00P.M. (EST)** by Charles Croner, Ph.D., Geographer and Survey Statistician, CDC, and The Center for Community Solutions, Cleveland. An abstract of this presentation is included in this edition. The NCHS GIS Guest Lecture Series has been presented continuously at NCHS since 1988. As with all live lectures, Envision (live interactive) will be available to offsite CDC locations as well as IPTV. Web access will be available to our national and worldwide public health audience. The cosponsors to the NCHS Cartography and GIS Guest Lecture Series include CDC's Behavioral and Social Science Working Group (BSSWG) and Statistical Advisory Group (SAG). Note: **NCHS Cartography and GIS lectures are open to all**. We look forward to having you join us. [Contact: Editor, *Public Health GIS News and Information* at cmc2@cdc.gov]

[Notes: (1) Calendar events are posted as received; for a more complete listing see NCHS GIS website and calendar; (2) Disclaimer: The findings and conclusions in this report are those of the Editor and do not necessarily represent the views of the Centers for Disease Control and Prevention (CDC)]

2005

* United Nations/European Space Agency/Argentina Workshop on the Use of Space Technology for Human Health, September 19-23, 2005, Cordoba, Argentina [See: http://www.oosa.unvienna.org/ http://www.oosa.unvienna.org]

* 13th Annual Public Health Distance Learning Summit: New Horizons in Distance Learning for Public Health, September 21-23, 2005, Centers for Disease Control and Prevention Atlanta, GA [See Distance Learning Summit website: https://register.grad.usda.gov/conferences/cdc/cdc_reg_form.cfm]

* URISA's 43rd Annual Conference [with program track devoted to Public Health GIS], October 9-12, 2005, Kansas City, MO [See: http://www.urisa.org]

* 2005 ESRI Health GIS Conference, "Advancing Health and Human Services with Spatial Information," October 23-26, 2005, Chicago IL [See health conference website at: http://www.esri.com/events/hug/index.html]

* 6th International Conference on Health Policy Research, "Methodological Issues in Health Services and Outcomes Research," October 28-30, 2005, Boston MA [See website at: http://www.amstat.org/meetings/ichpr/2005]

* Latino/Hispanic Cancer Disparities Conference, The George Washington University Medical Center, October 31, 2005, Washington D.C. [See cancer disparities website at: http://www.cancerdisparityconference.info]

* First International Symposium on Health GIS, Association for Geoinformation Technology (AgIT), December 1-2, 2005, Bangkok Thailand [See website: http://www.j-geoinfo.net/HealthGIS/main.htm]

* 2005 American Geophysical Union (AGU), "Transforming Geoscience Access through Standards Implementation," December 5-9, 2005, San Francisco CA [See: http://www.agu.org/meetings/fm05]

2006

* National Leadership Summit on Eliminating Racial and Ethnic Disparities in Health, Office of Minority Health, DHHS, January 9-11, 2005, Washington D.C. [See website at: http://www.omhsummit2006.org]

* University Consortium for GIS (UCGIS) Winter Meeting, "GIScience and the Common Good: Public Spatial Information and Society's Framework of Democratic Deliberation, Access and Accountability," February 8-10, 2006, Washington DC [See UCGIS website at: http://www.ucgis.org]

* 2006 Annual Meeting of the Association of American

Geographers, March 7-11 2006, Chicago, IL [See AAG website: http://www.aag.org]

* International Conference on Women and Infectious Diseases (ICWID), Office of Minority and Women's Health, CDC's National Center for Infectious Diseases, March 16-18, 2006, Atlanta, GA [See conference website: http://www.womenshealthconf.org]

* 2006 International Symposium on Waterborne Pathogens, American Water Works Association, March 16-18, 2005, Atlanta GA [See the AWWA website at: http://www.awwa.org/conferences/pathogens/call]

* 2006 Geospatial Technologies Symposium, March 20-23, 2006, Denver CO [See symposium geospatial website at: http://geospatialsymp2006.instepsoftware.com/main.htm]

* 24th National DHPE/CDC Conference on Health Promotion and Education: "Advancing the National Health Promotion and Health Education Agenda through Effective Policies and Practices," May 23-26, 2006, Washington D.C. [Advance contact: KVandiver@cdc.gov]

* Second American Congress of Epidemiology, June 21-24, 2006, Seattle WA [See: ACE conference website at: http://www.epicongress2006.org]

* 12th International Symposium on Spatial Data Handling, July 10-12, 2006, held at University of Vienna, Austria [See: http://www.gicon2006.at]

* 7th International Interdisciplinary Conference Advances in Qualitative Methods, "Looking to the Future: Opportunities and Challenges for Qualitative Research," July 13-15, 2006, Queensland Australia [Advance contact: info@conorg.com.au]

* 2006 Joint Statistical Meetings of the American Statistical Association, August 6-10, 2006, Seattle, WA [See: http://www.amstat.org]

II. GIS News

[Public Health GIS Users are encouraged to communicate directly with colleagues referenced below on any items; note that the use of trade names and commercial sources that may appear in Public Health *GIS News and Information* is for identification only and does not imply endorsement by CDC]

A. General News and Training Opportunities

1. **2004 Guide to the New American Community Survey Data Products**. The Census Bureau has released an online guide about the newest data products, including the first in a series of analytic reports, which are being introduced starting with the August 30, 2005, data release for the 2004 ACS. It is aimed at both experienced ACS data users and those new to the ACS. Included in the Guide are several tools and documents. These include tools to help data users: *Quickly locate the geographic areas in a state for which 2004 ACS estimates will be published; *Locate and compare the changes between the new base table(s) (also known as detailed tables) base tables from past years; and *Locate all the base tables for a specific topic. For each new base table, there is also a link to the table layout so the user can see exactly how the table will appear in the Census Bureau's American FactFinder. In addition to the tools, there are several useful documents such as "ACS at a Glance," "ACS in American FactFinder," and a 2004 Ranking Table list, at http://www.census.gov/acs/www/Products/users_guide/index.htm.

2. **Symposium on Geography and Drug Addiction**. The Association of American Geographers (AAG) and the National Institutes of Health's National Institute on Drug Abuse (NIDA) are jointly sponsoring a research symposium on Geography and Drug Addiction. The symposium will be held March 8, 2006, in conjunction with the 2006 Annual Meeting of the AAG in Chicago, Illinois. Researchers from all fields of science and others with experience in the geographical dimensions of drug addiction are encouraged to apply to participate in the symposium.

Themes to be addressed include: Spatial patterns of drug use and addiction; Linking spatial models with neuroscience and genetics in drug abuse research; Interaction of social and environmental factors with biochemical processes of addiction; Geographic analysis linking demographic and genetic characteristics related to drug addiction and treatment; Locational analyses of drug addiction treatment and service delivery facilities; Neighborhood scale studies of geographic factors (including the built environment) and their interaction with drug addiction, treatment, or prevention; Use of Geographic Information Systems in better understanding and responding to drug addiction; Spatial diffusion modeling of addictive drug usage and its changing characteristics, including also predictive modeling; Interaction of other spatially dependent variables with

drug addiction, or with prevention and treatment strategies; and, Other geographic research relevant to better understanding the etiology of drug use and addiction. [Submission of one-page summary of topic, description of relevant research conducted, along with a brief resume or CV should be sent to Douglas Richardson, AAG Executive Director, at drichardson@aag.org and Yonette Thomas, Chief, Epidemiology Research Branch, NIDA Division of Epidemiology, Services and Prevention Research, at yt38e@nih.gov; poster submissions are also welcome and need only be accompanied by an abstract]

3. This is to announce the recent publication of *Crime Analysis and Crime Mapping*, by Rachel Boba. This book provides an overview of the field and guidelines for crime analysis practice. It features a comprehensive introduction to crime analysis and mapping including key concepts, definitions, and relevant criminological theory as well as methods and techniques of tactical, strategic, and administrative crime analysis. This book was written for both practitioners and undergraduate/graduate students. It is accompanied by a free student version of ATAC (Automated Tactical Analysis of Crime) software by Bair Software as well as sample crime and geographic data that are highlighted in exercises outlined on the CD. [Contact: Rachel Boba, Assistant Professor, Florida Atlantic University at rboba@fau.edu]

B. Department of Health and Human Services
http://www.hhs.gov

4. The **Americans with Disabilities Act** (ADA) has transformed policies and programs to the benefit of people with disabilities, and it continues to do so. [Today] **54 million Americans**, or one in five people, live with at least one disability, and most Americans will experience a disability some time during the course of their lives. I'm pleased [Secretary Michael Leavitt] that HHS plays an important role in ensuring access to health care and human services under the ADA. We are working hard to promote the New Freedom Initiative's focus on full inclusion of people with disabilities in our society. We're encouraging flexibility in Medicaid waivers. We're implementing Medicare reforms. We're supporting state grants that promote innovative system reform, and we're also ensuring that people with disabilities have access to human services programs. [Announcement excerpts, July 26, 2005]

5. The CDC recently announced that the nation's childhood immunization coverage rates continue at record high levels, with about 81 percent of the nation's 19-to-35-month-old children receiving all the vaccinations in the recommended series. This is the first time coverage for the base line series of vaccines has exceeded 80 percent which also represents the Healthy People 2010 goal.

In 2004, as in previous years, there was substantial variation in coverage levels among states and among cities. Estimated coverage with the 4:3:1:3:3 series ranged from 89.1% in Massachusetts to 68.4% in Nevada. The range in coverage among the 28 urban areas was similar as among the states. Among the 28 urban areas, the highest estimated coverage for the 4:3:1:3:3 series was 89.7% for Davidson County, Tennessee, and the lowest was 64.8% in El Paso County, Texas. [See: http://www.cdc.gov/od/oc/media/pressrel/r050726.htm]

Administration for Children and Families
http://www.acf.dhhs.gov

6. The U.S. Department of Health and Human Services today announced $15 million in **emergency funding to assist Head Start and Early Head Start** grantees in providing services to children and families displaced by Hurricane Katrina. The $15 million announcement will enable Head Start and Early Head Start grantees to provide services to evacuee children and families over the next 30 days. To receive services, a family must have been forced to leave their home because of Hurricane Katrina. "Services will be available to help children even if their parents do not have their child's birth certificate on hand," said HHS' assistant secretary for children and families.

Administration on Aging
http://www.aoa.gov

7. AoA is responding to **Hurricane Katrina** by assisting the **Aging Network** in the affected areas and has been doing so from the very beginning. AoA has released an initial sum of $750,000 in disaster relief funds to Alabama, Louisiana, and Mississippi for immediate reestablishment of infrastructure and resources to support full recovery.

Agency for Healthcare Research and Quality
http://www.ahrq.gov

8. The Agency for Healthcare Research and Quality has a

number of tools and resources that can be used now during Hurricane Katrina response and recovery efforts. Among these are **Standardized Hospital Bed Definitions to Aid Katrina Responders**. These newly released hospital bed definitions can provide uniform terminology for organizations tracking the availability of beds in the aftermath of hurricane Katrina. The standardized definitions allow hospital systems and emergency responders seeking beds for Katrina victims to speak the same language. Until now, definitions have varied among systems and even among hospitals.

Centers for Disease Control and Prevention
[Includes the Agency for Toxic Substances and Disease Registry (ATSDR), in CDC's National Center for Environmental Health]
http://www.cdc.gov

9. The CDC website contains important public health information and advisories on all aspects of **Hurricane Katrina**, and related kinds of disasters. The CDC's public health response to Hurricane Katrina continues to be intense. Early disease and injury assessments have shown no unexpected health concerns. Vigilant disease, environmental and injury surveillance continues. Public health professionals remain concerned about mosquito control and health risks posed by other pests such as rodents in some areas affected by Hurricane Katrina. Spraying will begin today in the New Orleans area to kill adult mosquitoes that could carry the **West Nile** and other viruses. **Leptospirosis** is a bacterial disease that can infect humans who come into contact with infected rodents and other animals, or when exposed to water contaminated with the urine of infected animals. People can reduce their risk of getting leptospirosis by avoiding contact with urine-contaminated water. The disease is not spread from person to person. [September 12, 2005, update]

10. NSFG Cycle 6 **Contextual Data Files** Now Available. The staff of the **National Survey of Family Growth (NSFG)** is pleased to let you know that the Contextual Data Files for Cycle 6 (2002) of the NSFG are now available for use. The files are designed to be used in conjunction with the NSFG Cycle 6 (2002) public use files. They contain about 1,000 variables for the state, county, census tract, and block group in which NSFG respondents lived at (a) the date of interview in 2002, and (b) the date of the Census, on April 1, 2000. The variables include such characteristics as median income,

percent below poverty, percent foreign born, etc. The NSFG web site has a complete list of file variables (See http://www.cdc.gov/nchs/nsfg.htm and click on "Other Cycle 6 data files".) Because of the disclosure risk associated with the files, the contextual data files are available through the NCHS Research Data Center (RDC). [For information on how to use the RDC, please contact the NSFG staff at nsfg@cdc.gov or phone (301) 458-4222]

11. **No public exposure found to contaminated groundwater from the Oak Ridge Reservation**. The Oak Ridge Reservation is a US Department of Energy (DOE) facility that was established in Oak Ridge, Tennessee in 1942 as part of the Manhattan Project, the federal government's World War II effort to build the atomic bomb. ATSDR is the principal federal public health agency charged with evaluating the human health effects of exposure to hazardous substances in the environment. A recent ATSDR report finds no public exposure to contaminated groundwater from the Oak Ridge Reservation (photo). [See: http://www.atsdr.cdc.gov]

12. **CDC: Levels of Lead and Other Chemicals in Americans' Bodies Are Dropping**. Americans have lower levels of lead, secondhand-smoke byproducts and other potentially dangerous substances in their bodies than they did a decade ago, according to perhaps the most extensive government study ever of exposure to environmental chemicals. "These data help relieve worry and concern," said Dr. Julie Gerberding, Director, Centers for Disease Control and Prevention (CDC). The

CDC released its first **National Report on Exposure to Environmental Chemicals** in 2001 and has updated it every two years. For its latest findings, e.g., *Third Report*, the CDC took blood and urine samples from about 2,400 people in 2001 and 2002 and tested for 148 environmental chemicals, including metals, pesticides, insect repellants and disinfectants. The CDC stressed that the presence of an environmental chemical in blood or urine "does not mean that the chemical causes disease." In the early 1990s, 4.4 percent of U.S. children ages 1 to 5 had elevated lead levels. That dropped to 1.6 percent between 1999 and 2002, according to the latest study. "This is an astonishing public health achievement" that is related to the removal of lead from gasoline and other efforts to screen and treat children for lead exposure, Gerberding said.

This *Third Report* presents first-time exposure information for the U.S. population for 38 of the 148 chemicals included in the *Report*. It may be ordered at: http://www2a.cdc.gov/nceh/DLS/RequestForm/requestform.asp?FID=ner. The *Report* also includes the data from the *Second Report*; that is, data for 1999-2000. [Sources: Associated Press, July 21, 2005 and http://www.cdc.gov/exposurereport]

Centers for Medicare and Medicaid Services
http://www.cms.hhs.gov

13. The Centers for Medicare & Medicaid Services has acted to assure that the **Medicare, Medicaid and State Children's Health Insurance Programs** will flex to accommodate the emergency health care needs of beneficiaries and medical providers in the Hurricane Katrina devastated states. Many of the programs' normal operating procedures will be relaxed to speed provision of health care services to the elderly, children and persons with disabilities who depend upon them. Because of hurricane damage to local health care facilities, many beneficiaries have been evacuated to neighboring states where receiving hospitals and nursing homes have no health care records, information on current health status or even verification of the person's status as a Medicare or Medicaid beneficiary. CMS is assuring those facilities that in this circumstance the normal burden of documentation will be waived and that the presumption of eligibility should be made.

Food and Drug Administration
http://www.fda.gov

14. The FDA announced on September 8, 2005, the tentative approval of zidovudine oral solution, a generic version of a child-friendly oral solution to help keep AIDS virus from reproducing. The **Emergency Plan for AIDS Relief** is currently providing $15 billion to fight the HIV/AIDS pandemic over five years, with a special focus on 15 of the hardest-hit countries. The President's Emergency Plan is designed to prevent seven million new HIV infections, treat at least two million HIV-infected people, and care for ten million HIV-affected individuals, AIDS orphans and vulnerable children.

Health Resources and Services Administration
http://www.hrsa.gov

15. **Hospitals and HRSA Outpatient Health Centers, N. Orleans area** [See website for mapping tool and options]

Indian Health Service
http://www.ihs.gov

16. The main health challenges currently faced by American Indian and Alaska Native people are the increasing health conditions and chronic diseases that are related to lifestyles issues such as obesity, physical inactivity, poor diet, substance abuse, and injuries. To help meet these challenges, the Indian Health Service (IHS) has launched a **Health Promotion and Disease Prevention (HP/DP) Initiative** to develop a coordinated and systematic approach to enhance preventive health approaches at the local, regional, and national levels. This Initiative is aligned with the President's HealthierUS, HHS Steps to a HealthierUS, and Healthy People 2010.

National Institutes of Health
http://www.nih.gov

17. A new website with a **Global Information System** will provide valuable information for assessing environmental hazards caused by Hurricane Katrina. The

National Institute of Environmental Health Sciences (NIEHS), one of the National Institutes of Health, created the website to provide the most up-to-date data to public health and safety workers on contaminants in flood waters, infrastructure and industry maps, as well as demographic information for local populations. The **NIEHS Hurricane Katrina Information Website**, accessible at http://www-apps.niehs.nih.gov/Katrina, provides information on assessing and evaluating hundreds of potentially hazardous environmental pollutants that may pose a risk to human health. The website draws from information that NIEHS has acquired from a variety of sources including its research programs, as well as through its Superfund Basic Research Program, Worker Education and Training Program, and Environmental Health Science Centers. The website also includes a link to a new Global Information System (GIS) that NIEHS is developing with several academic partners. The GIS will contain layers of data, including the locations of refineries, oil pipelines, industrial facilities, Superfund sites, Toxic Release Inventory Data, agricultural operations, as well as maps and satellite images of schools, neighborhoods, and medical facilities, that will help assess the short and long effects of Katrina on the Gulf region.

Substance Abuse and Mental Health Services Administration
http://www.samhsa.gov

18. SAMHSA Administrator (excerpts, September 6, 2005): We have already approved $500,000 for **SAMHSA Emergency Response Grants** (SERG) for clinical services, including pharmaceuticals, for four States initially impacted by Katrina as follows: $200,000 for Louisiana, $150,000 for Mississippi, $75,000 for Alabama, and $75,000 for Texas. Texas was included because of the immediate influx of people evacuated from their homes. We are also working with Louisiana, Mississippi, and Alabama to implement their FEMA Crisis Counseling Program for funds for up to 60 days of services. In addition to supporting initial FEMA efforts, SAMHSA has deployed staff and mobilized its Disaster Technical Assistance Center to support state officials in their efforts to conduct needs assessments, provide services, support ongoing administrative operations, access financial assistance and plan for long-term recovery. An interagency triage team from the Administration on Aging (AoA), the Administration for

Children and Families (ACF), and SAMHSA is assisting at Federal Medical Shelters to provide staffing recommendations and service delivery. We are working with the Texas Department of Health Methadone Authority to establish a triage arrangement in conjunction with people evacuated to the state.

C. Historically Black Colleges and Universities (HBCUs), Hispanic Association of Colleges and Universities (HACUs), and Other Minority Health News [A listing of HBCUs and HACUs may be found at the following websites http://www.smart.net/~pope/hbcu/hbculist.htm and https://www.hnip.net]

19. Historically Black Colleges and Universities (HBCUs) are constantly faced with challenges that can include state funding issues, inadequate housing, poor student-teacher ratios, and even violence. However, the most recent challenge is **Hurricane Katrina**. The deadly natural disaster has affected HBCUs in the Gulf coast area including: In **Louisiana**- Delgado Community College, Dillard University, Louisiana Tech University, Loyola University New Orleans, McNeese State University, Our Lady of Holy Cross College, Southeastern Louisiana University, Southern University at New Orleans, Tulane University, University of New Orleans, Xavier University of Louisiana; In **Mississippi**- Alcorn State University, East Central Community College, Holmes Community College, Jackson State University, Jackson State University, Jackson State University, Jones County Junior College, Mary Holmes College, Meridian Junior College, Mississippi Gulf Coast Community College, Mississippi Gulf Coast Community College, Mississippi Gulf Coast Community College, Pearl River Community College, Southwest Mississippi Community College, Tougaloo College, University of Southern Mississippi, William Carey College, and Wood (Junior) College. Campuses are damaged, students are stranded, and the school year may not start this year at all. Fortunately, several organizations are stepping up to the plate to offer some relief. One of these is The United Negro College Fund which has initiated a special online relief fund to which people can donate. [See: http://www.uncf.org]

D. Other Related Agency or GIS News

20. The Maryland Department of Health and Mental Hygiene with the Mid-Atlantic Center for Children's Health and the Environment (MACCHE) at George

Washington University and the Regional 3 EPA welcome you to attend the **3rd annual Children's Health and the Environment Conference**. The Conference will be held Saturday, October 1, 2005, in Baltimore, from 7:30AM to 5:30PM. This event will feature national experts in areas of environmental health, such as asthma, the built environment, perinatal health, pesticide use, environmental tobacco smoke and other topics. [See: http://www.gwu.edu/~macche/confe_oct1st2005.htm or contact Betty Dabney at bdabney@mde.state.md.us]

21. **The Council for Excellence in Government: Council Hosts Big City Emergency Managers Forum; New Homeland Security Polls in the Works** [excerpts]. Nearly four years after the events of September 11, 2001, how are our largest cities coping with the challenges of emergency preparedness and public readiness? The Council hosted emergency managers from New York, Los Angeles, Chicago, Miami, San Francisco and Washington, D.C. in June at a first-of-its-kind forum to discuss these issues. Managers exchanged information and best practices on topics including public preparedness campaigns and plans, critical infrastructure protection, and mass warning systems.

Also on the agenda was a discussion of a **Public Readiness Index (PRI)**. The Council is working collaboratively with leaders in the homeland security enterprise and survey experts to design a PRI to measure and track progress and gaps in public preparedness. The PRI will provide a tool for communities to determine the effectiveness of their emergency preparedness strategies, and enable leaders to gauge the level of readiness in communities and identify gaps and solutions. It will also allow citizens to hold their local government, employers and civic leaders accountable for effective emergency planning, practice drills, and user-friendly, readily available information and alert systems. The Council is developing the PRI with grants from the Sloan Family Foundation. [See discussion on new online Council newsletter at http://www.excelgov.org]

III. GIS Outreach
[Editor: All requests for Public Health GIS User Group assistance are welcomed; readers are encouraged to respond directly to colleagues]
From Michael Hochman, Harvard University: I am working with the Johns Hopkins School of Public Health, and we have a question about the **use of ZCTAs (ZIP Code Tabulation Areas)** in health studies. We are working on a study to determine the prevalence of renal failure on the Navajo reservation. We have determined the number of cases of renal failure in people who live in the 82 ZIP Codes that make up the Navajo Reservation. Now, we want to know how many people live in these 82 ZIP Codes (i.e. we need to determine the denominator for the prevalence calculation). I used the American FactFinder to determine how many people live in the corresponding 82 ZCTAs. As you probably know, ZCTAs and ZIP Codes do not correspond perfectly, however I'm trying to get a sense of how far off our estimate would be over an area the size of the Navajo reservation (which is bigger than the state of West Virginia). Do you know of anyone who has tried to use ZCTAs in a similar way? I'd love to be able to cite any previous studies in which ZCTAs have been used in this way to justify our use of them in our study. Thoughts from the CDC PH GIS Users Group would be welcome. [Contact: michael_hochman@student.hms.harvard.edu]
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From Lisel O'Dwyer, Flinders Medical Centre, Australia: I'm writing a book chapter on **how health geography can contribute to health promotion (HP)**. The rest of the book is about how other fields such as anthropology can contribute to HP practice and I want to give two examples of how spatial perspectives etc., were an important, or better yet, essential part of a successful HP effort. Has anyone here been involved in something like this that would make a useful case study, or maybe stood helplessly by and watched a HP effort fail due to failure to consider place, location, etc.? Here's a chance to let more people know about it (I can change identifying details if necessary). [Contact: Lisel, Senior Research Officer, at lisel.odwyer@flinders.edu.au]
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From Sumith Pathirana, Southern Cross University, Australia: I am working on a research project **to map the potential risk of dengue fever** using GIS and remote sensing techniques. Here, I am examining two aspects: impact of climate on the spatial distribution patterns of dengue vector; and effect of population mobility on the potential increase of dengue vector. Just wondering whether any one has used GIS models/spatial statistical tools to map the population mobility (e.g. Markov). I appreciate it if you can let me know where to find them as I haven't found a suitable tool in current major GIS software. [Contact: Sumith at spathira@scu.edu.au]
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From Paul McMurray, CDC: In using zip codes for spatial analysis, issues have been raised concerning the **management of Zip Code changes over time**. Issues that I am researching the management of Zip Codes over time include the following: *How do you handle ZIP codes that may become obsolete or split into new ZIP codes? *How do you map historical data that has been collected under the original zip codes? *When analyzing data across time and there have been ZIP code changes that affect that data, what "version" of ZIP codes do you use to map and analyze the data?; and, *Mapping boundaries can change. How do you version the boundary files associated with the various ZIP code versions when doing mapping? I would like to know how others are addressing these questions. Any feedback anyone can give me concerning the management of ZIP codes over time would be much appreciated. [Contact: Paul at pzm5@cdc.gov]

IV. Public Health GIS Presentations and Literature
NCHS/CDC Cartography and GIS Guest Lecture
"GIS Analysis of African American Public Health Disparities, Cleveland, Ohio," Charles Croner, Ph.D., NCHS, CDC, and The Center for Community Solutions, Cleveland. Abstract. The Centers for Disease Control and Prevention has declared "Achieving a healthy nation is impossible without healthy minority populations and without eliminating racial/ethnic health disparities." In Cleveland, Ohio, one of our nation's most residentially segregated cities, there is compelling evidence that African American families and children bear an inordinate public health burden in terms of basic and related measurements of societal health and well being. We apply Geographic Information Systems (GIS) and census tract geography to help improve detection and visualization of public health and related disparities in Cleveland's African American neighborhoods. By comparison, the use of national, state, county and even city-wide statistics would tend to mask key measurements of localized disparity and public health burden. We face a variety of spatial statistical methodological challenges which include the selection of census tracts over other small area geographies for public health disparities analysis, ways to incorporate and map small numbers in the visualizations, and building a scientific basis for what appears to be a convergence in public health for the use of ecological covariates to detect

gradients in public health measurement and outcome. We believe this approach provides community health planners an important tool to help improve the cost-effective allocation of scarce health prevention resources. These methods can be standardized for similar small area study in other U.S. urban populations and may have implications for improved estimation efficiencies in the future design of national health surveys.

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CDC's *Emerging Infectious Diseases, MMWR* and *Preventing Chronic Disease*
(1)Emerging Infectious Diseases
Emerging Infectious Diseases (EID) is indexed in Index Medicus/Medline, Current Contents, Exerpta Medica, and other databases. EID is part of CDC's key plan for
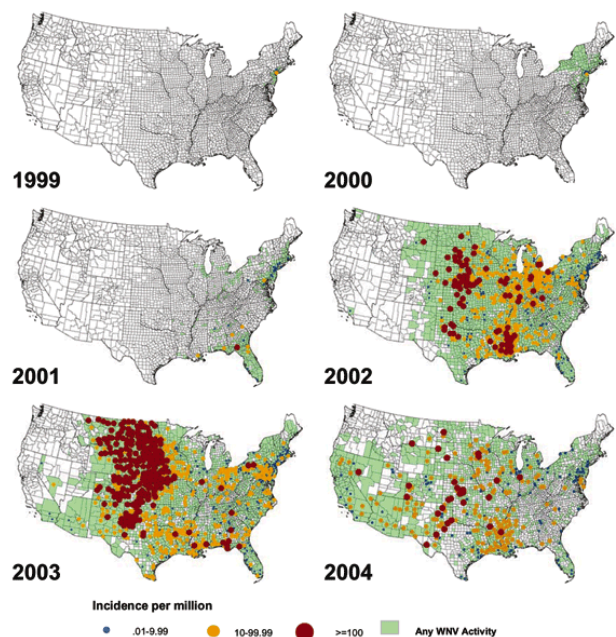
Map: Vol **11(8)**, August 2005- Epidemiology and Transmission Dynamics of West Nile Virus Disease, article Hayes EB, et al.

combating emerging infectious diseases; one of the main goals of CDC's plan is to enhance communication of public health information about emerging diseases so that prevention measures can be implemented without delay. The **September 2005 11(9)** edition of EID is now online. This edition is devoted mainly to articles on the epidemiology and ecology of West Nile Virus, dengue, malaria and other topics [See EID website for this and other reports: http://www.cdc.gov/ncidod/EID/index.htm]

(2) Morbidity and Mortality Weekly Report
Selected articles from CDC's ***Morbidity and Mortality Weekly Report*** (MMWR): [Readers may subscribe to MMWR and other CDC reports, without cost, at site http://www.cdc.gov/subscribe.html as well as access the MMWR online at website http://www.cdc.gov/mmwr. Note: Efforts are made to include themes which may lend themselves to spatial distribution.] Vol. **54(35)**- Unintentional Deaths from Drug Poisoning by Urbanization of Area New Mexico, 1994-2003; Hurricane Katrina Response and Guidance for Health-Care Providers, Relief Workers, and Shelter Operators; Vol. **54 (34)**- QuickStats: Percentage of Children Aged 4-17 Years with Emotional or Behavioral Difficulties Who Used Mental Health Services, by Type of Service: United States, 2003; Vol. **54, Supplement**- Syndromic Surveillance: Reports from a National Conference, 2004; Vol. 54(33)- **Progress in Improving State and Local Disease Surveillance-United States, 2000-2005**. In September 2000, states began receiving federal funding to plan and implement integrated electronic systems for disease surveillance. CDC and state and local health departments had

FIGURE 1. Disease surveillance, by state and method — National Electronic Disease Surveillance System, United States, April 2005
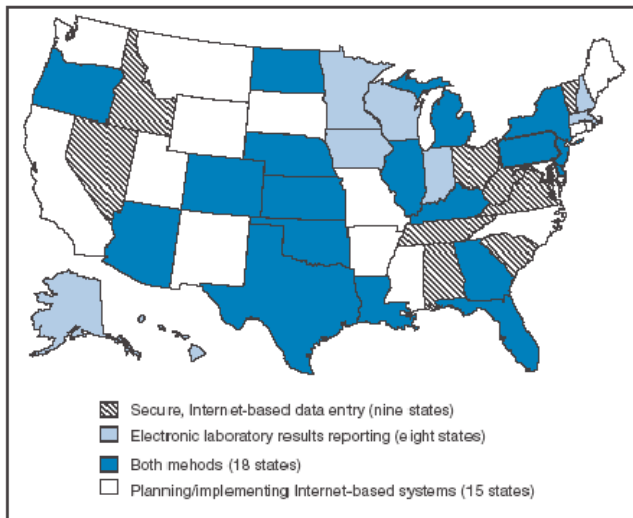
recognized the importance of such systems and of uniform standards to improve the usefulness of public health surveillance and the timeliness of response to outbreaks of disease. Previously, state health departments received most case-report forms by mail and then entered the data into computer systems, sometimes weeks after the cases of notifiable disease had occurred, including

cases that warranted immediate public health investigation or intervention. In addition, depending on the disease, only 10%-85% of cases were reported, and more than 100 different systems were used to transmit these reports from the states to CDC (CDC, unpublished data, 2005). This report summarizes progress since the initial funding in 2000 in improving state and local disease surveillance through secure, Internet-based data entry and automated electronic laboratory results (ELR) reporting. Both are components of the National Electronic Disease Surveillance System (NEDSS), the surveillance and monitoring component of the broader Public Health Information Network (PHIN) initiative. Local, state, and national public health officials should continue to improve the timeliness and completeness of disease surveillance. [See full report at MMWR website at w/mmwrhtml/mm5433a3.htm]; QuickStats: Percentage of Persons Aged >20 Years with Hypertension, by Race/Ethnicity: United States, 1999-2002; Vol. **54(31)**- **Self-Reported Asthma Among High School Students, United States, 2003** [Asthma is a leading chronic illness among children in the United States. To examine self-reported asthma and asthma attacks among U.S. high school students, CDC analyzed data from the 2003 national Youth Risk Behavior Survey. This report summarizes the results of that analysis, which indicated that 18.9% of high school students had been told by a doctor or nurse that they had asthma, 16.1% had current asthma, and 37.9% of those with current asthma had had an episode of asthma or an asthma attack during the 12 months preceding the survey. These findings underscore the need for health-care providers, schools, families, and public health practitioners to be prepared to respond to asthma-related emergencies and to help students manage their asthma]; Final 2004 Reports of Notifiable Diseases; Vol. **54(28)**- Epidemiologic Assessment of the Impact of Four Hurricanes, Florida, 2004; QuickStats reports: Hospitalizations for Heart Disease, by Diagnosis and Percentage Distribution United States, 2003.

(3) Preventing Chronic Disease
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Titles

Methodological aspects of a GIS-based environmental health inspection program used in the Athens 2004 Olympic and Para Olympic Games, Hadjichristodoulou C, Soteriades ES, Kolonia V, Falagas ME, Pantelopoulos E, Panagakos G, Mouchtouri V, Kremastinou J, *BMC Pub Health* 5(93) SEPT 2005)

Self report and GIS based modelling as indicators of air pollution exposure: is there a gold standard?, Forastiere F, Galassi C, *Occup Environ Med* 62 (8): 508-509 AUG 2005;
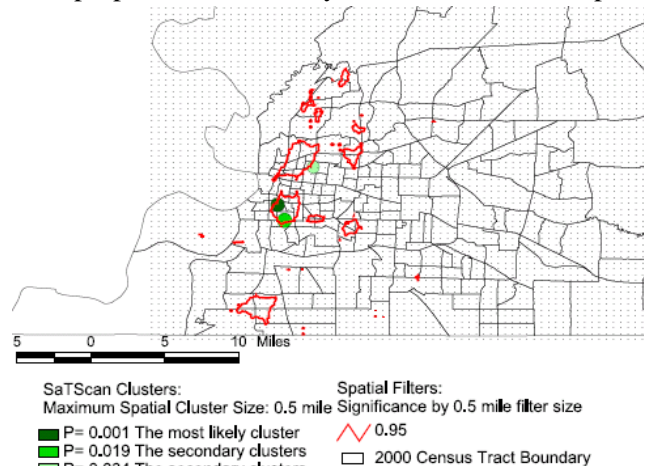
Hazardous Waste Sites and Stroke in New York State, Shcherbatykh I, Huang X, Lessner L and Carpenter D, *Environ Health* 4(18) AUG 2005;

A comparison of six analytical disease mapping techniques as applied to West Nile Virus in the coterminous United States, Griffith DA, *Inter J Health Geogr* 4(18) AUG 2005;

Exposure to traffic related air pollutants: self reported traffic intensity versus GIS modelled exposure, Heinrich J, Gehring U, Cyrys J, Brauer M, Hoek G, Fischer P, Bellander T, Brunekreef B, *Occup Environ Med* 62 (8): 517-523 AUG 2005; [In epidemiological studies of the potential health effects of traffic related air pollution, self reported traffic intensity is a commonly used, but rarely validated, exposure variable. Results: The agreement rates between self reported and GIS modelled exposure-accumulated over the three strata of self assessed traffic intensity-were 55-58% for PM2.5, filter absorbance (PM2.5 abs), and nitrogen dioxide in Munich and 39-40% in the Netherlands. Of the self reported low traffic exposed group, 71-73% in Munich and 45-47% in the Netherlands had low modelled exposure to these three air pollutants. Of the self assessed high exposed subgroups in Munich (15% of the total population) and the Netherlands (22% of the total population), only 22-33% and 30-32% respectively had high modelled exposure to the three air pollutants. The subjective assessments tend to overestimate the modelled estimates for PM2.5 and NO2 in both study areas. When analysis was restricted to the portion of the Dutch cohort living in non-urban areas, the agreement rates were even lower. Conclusions: Self reported and modelled assessment of exposure to air pollutants are only weakly associated.]

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SaTScan Clusters:
Maximum Spatial Cluster Size: 0.5 mile
☐ P= 0.001 The most likely cluster
☐ P= 0.019 The secondary clusters

Spatial Filters:
Significance by 0.5 mile filter size
∧∨ 0.95
☐ 2000 Census Tract Boundary

characteristics of low birthweight using two distinct cluster analysis techniques and compare the resultant clusters in terms of their socioeconomic characteristics. Additionally, we compare two methods of identifying spatial clusters of low birthweight in the target region. The research questions are as follows: (1) Are low birthweight births clustered significantly in relation to maternal residence from 2000-2002 in Shelby County? (2) To what extent will the total area within SaTScan clusters differ from the total area within Spatial Filtering clusters? (3) To what extent will the maternal and familial characteristics of those births within SaTScan clusters differ from that within Spatial Filtering clusters? (4) To what extent will the distribution of point sources of contamination within SaTScan clusters differ from that within Spatial Filtering clusters? The two estimation methods produced dramatically different results with respect to maternal characteristics of births within clusters.

Inequalities in neighbourhood socioeconomic characteristics: potential evidence-base for neighbourhood health planning, Odoi A, Wray R, Emo M, Birch S, Hutchison B, Eyles J and Abernathy T, *Int J Health Geogr* 4(20) AUG 2005;

Personalized exposure assessment: Promising approaches for human environmental health research, Weis BK, Balshawl D, Barr JR, Brown D, Ellisman M, Liov P, Omenn G, Potter JD, Smith MT, Sohn L, Suk WA, Sumner S, Swenberg J, Walt DR, Watkins S, Thompson C, Wilson SH, *Environ Health Persp* 113 (7): 840-848 JUL 2005;

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New Report: Children's Health
America's Children: Key National Indicators of Well-Being 2005

This is a biennial report to the Nation on the condition of children in America. Nine contextual measures describe the changing population, family, and environmental context in which children are living, and 25 indicators depict the well-being of children in the areas of economic security, health, behavior and social environment, and education. This year's report has special features on children with asthma, children with specified blood lead levels, and parental reports of children's emotional and behavioral difficulties. In addition, the report includes a special section on family structure and the well-being of children. Highlights from each section of the report follow.

Population and Family Characteristics. *In 2003, there were 73 million children ages 0-17 in the United States, or 25 percent of the population, down from a peak of 36 percent at the end of the baby boom (1964). Children are projected to compose 24 percent of the total population in 2020; *The racial and ethnic diversity of America's children continues to increase over time. In 2003, 60 percent of U.S. children were White-alone, non-Hispanic, 16 percent were Black-alone, and 4 percent were Asian-alone. The proportion of Hispanic children has increased faster than that of any other racial and ethnic group, growing from 9 percent of the child population in 1980 to 19 percent in 2003; *In 2004, 68 percent of children ages 0–17 lived with two married

parents, down from 77 percent in 1980. After decreasing from 1980 to 1994, the percentage has remained stable at about 68–69 percent from 1994 to 2004; *Between 1980 and 1994, the rate of childbearing by unmarried women rose sharply for women of all ages. For all age groups combined, this trend ended in 1994. Birth rates for unmarried teenagers have dropped considerably since 1994, while increases in rates for women in their twenties and older have slowed. In 2003, the overall birth rate was 45 births per 1,000 unmarried women ages 15-44; *In 2003, 62 percent of children ages 0-17 lived in counties in which one or more of the Primary National Ambient Air Quality Standards were exceeded, an improvement from 69 percent in 1999; *Children's exposure to secondhand smoke, as indicated by blood cotinine levels, dropped between 1988-1994 and 1999-2002. Overall, 59 percent of children ages 4-11 had cotinine in their blood in 1999-2002, down from 88 percent in 1988-1994. In 2003, 11 percent of children ages 0-6 lived in homes where someone smoked regularly.

Economic Security Indicators. *In 2003, 18 percent of all children ages 0-17 lived in poverty, whereas among children living in families, the poverty rate was 17 percent; *The official poverty rate of children living in families below the poverty threshold has fluctuated since the early 1980s: it reached a high of 22 percent in 1993 and decreased to a low of 16 percent in 2000; *In 2003, 89 percent of children had health insurance coverage at some point during the year. While government insurance coverage has continued its upward trend since 1999, the proportion of children covered by private health insurance has dropped since 2000, reversing the upward trend from 1994-1999.

Health Indicators. *The proportion of children ages 6–18 who were overweight increased from 6 percent in 1976–1980 to 16 percent in 1999–2002. Racial, ethnic, and gender disparities exist, such that in 1999–2002, Black-alone, non-Hispanic girls and Mexican American boys were at particularly high risk of being overweight (23 percent and 27 percent, respectively); *While still near its record low, the infant mortality rate increased in 2002 for the first time in decades. The rate was 7.0 deaths per 1,000 live births, up from a rate of 6.8 in 2001. A special analysis showed that most of the increase was due to an increase in the number of infants weighing less than 750 grams, or about 1 lb. 10 oz. Racial and ethnic disparities persist, with the Black, non-Hispanic infant

mortality rate consistently higher than that of other racial or ethnic groups; *Child mortality dropped by approximately half between 1980 and 2002 among children ages 1-4 (from 64 to 31 deaths per 100,000 children) and among children ages 5-14 (from 31 to 17 deaths per 100,000 children); Deaths from firearm injuries among adolescents declined between 1995 and 2002, particularly among Black and Hispanic males. For example, from 1995 to 2002, the firearm homicide rate declined from 101 to 48 deaths per 100,000 Black males and from 47 to 22 deaths per 100,000 Hispanic males; *The birth rate for adolescents continued to decline in 2003 to 22 births per 1,000 females ages 15-17, representing the lowest rate ever recorded. The decrease in adolescent births is apparent for all racial and ethnic groups and is notable among Black adolescents. The birth rate among Black, non-Hispanic females ages 15-17 dropped by more than half between 1991 and 2003 (from 86 to 39 births per 1,000), completely reversing the increase from 1986 to 1991.

Behavior and Social Environment Indicators. *Following several years of gradual decreases, the rate of daily smoking remained stable between 2003 and 2004; in 2004, 4 percent of 8th-graders, 8 percent of 10th-graders, and 16 percent of 12th¬graders reported smoking cigarettes daily in the previous 30 days; *The percentage of students who reported having five or more drinks in a row in the past 2 weeks was stable from 2003 to 2004 at 11 percent among 8th¬graders, 22 percent among 10th-graders, and 29 percent among 12th-graders; *Between 2003 and 2004, illicit drug use (in the past 30 days) significantly declined from 10 percent to 8 percent among 8th-graders; *Serious violent crime involving juvenile victims and offenders went up between 2002 and 2003. In 2003, 18 per 1,000 juveniles were victims of serious violent crimes-that is, homicide, rape, aggravated assault, and robbery- and 15 per 1,000 juveniles were reported by victims to have committed such crimes. These rates increased from those in 2002, when 10 per 1,000 youth were victims of serious crimes and 11 per 1,000 juveniles were identified as offenders. However, rates still generally declined from their peaks in 1993 of 44 victims per 1,000 youth and 52 offending youth per 1,000 juveniles.

Education Indicators. *The average mathematics scale score of 4th- and 8th-graders was higher in 2003 than in all previous National Assessment of Educational Progress assessments since the series began in 1990. In reading, the 2003 4th-grade scale score was not measurably different from the scale score in 1992, the first year of the reading assessment series. The 8th-grade reading scale score declined 1 point from 2002 to 2003, but the 2003 scale score was higher than in 1992.

*The proportion of Black-alone, non-Hispanic youth who were neither in school nor working was 10 percent in 2004, down from 12 percent in 2003. More Black-alone, non-Hispanic youth moved from the category "not enrolled in school and not working" into the category of "enrolled in school and not working" in 2004; *White-alone, non-Hispanic persons ages 25–29 in 2003 were more likely to have earned at least a bachelor's degree (32 percent) than their Black-alone, non-Hispanic (18 percent) and Hispanic (12 percent) peers. The percentage of Black-alone, non-Hispanic persons with at least a bachelor's degree increased from 12 percent in 1980, and the percentage of Hispanic persons with at least a bachelor's degree increased from 8 percent in 1980.

Special Features. *In 2003, about 13 percent of children had been diagnosed with asthma at some time in their lives, about 9 percent of children were reported to currently have asthma, and about 6 percent of children had one or more asthma attacks in the previous year. From 1997-2003, the trends for these three asthma indicators have remained fairly stable; however, between 1980 and 1995, childhood asthma, as measured using different indicators, more than doubled; *In 1999-2002, less than 2 percent of children ages 1-5 had blood lead levels greater than 10 micrograms per deciliter (µg/dL). The median concentration of lead in the blood of children ages 1-5 dropped from 14 µg/dL in 1976–1980 to about 2 µg/dL in 2001–2002, a decline of 89 percent; *In 2003, 5 percent of children ages 4-17 were reported by a parent to have definite or severe difficulties with emotions, concentration, behavior, or being able to get along with other people. Sixty-five percent of the parents of these children reported contacting a mental health professional or general doctor and/or that the child received special education for these difficulties.

Special Section. *In 2002, 7 percent of births to married mothers were low birthweight, compared with 10 percent of births to unmarried mothers. In that same year, the infant mortality rate for infants born to married mothers was 5 per 1,000 live births, compared with 10

per 1,000 live births for infants born to unmarried mothers; *Pooled data from 1996 and 2001 show that 97 percent of adolescents ages 15-17 who lived with their married, biological parents were enrolled in school, compared with 94 percent of adolescents who lived with a single parent, and 80 percent of adolescents who lived with neither parent; *According to pooled data from 1996 and 2001, 86 percent of adolescents ages 15-17 who lived with their married, biological parents, were reported to be in excellent or very good health, compared with 80 percent of adolescents who lived with a married stepparent, 76 percent of those who lived with a single parent, and 67 percent of those who lived with neither parent; *Pooled data from 1996 and 2001 show that 2 percent of all females ages 15-17 who lived with their married biological parents became unmarried mothers by age 17–19, compared with 9 percent of those who lived with a single parent, and 27 percent of those who did not live with either parent. [For the full report, see **2005 Federal Interagency Forum on Child and Family Statistics**, at http://childstats.gov]

Research Report: Disease Mapping
**A Procedure for Disease Mapping: Bayesian Models and GIS**

Authors: Thomas Jagger[1], Laurel Harduar-Morano[2], James Elsner[1], Chris Duclos[2], Greg Kearney[2], David Johnson[2], Prakash Patel[2]: [1]Department of Geography, The Florida State University; [2]Florida Department of Health [Contact Greg at Greg_Kearney@Doh.State.Fl.US].
Introduction. In 2002 the CDC awarded 21 states, three metropolitan city health departments, and three universities grant awards for EPHT. As a data linkage state, Florida is tasked to demonstrate and evaluate methods for linking data from ongoing, existing health effects surveillance systems with data from existing human exposure and environmental hazards surveillance/monitoring systems. The Florida Department of Health (FDOH) is working with the Department of Geography at The Florida State University to develop models for examining spatial and temporal relationships between known sources of hazard exposure and health outcomes (disease mapping) across the state.

A traditional approach to mapping disease is to use the standardized incidence ratio (SIR), which is an estimate of incident number of disease cases in a population relative to what might be expected if the study population had the same disease incidence rate as some larger (or standard) comparison population (Fig.1). There

are several limitations to this approach and other methods can make use of the correlation inherent in the data. For example, Bayesian models are flexible enough to incorporate spatial correlation and to adjust the overall mean ratio when relatively few cases exist.

A problem with widespread use of Bayesian models in disease mapping is the lack of such tools within standard Geographic Information Systems (GIS). Here we demonstrate the tools needed. We use GIS for database management, estimating adjacency, and mapping, but use Bayesian software to develop and run a model of adult Leukemia rates. Our goal is to showcase the advantage of working with freely available and open source software to create a workflow for modern disease mapping.

Data and Process. We build a model to explore the relationship between a known source of benzene exposure and Leukemia rates. This choice is predicated on results in which a significant relationship was found between acute childhood Leukemia and benzene
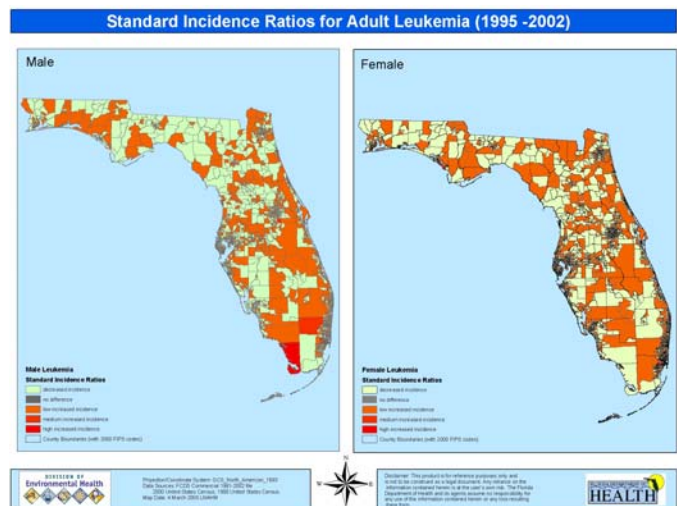

Figure 1. Traditional SIR Maps

exposure (Steffen et al. 2004). Here we choose an ecological approach that identifies the density of petrol stations (as a surrogate for benzene exposure) and total adult (20 years or older) Leukemia counts by county, race, age and sex. We interpolate the 1990 and 2000 U.S. census data to the years 1995-2002 and total the Leukemia counts by county and year over the same 8-year period. The initial study considers only petrol stations in existence from 1989 or earlier.

The process we use (Fig. 2) is shown in the flow from ArcMap to R to WinBUGS (Windows version of the Bayesian inference Using Gibbs Sampling) back to R then back to ArcMap. The WinBUGS and R software packages are described below. The process begins by exporting shapefiles from ArcMap. These files are read into R and converted to WinBUGS text files that are read by WinBUGS. Data is loaded and the model is compiled in WinBUGS. Initial values are specified and the model is run to generate samples that collectively form a posterior distribution for the risk ratio. The sample values are written by WinBUGS and read by R. R then generates and writes database files that are read into and displayed by ArcMap. Currently the process requires us to manually move between the 3 software platforms.

Figure. 2. The process of disease mapping using ArcMap, WinBUGS, and R. The process is layered with ArcMap on top, WinBUGS at the bottom and R in between. The flow is from ArcMap to R to WinBUGS back to R then back to ArcMap.
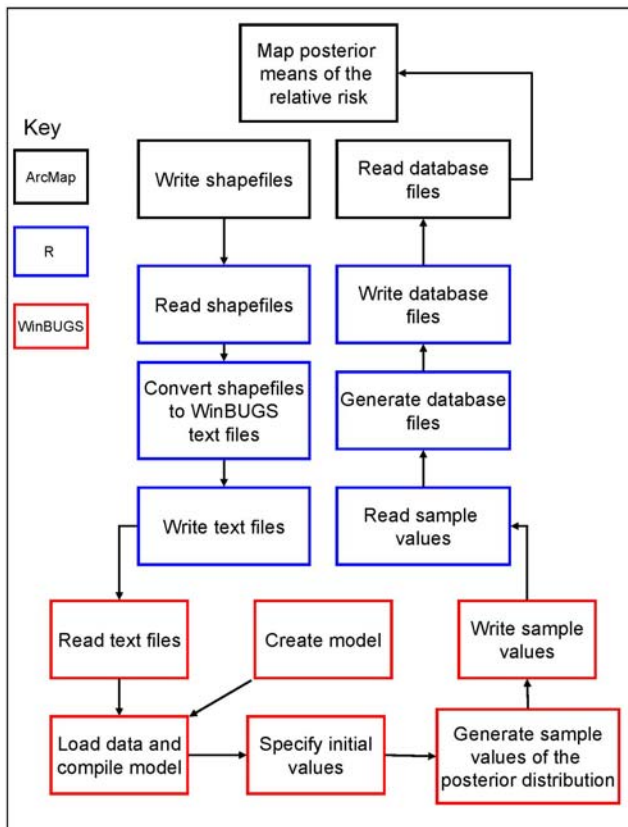
Leukemia-Benzene Model. The model is a Bayesian regression containing structured (correlated) and unstructured (uncorrelated) random effects. The correlation refers to spatial autocorrelation as rates will be more similar for nearby counties than for distant counties. The model we use is derived from a model of Scottish lip cancer (Banerjee et al. 2004, p. 167). We use total adult Leukemia counts grouped by county, sex and race. We estimate the benzene hazard using the number of petrol stations per square mile for each of the 67 Florida counties and the population at risk for each county from the previously interpolated person years (1995-2002).

We generate sample values of the relative risk ratio for Leukemia using the WinBUGS software developed at the Medical Research Council in the U.K (Gilks et al. 1994). WinBUGS minimizes the startup cost of Bayesian modeling by eliminating the need to program in a high-level language. It also chooses an appropriate sampling algorithm based on model structure. WinBUGS is freely available and flexible. For our purposes, the geoBUGS extension allows us to model spatial autocorrelation in addition to providing a mapping tool. Interoperability between ArcGIS and WinBUGS is achieved through the use of the open source R software. R is an independent and freely available implementation of the S object-oriented language, developed by an international team of statisticians and is available for Windows and other operating systems.

Samples generated from WinBUGS form the posterior distribution of the relative risk ratio for Leukemia. We calculate statistics, such as the mean and credible interval, directly from the posterior distribution. We check the assumption that the samples generated are from a stationary distribution. It takes 16K iterations for the model to converge (reach approximate stationarity) and another 100K to obtain a reasonably smooth posterior distribution.

Results. Next we show the posterior mean of the relative risk ratio of developing adult Leukemia by county (Fig. 3). The relative risk ratio is the population weighted risk of Leukemia relative to the risk if there are no petrol stations. For example, a relative risk ratio of 1.03 for a county indicates that the probability of Leukemia is on average 3% more likely given the petrol station density of the county. No county has a relative risk statistically significant different from 1. Results also indicate little difference in relative risk of Leukemia for the subgroups of white male, white female, and other

male. For the other female group results are suggestive, but inconclusive of a higher Leukemia rate.

Figure 3. The association between petrol station density and Leukemia rates based on the Bayesian model.
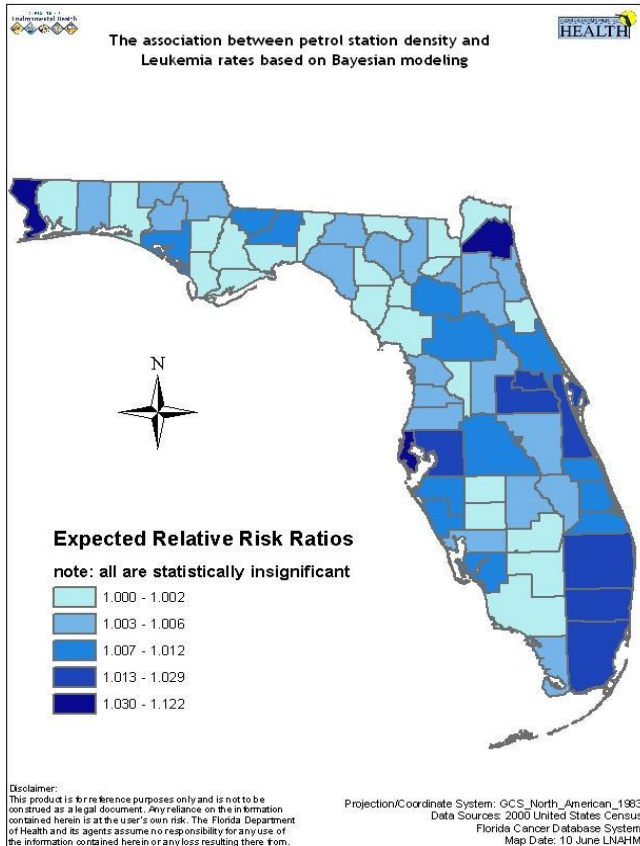
We note that, as a result of the structured random effects term, the model indicates spatial variation in adult Leukemia rates that might not be accounted for by petrol station density alone. In fact the spatial trend in the structured random effect is significant with the largest values occurring over the central peninsula. Removing the structured effect from the model changes the expected relative risk ratios such that one might erroneously conclude that benzene and Leukemia are negatively related for white males. We therefore suggest that the structured effects term is important and represents variation in Leukemia rates not captured by petrol station density (see Gelman et al. 2004 for additional information).

Summary. This study is intended to show how Bayesian techniques can be used with GIS for disease modeling and mapping. The study can be improved by
examining the relationship on a finer scale, such as the census tract level, by including additional information for each petrol station to indicate the level of exposure, by adding additional information on benzene exposure from other sources such as the Toxic Release Inventory, and by developing a point-source model for the distribution of benzene hazard to specify the relative risk at the individual level.

References •Banerjee, S., B. P. Carlin, and A. E. Gelfand, 2004: Hierarchical Modeling and Analysis for Spatial Data. Chapman Hall/CRC, New York, 452pp;•Gilks, W. R., A. Thomas, and D. J. Spiegelhalter, 1994: A language and program for complex Bayesian modelling. *The Statistician*, 43, 169-178; Steffen, C., M. F. Auclerc, A. Auvrignon, A. Baruchel, K. Kebaili, A. Lambilliotte, G. Leverger, D. Sommelet, E. Vilmer, D. Hémon, and J. Clavel, 2004: Acute childhood leukaemia and environmental exposure to potential sources of benzene and other hydrocarbons; a case-control study. *Occup. Environ.Med*., 61, 773-778.

V. Related Census, HHS, FGDC and Other Federal/State Developments
New Report on Geography at USGS

Geography for a Changing World: A Science Strategy for the Geographic Research of the U.S. Geological Survey, 2005-2015, McMahon, Gerard, and others, 2005, Sioux Falls, SD: U.S. Geological Survey Circular 1281, 76 pages. This report presents a science strategy for the geographic research of the U.S. Geological Survey (USGS) for the years 2005-2015. The common thread running through the vision, mission, and science goals presented in the plan is that USGS geographers will provide national leadership to understand coupled human-environmental systems in the face of land change and will deliver pertinent information to decision makers on the vulnerability and resilience of these systems. We define land change science as the study of the human and environment dynamics that give rise to changed land use, cover, and surface form.

A number of realities shape the strategic context of this plan: The Department of Interior Strategic Plan focuses on meeting society's resource needs and sustaining the Nation's life support systems, underscoring the importance of characterizing and understanding coupled human-environmental systems; In redefining its mission in the mid-1990s, the USGS envisions itself as an integrated natural science and information agency. The USGS will assume a national leadership role in the use of science to develop knowledge about the web of relations that couple biophysical and human systems and translate this knowledge into unbiased, reliable information that meets important societal information needs; The following trends will influence USGS geography-oriented science activities over the next decade. Most of the emerging earth science issues that the USGS will address are geographic phenomena. A growing international concern for aligning society's development activities with environmental limits has led to an articulation of an

Three-dimensional virtual city from LIDAR

agenda associated with global environmental change, vulnerability, and resilience. Earth science investigations have evolved toward the study of very large areas, and the resulting huge volumes of data are challenging to manage and understand. Finally, scientists and the public face the challenge of gaining intelligent insights about geographic and environmental processes from these data, with the ultimate goal of guiding resource-management decisions. [See USGS website for this geography report and other papers: http://geography.usgs.gov/documents/gcw/index.html#Executive]

Federal Geographic Data Committee (FGDC)

[The Federal Geographic Data Committee (FGDC) is an interagency committee, organized in 1990 under OMB Circular A-16, which promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis. The FGDC is composed of representatives from seventeen Cabinet level and independent federal agencies. The FGDC coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 19 federal agencies that make up the FGDC, including HHS, are developing the NSDI in cooperation with organizations from state, local and tribal governments, the academic community, and the private sector. See http://www.fgdc.gov]

FGDC approves "Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns." What is the purpose of the guidelines? Many public, private, and non-profit organizations originate and publicly disseminate geospatial data. Dissemination is essential to the missions of many organizations and the majority of these data are appropriate for public release. However, a small portion of these data could pose risks to security and may therefore require safeguarding. Although there is not much publicly available geospatial information that is sensitive ([1]Baker et al., 2004, p. 123), managers of geospatial information have safeguarded information using different decision procedures and criteria. The guidelines provide standard procedures to: 1. Identify sensitive information content of geospatial data that pose a risk to security; 2. Review decisions about sensitive information content during reassessments of safeguards on geospatial data.

Additionally, the guidelines provide a method for balancing security risks and the benefits of geospatial data dissemination. If safeguarding is justified, the guidelines help organizations select appropriate risk-based safeguards that provide access to geospatial data and still protect sensitive information content. The guidelines do not grant any new authority and are to be carried out within existing authorities available to organizations. They apply to geospatial data irrespective of the means of data access or delivery method, or the format. [Seefull report at http://www.fgdc.gov/fgdc/homeland; [1]Baker, John; Lachman, Beth; Frelinger, David; O'Connell, Kevin; Hou, Alexander; Tseng, Michael; Orletsky, David; and Yost, Charles, 2004, **Mapping the risks: assessing the homeland security implications of publicly available**

geospatial information: Santa Monica, Ca., RAND Corporation, 195 p.; Also available through the RAND Corporation at http://www.rand.org/publications/MG/MG142]

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Updated Emergency Management And Hazard Mapping Symbols Now Available

The Federal Geographic Data Committee (FGDC) Homeland Security Working Group has been tasked to develop a standard set of symbols for use by the Emergency Management and First Responder communities at all levels of need (i.e. National, State, Local and Incident). Federal, state, and local agencies worked together under the auspices of the FGDC's Homeland Security Working Group, to develop the proposed symbology. Symbols and their definitions have been developed for Incidents, Natural Events, Operations, and Infrastructures at a level to provide immediate and general understanding of the situation.

While these symbols do not include all emergency management features, they provide an initial framework for emergency management and first responder mapping and communication. Detailed attribution for any feature can be included by the user. Both a category structure and a damage-operational status hierarchy were developed using color and frame shapes with line patterns. The symbology was designed for use in digital and paper map products.

A voluntary evaluation by the Emergency Management and First Response community provided the Working Group with a preliminary assessment of the utility and acceptability of the symbology prior to it's formal submission to a consensus-based standards body such as the American National Standards Institute. It is anticipated that when these symbols become standard, their widespread adoption by the emergency management, first responder and software vendor communities will make them readily available and consistently used in emergency management mapping applications.

A comprehensive review and evaluation of existing symbology was performed prior to the development of the symbols. Whenever possible an authoritative source was used as a starting point. The symbology was designed to ensure scalability and cross-disciplinary/cross-cultural flexibility. Currently, the scope of this standard is limited to **point symbols**. However, the standard is expected to expand at a later date to include lines and polygons. Additional details can

be stored as attributes and displayed in a way appropriate to your specific map or application. For example, "football stadium" could be carried as an attribute of the "Open Facility" feature within Infrastructure/Public Venue.

To further distinguish between the four categories, **frame shapes or border patterns** (diamonds, circles, and rectangles) are used to visually classify the symbols into their respective groups (**Incidents, Natural Events, Operations, and Infrastructures**). The symbols are designed to be distinctive in either a color or a black and white environment. While a colored symbol frame can be used to denote the level of damage or operational status, the pattern of this frame also denotes the status. See the damage-operational section of this document.

The symbols were designed for application at the large and medium map scales typically used by emergency managers. If a very small symbol is required (below 12 point), it is recommended that you use the category shape as the symbol. For instance, use a diamond to represent an incident. Additional information can be provided via legend, labels, and attributes. [See: http://www.fgdc.gov/HSWG/ref_pages/SymbologyBackground_ref.htm]

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Street Address Data Standard- Review Requested

This is a community review of the first *working draft* of the Street Address Data Standard developed by the Urban and Regional Information Systems Association (URISA). Comments will be synthesized into a second *working draft*. A committee draft will be submitted to Federal Geographic Data Committee (FGDC) in 2006 for the 90-day FGDC public review, as mandated by the FGDC standards process. URISA invites everyone to review the standard and provide comments. The comment period for this version of the draft standard will end on October 3, 2005. A second draft will be posted for comment after the URISA annual conference (October 9-12, 2005). This is the first opportunity for members of the GIS Community to view the Federal Geographic Data Committee-approved effort to create a street address data standard.

The objective of this effort has been to create single street address data standard that consists of four parts: **content, classification, quality, and transfer**. URISA submitted a formal proposal to the FGDC. The standard is intended to provide a statement of best practices for defining street address data content and

classes, setting standards and tests of street address data quality, and facilitating exchange of street address data files. The results of this collaborative process will be submitted through the FGDC's formal standards approval process. If they are accepted, the Census Bureau will maintain the standards under the auspices of its duties as theme lead for the Federal Subcommittee on Cultural, Society, and Demographics. [The draft standard is available at http://www.urisa.org/address_data_standard.htm]

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Geographic Names Information System (GNIS): One of the Eight Layers of the National Map

[July 12, 2005 FGDC Coordination Working Group Meeting] Standards for Geographic Names exist and are in place. Geographic Names were recognized as a problem during the first great expedition to the west. Although they were collecting a lot of data, in many instances the maps weren't useable because they had different names for the same feature. In 1890 the US Board on Geographic Names (BGN) was established by Presidential Executive Order. In 1947 the Board was reestablished by Public Law to standardize geographic names for the Federal government and to formulate principles, policies and procedures to achieve the promulgation of standardized names.

Names shown on USGS topographic maps, USFS maps and NOAA nautical charts used to be the only three official sources of geographic names. Today no Federal agency may change or add unilaterally any name on any product without BGN approval; however an agency may choose to leave the name off a map or out of a publication. Congress is the only entity that can overrule the BGN. The most important toponymic policy for the Federal government is local use and acceptance-the BGN refers the name proposals to state names authorities.

BGN is divided into the Domestic Names Committee (DNC), with staff support through USGS, and the Foreign Names Committee (FNC), with staff support through NGA. Only Federal employees are permitted to vote on the committee. The Geographic Names Information System (GNIS) is the only source for applying geographic names to Federal maps and other products depicting areas under U.S. jurisdiction. The GNIS deals with every category of name except roads and highways.

FIPS 55 place codes will be carried through 2012 but are being replaced by **GNIS ID place codes**

which will be random and have no data content in the number. Until 2012 both codes will be shown in the GNIS for a feature. Federal agencies that use FIPS 55 place codes (based on place names) will be expected to switch over to the GNIS ID place codes (based on 1-10 random digit numbers). Thus, **after 2012, place name changes will not affect place codes**. The following departments/agencies are members of the Domestic Names Committee: Agriculture Department (USFS), Commerce Department (NOAA, Census), Government Printing Office, Department of Homeland Security (FEMA, USCG), Department of the Interior (USGS, NPS, BIA, FGDC, BLM, FWS), Library of Congress and Postal Service. [Contact: Roger Payne, USGS/BGN at rpayne@usgs.gov; see: http://geonames.usgs.gov]

Recent (selected) Government Accountability Office (GAO) Reports, 2005
[See: http://www.gao.gov/docsearch/repandtest.html]

Defense Health Care: Occupational and Environmental Health Surveillance Conducted During Deployments Needs Improvement GAO-05-903T, July 19, 2005.

<div align="center">***</div>

Flood Map Modernization: Federal Emergency Management Agency's Implementation of a National Strategy GAO-05-894T, July 12, 2005.

<div align="center">***</div>

Influenza Pandemic: Challenges in Preparedness and Response, GAO-05-863T, June 30, 2005. Shortages of influenza vaccine in the 2004-05 and previous influenza seasons and mounting concern about recent avian influenza activity in Asia have raised concern about the nation's preparedness to deal with a worldwide influenza epidemic, or influenza pandemic. Although the extent of such a pandemic cannot be predicted, according to the Centers for Disease Control and Prevention (CDC), an agency within the Department of Health and Human Services (HHS), it has been estimated that in the absence of any control measures such as vaccination or antiviral drugs, a "medium-level" influenza pandemic could kill up to 207,000 people in the United States, affect from 15 to 35 percent of the U.S. population, and generate associated costs ranging from $71 billion to $167 billion in the United States.

The nation faces multiple challenges to prepare for and respond to an influenza pandemic. First, key questions about the federal role in purchasing and

distributing vaccines during a pandemic remain, and clear guidance on potential priority groups is lacking in HHS's current draft of its pandemic preparedness plan. For example, the draft plan does not establish the actions the federal government would take to purchase or distribute vaccine during an influenza pandemic. In addition, as was highlighted in the nation's recent experience responding to the unexpected influenza vaccine shortage for the 2004-05 influenza season, clear communication of the nation's response plan will be a major challenge. During the 2004-05 influenza season, state health officials reported that mixed messages created confusion. For example, CDC advised vaccination for persons aged 65 and older, and at the same time a state advised vaccination for persons aged 50 and older. Further challenges include ensuring an adequate and timely supply of influenza vaccine and antiviral drugs, which can help prevent or mitigate the number of influenza-related deaths. Particularly given the length of time needed to produce vaccines, influenza vaccine may be unavailable or in short supply and might not be widely available during the initial states of a pandemic. Finally, the lack of sufficient hospital and health care workforce capacity to respond to an infectious disease outbreak may also affect response efforts during an influenza pandemic. Public health officials we spoke with said that a large-scale outbreak, such as an influenza pandemic, could strain the available capacity of hospitals by requiring entire hospital sections, along with their staff, to be used as isolation facilities.

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Groundwater Contamination: DOD Uses and Develops a Range of Remediation Technologies to Clean Up Military Sites GAO-05-666, June 30, 2005

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Data Quality: Improvements to Count Correction Efforts Could Produce More Accurate Census Data GAO-05-463, June 20, 2005. The Census Bureau's **Count Question Resolution (CQR)** program corrected data affecting over 1,180 of the nation's more than 39,000 governmental units including states, counties, and cities. Although the national and state-level revisions were relatively small, in some cases the corrections at the local level were substantial. For example, CQR increased Morehead, Kentucky's, population total by more than 1,600 people because the Bureau mistakenly attributed local university students, who lived in dormitories located within the city, to the population count of an unincorporated section of the county in which Morehead is located. Likewise, the Bureau added almost 1,500 persons to the population count of Cameron, Missouri, when CQR found that a prison's population was erroneously omitted.

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Community Development Block Grant Formula: Targeting Assistance to High-Need Communities Could Be Enhanced GAO-05-622T, April 26, 2005. HUD's report on the CDBG formula provides a thoughtful and sophisticated analysis of those elements of the formula that impede effective and equitable targeting of limited federal resources. Central to HUD's analysis is an index of need that encompasses a wide variety of indicators related to poverty, housing infrastructure, and population growth and decline. While we would question some of the factors in their index, overall we believe it serves as a reasonable basis for evaluating CDBG targeting.

The study identifies a number of causes that explain the poor performance of the current formula: • The use of two formulas rather than one is an important reason communities with similar needs do not receive similar funding; • The use of population size as a need indicator significantly reduces the extent to which funding is directed to high-need communities; • Changing the poverty measure to one based on the poverty status of households rather than individuals would avoid large grants to communities with large student populations; An increasing number of communities have attained the minimum population size necessary to be eligible for formula funding and this has also reduced funding to communities with the highest needs.

Web Site(s) of Interest Resumes Next Edition

Final Thoughts
### HHS and CDC Geospatial Response to Hurricane Katrina

"…I have seen in the hearts and hands of the HHS employees deployed in the field, and those supporting them, the same capable, compassionate and moving service as I am certain was present on Sept. 11. This fine Department does America proud, and I am

honored to serve at your side. May each of us find time to remember those killed or hurt by these tragedies, stand in unity with a deeper appreciation for our country and the sanctity of human life, and strengthen our resolve to make the world better each day"…excerpts, HHS Secretary Michael Leavitt, 9/10/05

September 16, 2005, Hurricane Katrina CDC Public Health Update (changes daily): CDC's public health disaster response, including its 212 deployed professionals, has entered an active maintenance phase and continues to see no unexpected health concerns related to Hurricane Katrina. Response-worker safety, immunizations, and environmental health concerns top CDC's response at this time. In addition, monitoring for outbreaks of infectious disease continues at intense levels.

   Spraying to kill pest flies and adult mosquitoes that could carry the West Nile and other viruses continues today. Evacuation-center and hospital surveillance have detected clusters of varicella and scabies or lice. Personal hygiene and measures to prevent disease spread have been encouraged. CDC is engaged in helping to provide vaccines and vaccinate children displaced by Hurricane Katrina, especially those staying in evacuation centers. Early Thursday (9/15), CDC's laboratory confirmed a strain of nontoxigenic *Vibrio cholerae* serogroup 01 bacteria in a sample obtained from a person who had been evacuated. This bacteria does not cause cholera disease.

   CDC has deployed public health surveillance teams to work with local and state partners to conduct two surveys. The behavior migration survey will measure best ways to share information with people who were displaced, and capture an early sense of their relocation or return preferences. A mental health survey will help CDC compare mental well being among persons who were evacuated with populations similar to them who were not evacuated. [Source: CDC Director's Emergency Operations Center, September 16, 2005]
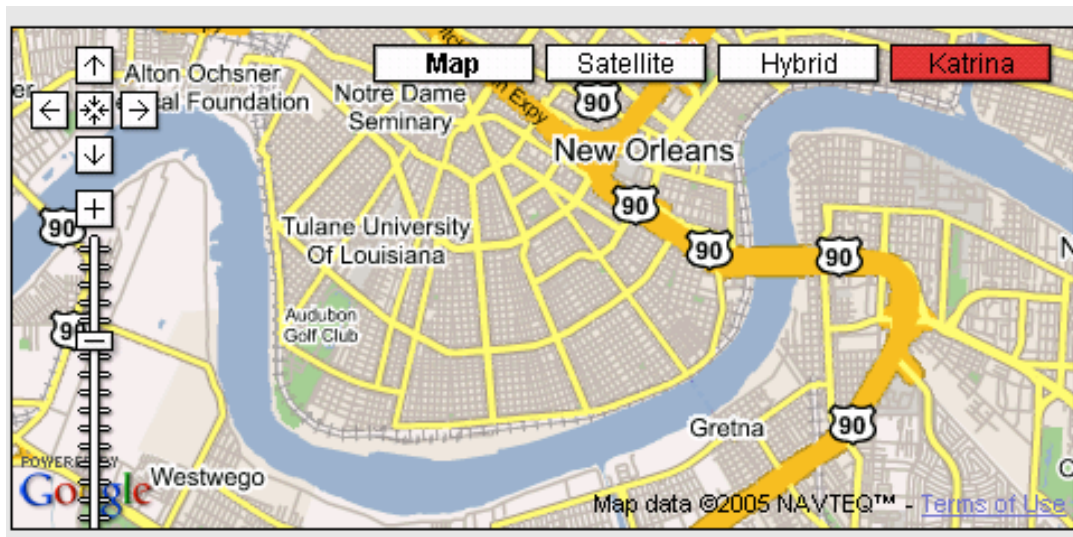

Online Interactive Flood Map. September 6, 2005. Water depths reported are the average of a 100x100ft region around the point you click. For example, estimated maximum water depth 7.7', last update 4.2', at location east of Notre Dame Seminary
[Source: http://mapper.cctechnol.com]

GIS and public health colleagues might well imagine the enormity of the public health geospatial response to Hurricane Katrina. It has comprised a major mobilization of geospatial tools and databases to help contribute to the evolving orderly restoration of health and wellbeing in this extensive hurricane-affected area of the U.S. Although we are only several weeks removed from this disaster, and much work remains to be done, I solicited the response of many CDC GIS staff to help provide readers with some insight into the mobilization of resources required for the tasks faced. Key entities involved in the geospatial response include the HHS Secretary's Operations Center (SOC; see write-up in May edition (58) 2004 of CDC's *Public Health GIS News and Information*), the CDC Director's Emergency Operations

Center (DEOC), and CDC staff and contractors from which an ad hoc CDC Hurricane Katrina response group formed to help provide assistance e.g., maps, data cleaning, information and any other onsite services, to the SOC and DEOC.

Mapping efforts in the SOC, in support of the Office of Public Health Emergency Preparedness, ranged from the citing of deployed federal assets on the ground, tracking deployed personnel to identifying the most suitable location for setting up Federal Medical Shelters (FMS) in support of continued medical care for special needs and the overall well-being of displaced populations. An effort to obtain near real-time information on hospitals, nursing homes, community clinics and other critical assets has been ongoing for the Secretary. Daily maps on shelter capacities provided through the American Red Cross' ESF-6 (Emergency Support Function 6: Mass Care and Shelter; Red Cross is the Principal Agency responsible for these responsibilities) provided a comprehensive view of shelters across the nation, some as far away as Seattle, WA.
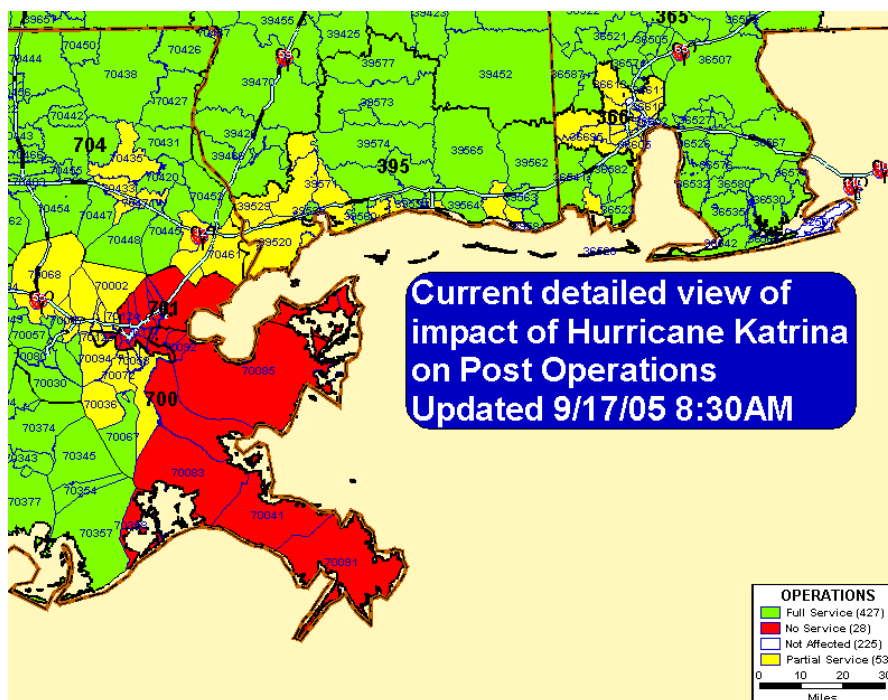
Meanwhile, during the week prior to Hurricane Katrina's landfall, the DEOC at CDC began to identify hurricane path maps and existing datasets. On Monday, August 29, 2005, the day the hurricane struck coastal portions of Florida, Alabama, Mississippi and Louisiana, the DEOC went to 12 hour in-house staffing which increased to 16 hours, seven days a week. Teams in the DEOC were responsible for fielding requests and others in Atlanta offices were responsible for obtaining and cleaning data and preparing it for integration into GIS products. Initial products focused on the needs of field teams being deployed e.g., creation of Arc Reader projects for Epi teams and chemical facility data for environmental health teams.

Map of Postal Service Status by ZIP Codes: **Green (full service), Yellow (partial service), Red (no service); September 17, 2005,** [see: http://www.usps.com/communications/news/serviceupdates/zipmap.htm]

Within HHS and CDC, the DEOC continued to work closely with the SOC to share data and products of use by both groups. As noted, the SOC has had a key role in obtaining information on shelter location and related infrastructure data in support of field operations. The SOC and DEOC became linked through an ftp site set up for data sharing.

Outside of CDC, communication ties occurred with a variety of agencies. Federal agencies included: USEPA (Environmental Protection Agency) headquarters and two regions to obtain data and information related to chemical facilities and water systems; NGA (National Geospatial-Intelligence Agency) for imagery data; USGS (US Geological Survey) for imagery data; FGDC (Federal Geographic Data Committee) for publishing geospatial datasets to the Geospatial One-Stop portal e.g., in order of importance: live data and maps (dynamic web mapping services), applications (data visualization and exploration sites), data download sites (download and ftp sites), clearinghouses (data and metadata catalogs), and general information websites; NOAA (National Oceanic and Atmospheric Administration) for imagery and modeling data; and, FEMA (Federal Emergency Management Agency) for data on damage.

Non-federal agencies included: Pictometry for providing before and after high resolution digital oblique aerial photography that they obtained at the request of FEMA; ESRI (Environmental Systems Research Institute, Inc.) for linkage to NACCHO's (National Association of County & City Health Officials) ArcIMS project based on NACCHO VacTrack to track flu vaccine; Louisiana Department of Health and Hospitals to provide them data on flooded areas in Louisiana; Mississippi state GIS staff to provide imagery data and topographic maps for Mississippi; American Academy of Pediatrics which requested information on the children living in the areas impacted; the American Red Cross; URISA (Urban and Regional Information Systems Association) GIS Corps; UCGIS (University Consortium on Geographic Information Science) which created a devoted web page to resources for Hurricane Katrina; the Council for Excellence in government, and others of which I may not be aware.

Finally, colleague Bill Henriques (HHS/OS) believes the success of the efforts at the level of the Office of the Secretary is largely the result of an outpouring of compassion and desire to help those affected by Hurricane Katrina. Assistance from HHS employees, non-governmental organizations, and the private sector has been phenomenal. The Director's Emergency Operations Center and all the operational divisions of the CDC/ATSDR family, as well as data warehouses and GIS efforts in other agencies within HHS, have assisted greatly in moving us ahead towards a unified system of common source data. Bill states "perhaps the silver lining of the Hurricane Katrina Disaster is that decision makers now fully comprehend the power of geospatial analyses, and we are better prepared for future calamities." Through new initiatives by Secretary Leavitt, and new partnerships fostered in response to this event, we are investing time and resources towards integrating 'place' into existing and emerging foundation information systems.

Editor. I would like to recognize formally our GIS 'family' of players who are responding to this national tragedy and the many associated challenges of helping to restore health and wellbeing to the affected areas and their citizens. They include:
HHS/CDC Staff. SOC: William Henriques (OS), Todd Roziano (OS); DEOC: Carolyn Virginia Lee (NCEH/ATSDR), Dabo Brantley (NCCDPHP); NCBDDD: Ann McClellan; NCCDPHP: Jeanne Gilliland, James Holt, Nicholas Jones, Ishmael Williams; NCEH/ATSDR: Melissa Smith, Arie Manangan, Andy Dent, Jerry Curtis, Carlos Bell, Janet Heitgerd, Ed Gregory, Jeri Anderson, Brian Kaplan, Kelly Asadi, Alex Charleston, Roy Ing, Ken Long; NCEH/ORISE Fellows: Alissa Berzen, Padma Vempaty, Kim Elmore; NCHS: Charles Croner; NIP: Vishnu-Priya Sneller;

Contractors and Others: SOC: Carl Kinkade (NCPHI), Hua Lu (NCEH/ATSDR), Elizabeth Root, Andrew Nunemaker, Robert Hedgecock, Elaine Schweitzer; NCEH/ATSDR: Jason Curtis, Craig Kassinger, Shannon Graham, Steve Bullard, Lance Broeker, Kevin Liske, Brian Lewis, Paul Calame, Rand Young, Janaki Kari; NCCDPHP: David Ray, Daniel Shorter; NIP: James Tobias.

Guide to Acronyms. SOC- Secretary's [Michael Leavitt, HHS] Operation Center; OS- Office of the Secretary; HHS- Department of Health and Human Services; DEOC- Director's [Julie Gerberding, CDC] Emergency Operation Center; NCEH/ATSDR- National Center for Environmental Health/Agency for Toxic Substances and Disease Registry [CDC]; NCCDPHP- National Center for Chronic Disease Prevention and Health Promotion [CDC]; NCBDDD- National Center on Birth Defects and Developmental Disabilities [CDC]; NCHS- National Center for Health Statistics [CDC]; NCPHI- National Center for Public Health Informatics [CDC]; NIP- National Immunization Program [CDC]; ORISE- Oak Ridge Institute for Science and Education.

Charles M. Croner, Ph.D., Geographer and Survey Statistician, and Editor, *Public Health GIS News and Information*, Office of Research and Methodology, National Center for Health Statistics, and DHHS Representative, Federal Geographic Data Committee, at cmc2@cdc.gov. Celebrating our **66**th edition with continuous reporting since **1994.**

The NCHS GIS home page contains current GIS events, archived GIS reports and other GIS links
http://www.cdc.gov/nchs/gis.htm - please join us September 27, 2005, for another in our GIS Guest Lecture Series

APPENDIX: MAPPING HEALTH INEQUALITIES
[Ninth in Collaborative Series: See also May, July, September, November 2004, January, March, May, and July 2005 editions]

# Premature Births by Maternal Race, 1996 to 2001

By Terry Lenahan, The Center for Community Solutions, Cleveland, Ohio

A premature or preterm birth is a birth occurring before the 37th week of pregnancy. Premature birth is a leading cause of death in the first month of life. Premature infants suffer illness and disability more frequently, including developmental delays, chronic respiratory problems, and vision and hearing impairment.[1] The short-term and long-term healthcare costs of prematurity can be an economic burden to families and social service agencies. While any pregnant woman can go into premature labor, risk factors associated with preterm births include: being single, low socioeconomic status, cigarette smoking, and health factors such as previous preterm and/or low- weight births,[2] gestational bleeding, and multiple gestations.

The *Healthy People 2010* goal is 7.6 percent premature births (76 premature births per 1,000 births). In 2003, 12.3 percent, or one out of every eight babies, was born prematurely in the United States, more than 503,000 babies. About 11 percent of White mothers had premature babies, but among African-American mothers the problem was more prevalent- nearly 18 percent of infants were premature. The national preterm rate rose 16 percent since 1990, partially due to the growth in the multiple birth rate.[3]
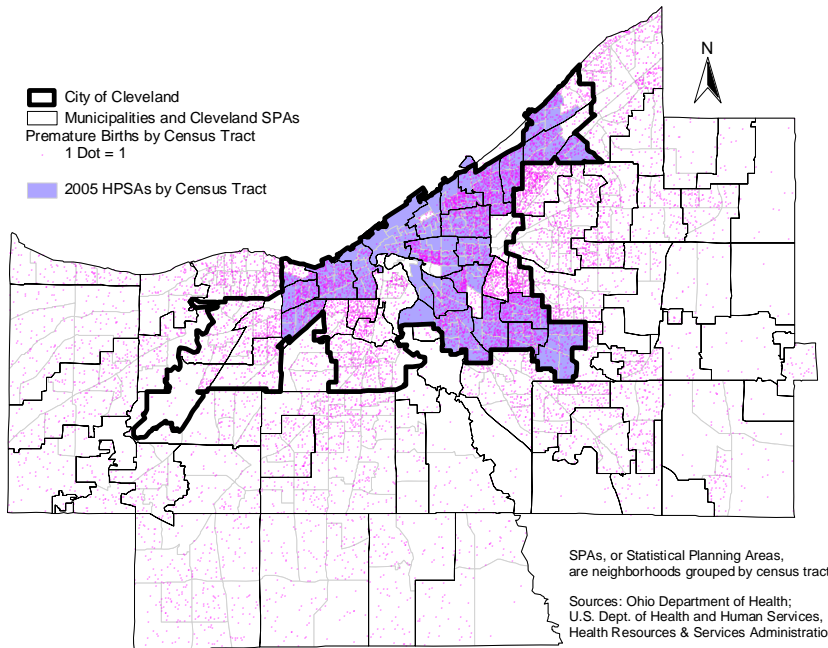
Map below: Premature Birth Rates
Cuyahoga County, Ohio, 1996 to 2001 Average Annual
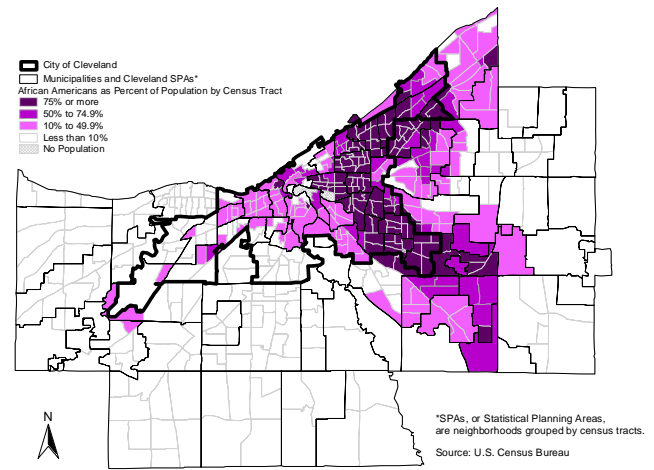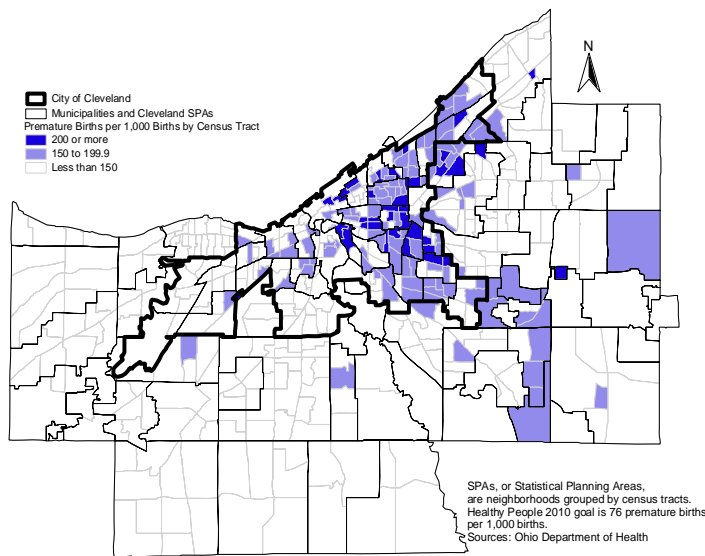
Map above: Percent African-American Population
Cuyahoga County, Ohio, 2000

Access to healthcare professionals is essential to assuring maternal health. Many neighborhoods in the city of Cleveland, Ohio have a shortage of full-time equivalent physicians in relation to the size of the population. As a result, most of the primary medical care health professional shortage areas (HPSAs) in Cuyahoga County are found within the city of Cleveland. These shortages may partially explain why premature birth rates were highest in the city of Cleveland. More than 15 percent of infants were born prematurely from 1996 to 2001, 21 percent higher than Cuyahoga County's 12.6 percent average.[4] The preterm birth rate for African-American mothers was 18 percent and 12.1 percent for White mothers. Overall, preterm births increased 1.5 percent in Cleveland per year during the study period; 3.9 percent for Whites and 0.2 percent for African-Americans.[5]

Premature Births, 1996 to 2001 Average Annual
And Primary Medical Care Health Professional Shortage Areas
(HPSAs), 2005, Cuyahoga County, Ohio

City of Cleveland
Municipalities and Cleveland SPAs
Premature Births by Census Tract
1 Dot = 1

2005 HPSAs by Census Tract

N

SPAs, or Statistical Planning Areas,
are neighborhoods grouped by census tract

Sources: Ohio Department of Health;
U.S. Dept. of Health and Human Services,
Health Resources & Services Administration

Over the same time period, fewer suburban Cuyahoga County women experienced preterm labor and delivery. Among all races combined, an average of 10.5 percent of infants was premature. Though the rate was higher at 16.1 percent among African-American mothers, it was still below the state and national rates for this group. Compared to African Americans, 75 percent fewer White suburban mothers had premature infants (9.2 percent). The percent of suburban premature births increased 1 percent per year for all races; 1.8 percent increase for White mothers but a 1 percent decrease for African-American mothers.[5]

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[1] March of Dimes Foundation, *Peristats* (June 2002).

[2] See "Low-Weight Births by Maternal Race" T. Lenahan, *Public Health GIS News and Information*, May 2004 (No. 58), Appendix, pp. 22-23.

[3] *National Vital Statistics Reports*, Vol. 53, No.9, November 23, 2004 (Preliminary 2003 data)

[4] The 1996 through 2001 data are from Ohio Department of Health birth certificates. Rates were calculated using estimated and projected population from the 1990 and 2000 censuses.

[5] Premature births increased at the same time that maternal smoking, drinking, and inadequate prenatal care decreased. This may be at least partially explained by an increase in multiple births. While multiple births for all races in Ohio increased about 3 percent per year since 1996, they increased about 5 percent per year in the suburbs. These increases are most likely the result of fertility treatments that increase the incidence of multiple births.

Maps created by: Ms. Terry Lenahan, Research Associate, The Center for Community Solutions. "Premature Births by Maternal Race" rates were calculated by Lucy Malakar. Data were geocoded to census tract level by Brian McNamara, GIS research specialist. Ellen Cyran, senior programmer/analyst, provided programming for the premature birth rate data. Brian and Ellen are with the Northern Ohio Data and Information Service at the Maxine Goodman Levin College of Urban Affairs, Cleveland State University. "Premature Births by Maternal Race" was one of 22 indicators from *Social Indicators 2003: Community Health*, produced by The Center for Community Solutions and United Way of Greater Cleveland. The complete report may be seen at Community Solutions' website (www.communitysolutions.com). Contact: Terry at tlenahan@communitysolutions.com.