

PUBLIC HEALTH GIS NEWS AND INFORMATION

July 2003 (No. 53)

*Dedicated to CDC/ATSDR Scientific Excellence and Advancement in
Disease Control and Prevention using GIS*

Selected Contents: Events Calendar (p.1); (pp.7-9); Public Health and GIS Literature 22); Website(s) of Interest (pp. 19-22); Final



News from GIS Users (pp.2-7); GIS Outreach (pp.9-14); DHHS and Federal Update (pp.14-24); Thoughts (pp.22-24)

I. Public Health GIS (and related) Events:

SPECIAL NCHS/CDC/ATSDR GIS LECTURES

July 23, 2003. "Towards an Online CDC Public Health Atlas," by Charles Croner, CDC, and Lee De Cola, U.S. Geological Survey (USGS). Please join us for this NCHS Cartography and GIS Guest Lecture Series to be held in our new NCHS facility and Auditorium (RM1405B), **2:00-3:00PM**, Hyattsville, MD; The NCHS GIS Guest Lecture Series has been presented continuously since 1988. Envision is available to offsite CDC/ATSDR locations; Web access will be available on the Internet but only at the time of this presentation, at <http://video.cdc.gov/ramgen/envision/live.rm>. 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). [All NCHS Cartography and GIS presentations are open to the public. Contact: Editor, *Public Health GIS News and Information*]

[Note: Calendar events are posted as received; for a more complete listing see NCHS GIS website and prior reports]

* 11th Annual Conference of the National Association of Local Boards of Health: "Boards of Health: Stewards of Public Health," July 16-18, 2003, Baltimore MD [See: <http://www.nalboh.org>]

* 2nd Annual Public Participation GIS Conference, URISA, July 20-22, 2003, Portland OR [See website: <http://www.urisa.org/ppgis.htm>]

* 21st International Cartographic Conference & 12th General Assembly of the International Cartographic Association, August 10-16, 2003, Durban, South Africa [See: <http://www.icaci.org>]

* CityMatCH Annual Urban Maternal and Child Health Leadership Conference, August 23-26, 2003, Pittsburgh PA [See: <http://www.citymatch.org>]

* CDC's 2003 Cancer Conference *Comprehensive Approaches to Cancer Control: The Public Health Role*, September 15-18, 2003, Atlanta GA [See: GIS-related short courses below and conference details at website <http://www.cancerconference.net/default.aspx>]

*NSGIC 2003 Annual Conference, National States Geographic Information Council, September 15-18, 2003, Nashville TN [See: <http://www.nsgic.org>]

* Second International Conference on Urban Health, October 15-18, 2003, New York NY [See website: <http://www.isuh.org/conference.html>]

* 2003 IACA Conference, International Association of Crime Analysts, October 27-30 Kansas City MO [See: <http://www.iaca.net>]

* Sixth National Environmental Public Health Conference: "Preparing for the Environmental Public Health Challenges of the 21st Century," CDC, December 3-5, 2003, Atlanta GA [See conference website at: <http://www.cdc.gov/nceh/information/ncehconf03.htm>]

II. GIS News

(You 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 or ATSDR*)

A. General News and Training Opportunities

1. CDC's 2003 Cancer Conference *Comprehensive Approaches to Cancer Control: The Public Health Role*, September 15-18, 2003, Atlanta GA. Descriptions of GIS-related short courses to be offered at the 2003 Cancer Conference are now available at the website <http://www.cancerconference.net/default.aspx>. Courses include: **Geocoding and Exploratory Spatial Analysis of Cancer Data**, September 17, 2003, 2:00pm-5:00pm, Gerard Rushton and Chetan Tiwari, Department of

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Geography, The University of Iowa; **Spatial Statistics for Cancer Surveillance**, September 18, 2003, 8:30am-11:30am, Martin Kulldorff, Department of Community Medicine and Health Care, University of Connecticut School of Medicine; and **Introduction to Bayesian Mapping Methods**, September 18, 2003, 1:00pm-4:00pm, Andrew Lawson, Department of Epidemiology & Biostatistics, Arnold School of Public Health, University of South Carolina.

2. New SaTScan Release, version 3.1- Martin Kulldorff reports that **SaTScan v3.1**, software for the spatial and space-time scan statistics, has now been released. It can be downloaded for free at site <http://www.satscan.org>. Compared to v2.1, new features include: prospective space-time methods for the early detection of disease outbreaks; a space-time permutation model that requires only case data without denominators; a file import wizard for dBase and comma delimited files; more extensive output options in terms of both content and formats; an analysis history file; support for non-integer and daily/monthly population numbers; and, support for different location IDs with identical coordinates. [Contact: Martin, Department of Community Medicine and Health Care, University of Connecticut School of Medicine at martink@neuron.uchc.edu]

3. GeoDa 0.9.3- **Luc Anselin** reports update now available. **GeoDa** is the latest incarnation in a long line of software tools developed to implement techniques for exploratory spatial data analysis (ESDA) on lattice data (points and polygons). It is intended to provide a user friendly and graphical interface to methods of descriptive spatial data analysis, such as spatial autocorrelation statistics and indicators of spatial outliers. A new version of GeoDa has been released on the SAL web site. If you have a working version, you can copy the new executable at <http://sal.agecon.uiuc.edu/csiss/geoda.html#upgrade>. If you have/had problems with libraries, uninstall all the old files and reinstall using the new install setup.exe. The new GeoDa is smaller, faster and has several new features: Also new are tutorials and sample data sets. For now the sample data sets are only the ones that come with the installation, but others will be added in the near future. Check out the new User's Guide as well. [Readers can either post comments to the list or to Luc at anselin@uiuc.edu]

4. From **Dunrie Greiling**, TerraSeer: **Advanced Spatial Analysis Workshop for Public Health**. TerraSeer will host the Advanced Spatial Analysis Workshop for Public Health August 11-15, 2003, at Evergreen State College in Olympia, WA. This intensive 5-day course will cover the basics of GIS and advanced spatial analysis topics such as clustering, boundary analysis and geostatistical modeling. The focus of the workshop will be public health analysis, specifically epidemiology, disease surveillance, risk factor assessment, disease cluster detection and investigation. Participants will work through all the components of an analysis project. This includes geocoding, small numbers and denominator problems, mapping, cluster detection method selection, geostatistical and Bayesian approaches to interpolation of environmental and health data, and how to reconcile conflicting results from different techniques. Workshop leaders are Pierre Goovaerts, Dunrie Greiling, Richard Hoskins and Geoffrey Jacquez. [The contact is: Dunrie at dunrie@terraseer.com and see <http://www.terraseer.com>]

5. **Alan Zaslavsky**, Harvard University: **Summary of Survey Analysis Software**. The informational web site on the latest software for analysis of survey data (<http://www.fas.harvard.edu/~stats/survey-soft>) has been updated. Several new packages have been added (for a total of 14 products), web links have been updated, and new feature information has been inserted. The site also includes brief reviews of available software for other purposes relevant to survey data, including hierarchical modeling, disclosure control, imputation of missing data, and survey administration. The index of software is restricted to products that include special features for inferentially valid analysis of survey data with typical features such as weighting, stratification and clustering; it is not intended to be a comprehensive list of all general-purpose software that might be used to analyze data from a survey. Comments and corrections are welcome. [Contact: Alan at zaslavsky@hcp.med.harvard.edu]

B. Department of Health and Human Services

(<http://www.hhs.gov>)

HHS Participates in the TOPOFF 2 Simulation. HHS officials and staff took part in the largest terrorism response drill in the nation's history from May 12-16. TOPOFF 2 simulated events and response to a "dirty bomb" explosion in Seattle, WA, and the spread of

plague from Chicago, IL. More than 200 HHS employees from various agencies worked together simulating the HHS response to the events in the cities. The Department of Homeland Security was the lead department in the exercise and funded most of the \$16 million cost. In major emergencies the federal government acts to supplement and assist local responders. In this case, the federal government was asked to provide emergency personnel and supplies. The goal of the exercise was to improve communications and collaboration between and among the departments of the federal government so that in the case of a real emergency the American people would be even better served. [HHS Weekly Report-May 19-25, 2003]

Administration for Children and Families

<http://www.acf.dhhs.gov>

6. **Head Start children are not adequately prepared for school**, and those who have been in the program still enter kindergarten lagging far behind the typical American child in skills needed for school readiness, according to a report released today by the U.S. Department of Health and Human Services.

Agency for Healthcare Research and Quality

<http://www.ahrq.gov>

7. **Monitoring the Health Care Safety Net**, March 2003, at <http://www.ahrq.gov/data/safetynet>. The Institute of Medicine (IOM) released a report in 2000 describing the health care safety net-the Nation's "system" of providing health care to low-income and other vulnerable populations-as "intact but endangered." The report recommended that a concerted effort be made to monitor the status of the safety net. In response, the Agency for Healthcare Research and Quality and the Health Resources and Services Administration have begun a Safety Net Monitoring Initiative. This initiative will provide a wide variety of data related to the safety net for 90 metropolitan areas and 1,818 counties in 30 States plus the District of Columbia.

Agency for Toxic Substances and Disease Registry

<http://www.atsdr.cdc.gov>

8. The ATSDR, NCEH, & NCCDPHP cosponsored seminar "**Secondhand Smoke In The United Kingdom: A Risk Assessment of Mortality in the U.K. from passive smoking,**" by James Repace, was held June 12,

2003, in Atlanta. For the U.K.'s nonsmokers, it appears that secondhand smoke (SHS) pollution now causes as many deaths annually as did the great London Smog 50 years ago. It is triple the annual number of road deaths from traffic accidents. For manufacturing workers, three-fold as many are estimated to die from passive smoking than work-related deaths from all other causes. Some 17% of bar workers are estimated to die from passive smoking at current exposure levels. The SHS-caused deaths among office workers adds an estimated 9% to the total occupational mortality from all causes. [To read this intriguing report see the report website located at <http://www.ash.org.uk/html/workplace/pdfs/killer.pdf>]

12. At the request of the New York Department of Health, ATSDR conducted air and dust sampling in the Lower Manhattan area after the September 11th tragedy to determine if residents are being exposed to concentrations of materials that may be harmful. The "**Final Report on Air and Dust Sampling in Lower Manhattan**" has been released. An interactive map of sampling locations and air quality measurements is available online.



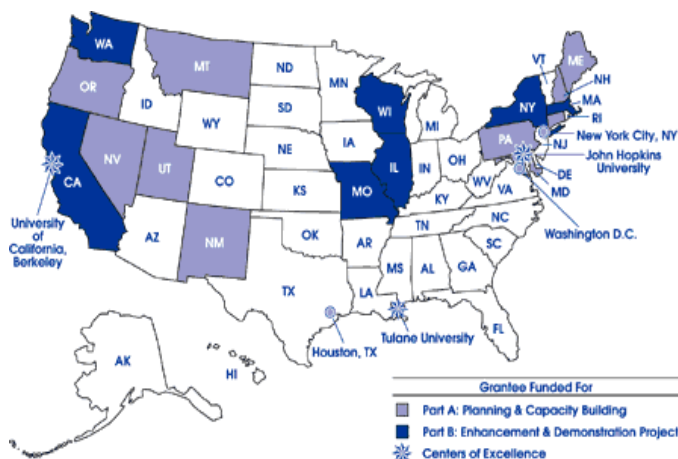
Residential Area Air and Dust Sampling Locations Lower Manhattan, November 4 - December 11, 2001

[For full report see summer edition of ATSDR's *Public Health and the Environment*; this edition focuses on the theme of Emergency Preparedness, and contains a variety of useful tools for spatial analysis as well as related topics. The *Public Health and the Environment* newsletter is published twice a year and may be read at <http://www.atsdr.cdc.gov/HEC/HSPH/hspphome.html>]

Centers for Disease Control and Prevention

<http://www.cdc.gov>

9. From National Center for Environmental Health (NCEH): **Environmental Public Health Tracking Program: Closing America's Environmental Public Health Gap 2003**. The mission of environmental public health tracking is to improve the health of communities. Using information from an environmental public health tracking network, federal, state, and local agencies will be better prepared to develop and evaluate effective public health actions to prevent or control chronic and acute diseases that can be linked to hazards in the environment.



The environment plays an important role in human development and health. Researchers have linked exposures to some environmental hazards with specific diseases, for example, exposure to asbestos and lung cancer. Other associations between environmental exposures and health effects are suspected but need further research; for example, the link between exposure to disinfectant by-products and bladder cancer. Currently, few systems exist at the state or national level to track many of the exposures and health effects that may be related to environmental hazards. Tracking systems that do exist are usually not compatible with each other, and data linkage is extremely difficult.

CDC's goal is to develop a national network that will 1) be standards-based; (2) allow direct electronic data reporting and linkage within and across health effect, exposure, and hazard data; and (3) interoperate with other public health systems. [For details on this system, see <http://www.cdc.gov/nceh/tracking>]

15. CDC/ATSDR Cancer Cluster Public Inquiry Triage System and Related Resources.

A cancer cluster is defined as a greater-than-expected number of cancer cases that occurs within a group of people in a geographic area over a period of time. There is concern about environmental causes of perceived cancer clusters, and CDC and ATSDR continue to receive public inquiries on the subject. In response, the CDC/ATSDR Cancer Cluster Public Inquiry Triage System (CCPITS) was created. The system, managed by the National Center for Environmental Health (NCEH), includes triaging, answering, tracking, and reporting on cancer cluster inquiries.

The site provides information about cancer clusters, answers to frequently asked questions, and includes contact information to report concerns or obtain more information. It also provides information on cancer cluster resources, such as publications; and information on investigations. Currently, in-depth information, including the full study protocol, for the Churchill County (Fallon), Nevada cancer study, "A Cross-Sectional Exposure Assessment of Environmental Exposures in Churchill County" is available at <http://www.cdc.gov/nceh/clusters> [To be added to the cancer cluster listserv, contact Beverly Kingsley at bbk9@cdc.gov].

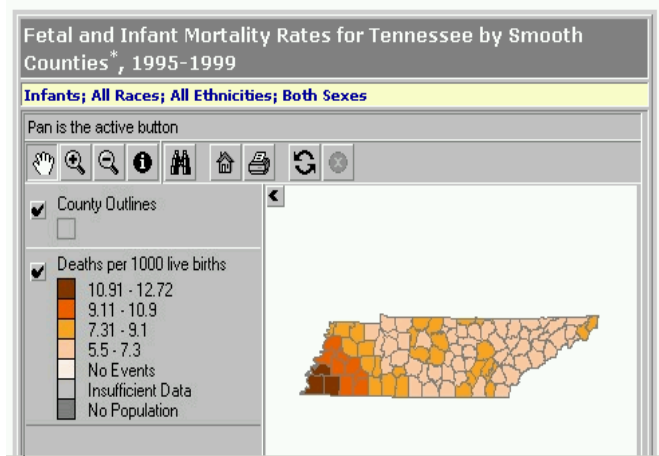
10. CDC's 2003 Cancer Conference: Comprehensive Approaches to Cancer Control-The Public Health Role,

September 15-18, 2003, Atlanta, GA (Sponsorship and Exhibiting Opportunities Available): CDC's 2003 Cancer Conference will offer unique opportunities to share your organization's materials, products, services, and resources with a broad array of public health professionals from across the country. Physicians, nurses, nutritionists, dietitians, health educators, epidemiologists, statisticians, behavioral scientists, health communications specialists, evaluations specialists, and health economists will be among the over 1,000 participants, giving your organization or company an exciting opportunity to get your message out. [Detailed prospectus for exhibitors and sponsors is now available online at the website <http://www.cancerconference.net/speakers/exhibitprospectusv11.pdf>].

11. The Behavioral Surveillance Branch, Division of Adult and Community Health, National Center for Disease Control and Prevention, is pleased to announce

the release of the **2002 Behavioral Risk Factor Surveillance System data** [See BRFSS website at: <http://www.cdc.gov/brfss>]. The Behavioral Risk Factor Surveillance System (BRFSS) is a unique, State-based surveillance system active in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. Information on health risk behaviors, clinical preventive health practices, and health care access is obtained from a representative sample of non-institutionalized adults, 18 years or older, in each State. The BRFSS provides flexible, timely, and ongoing data collection that allows for State-to-State and State-to-nation comparisons. State-specific data, including racial-and-ethnic-specific data from the BRFSS, provide a sound basis for developing and evaluating public health programs, including programs targeted to reduce racial and ethnic disparities in health risks. The BRFSS is the largest telephone-based surveillance system in the world with 247,977 completed interviews in 2002. [Contact: Lina at LBalluz@cdc.gov]

12. CDC's new Reproductive Health Atlas is now live on the Internet. The **Interactive Atlas of Reproductive Health** is a web-based interactive geographic information system (GIS) dedicated to reproductive health issues such as infant mortality, fertility and low birth weight and other related public health topics [See: <http://www.cdc.gov/nccdphp/drh/GISAtlas>]. The atlas provides viewers with access to a unique collection of national geographically and spatially enabled datasets that describe reproductive health.



The atlas project contributes to a CDC-wide initiative to promote geographic information science capabilities within public health. It will provide policymakers and service providers with easily

obtainable spatially-based data for program support, as well as a starter set of shapefiles and reproductive health-related data. This data is compatible with locally developed databases that can be used to conduct additional investigations. [Atlas Contact: Mary Brantley, Epidemiologist, National Center for Chronic Disease Prevention and Health Promotion at mdb4@cdc.gov]

Centers for Medicare and Medicaid Services

<http://cms.hhs.gov>

13. The Administrative Simplification provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA, Title II) require the Department of Health and Human Services to establish national standards for electronic health care transactions and national identifiers for providers, health plans, and employers. It also addresses the security and privacy of health data. Adopting these standards will improve the efficiency and effectiveness of the nation's health care system by encouraging the widespread use of electronic data interchange in health care.

Food and Drug Administration

<http://www.fda.gov>

14. **HHS Bans Rodent Imports From Africa; Prohibits Domestic Commerce In Rodents And Prairie Dogs, Actions Intended To Prevent Spread Of Monkeypox Virus.** As of June 11, 2003, HHS prohibits the importation of all rodents from Africa. In addition, it prohibits within the United States the distribution, sale, transportation and intentional release into the environment of prairie dogs and the following rodent species: Tree squirrels (*Sciurus*); Rope squirrels (*Funisciurus*); Dormices (*Graphiurus*); Gambian Giant Pouched Rats (*Cricetomys gambianus*); Brush-tailed porcupines (*Atherurus africanus*); and the Striped mice (*Typomys*).

Health Resources and Services Administration

<http://www.hrsa.gov>

15. **HRSA's Pilot Mapping Tool.** Provides easy access to information; Provides the ability to visualize multiple data layers interactively; Provides the public with the ability to interactively create maps that display HRSA grant awards data; Provides applicants of HRSA's programs the ability to create maps to include in grant applications; Assists grantees and other stakeholders in

locating potential partners (mental health, primary care resources).

Indian Health Service

<http://www.ihs.gov>

16. **Indian Health Service Strategic Plan.** Tribal leaders as well as Indian Health Service cite diabetes, unintentional injuries, and alcoholism and substance abuse as rising to crisis proportions in American Indian/Alaska Native communities. Currently, Indians experience disproportionately higher mortality rates compared to other Americans-627% higher for alcoholism, 249% higher for diabetes and 204% for injuries. The Indian Health Service (IHS) is the only source of health care coverage for 55% of Indians; only 28% have employment related insurance. The most serious health problems are long-term intractable issues that will be greatly affected by social-economic conditions in Indian communities and the lack of adequate resources to respond to them.

National Institutes of Health

<http://www.nih.gov>

17. From **Martina Vogel-Taylor**, Office of Disease Prevention: Listed below are several Web URL for the **Steps to a HealthierUS RFA, "A Community-Focused Initiative to Reduce the Burden of Asthma, Diabetes, and Obesity."** Applications for the RFA are due **July 15, 2003**. The announcements include website <http://www.cdc.gov/od/pgo/funding/03135.htm>, the CDC Program Announcement 03135-Steps to a HealthierUS: A Community-Focused Initiative to Reduce the Burden of Asthma, Diabetes, and Obesity. This is the complete announcement; the main website for the *Steps* is <http://www.healthierus.gov/steps/index.html>. There are headings on the RFA that provides the press release, RFA summary, Federal Register notice, and several documents from the lengthy announcement that you can access separately: selected HP2010 objectives for *Steps*, related resources, selected intervention strategies.

Editor: The purpose of *Steps* is to enable communities to reduce the burden of chronic disease, including: Preventing diabetes among populations with pre-diabetes; Increasing the likelihood that persons with undiagnosed diabetes are diagnosed; Reducing complications of diabetes; Preventing overweight and obesity; Reducing overweight and obesity; and Reducing

the complications of asthma. *Steps* will achieve these outcomes by: Improving nutrition; Increasing physical activity; Preventing tobacco use and exposure, targeting adults who are diabetic or who live with persons with asthma; Increasing tobacco cessation, targeting adults who are diabetic or who live with persons with asthma; Increasing access to and use of appropriate health care services by educating health care providers and consumers on quality health care standards, strategies, services, and resources; and Increasing effective self-management of chronic diseases and associated risk factors. [Contact: Martina at martinav@nih.gov]

Substance Abuse and Mental Health Services Administration

<http://www.samhsa.gov>

18. HHS and Partners Seek to Eliminate Health Disparities Among Minority Populations: ***Closing the Health Gap*** is an educational campaign designed to help make good health an important issue among racial and ethnic minority populations who are affected by serious diseases and health conditions at far greater rates than other Americans. In 2002, HHS and its founding partner, the ABC Radio Networks, launched the campaign with a series of health messages for African American communities. In 2003, the campaign will expand its focus to bring the best health information to more communities, including Hispanic Americans, Asian Americans and Pacific Islanders, American Indians, and Alaska Natives.

C. Historical Black Colleges and Universities (HBCUs) and Other Minority Health Activities

[A listing of HBCUs may be found at the website:

<http://www.smart.net/~pope/hbcu/hbculist.htm>]

19. The University of North Carolina at Chapel Hill, School of Public Health-Program for Ethnicity, Culture, and Health Outcomes (ECHO), the National Center for HIV, STD, and TB Prevention, and the CDC Corporate University (CDC CU), held the **9th Annual Summer Public Health Research Institute and Videoconference on Minority Health**, June 9-13, 2003. The Summer Public Health Research videoconference on Minority Health emphasized issues and solutions related to collecting, analyzing and interpreting data for racial/ethnic populations, disentangling and assessing the relationships among race, ethnicity, and socioeconomic status; using ethnographic research to improve enumeration and data quality; and community-academic

research partnerships. Videotapes are available from the HRMO, CDC Corporate University (770) 488-1714 or see program details at <http://www.minority.unc.edu>

D. Other Related Agency or Business GIS News

20. From **Rachel Boba**, Police Foundation: I would like to announce the release of the next issue of the *Crime Mapping News*: Volume 5 Issue 3, Summer 2003 [http://www.policefoundation.org/docs/tech_mapping.html] The topic of this issue of Crime Mapping News is Project Safe Neighborhoods (PSN), a national effort to reduce firearms violence in the United States. The articles in this issue cover topics including 1) an overview of the mission and goals of the PSN program; 2) a discussion of the Indianapolis Violence Reduction Partnership, a program that has contributed to reductions in homicides, gun-related assaults, and armed robberies in Indianapolis, IN; and 3) an overview of the St. Louis Strategic Approaches to Community Safety Initiative (SACSI), with the goal of reducing the high levels of firearms violence in St. Louis, MO. Also included in this issue is an announcement and instructions for obtaining our latest publication, *Problem Analysis in Policing*. [Contact: Rachel, Director, Crime Mapping Laboratory at rboba@policefoundation.org]

21. OGC Delivers an Open Platform for "**Geospatial Portal Operations**"- The Open GIS Consortium, Inc. (OGC) announces the achievement of a major milestone in geoprocessing and information technology-the completion of a multi-vendor standards-based geospatial data and services portal, along with a comprehensive portal architecture designed to serve as a community-wide template for advancing geospatial portal capability and capacity worldwide. Using nothing more than a Web browser, users of the portal can readily publish, discover, access, integrate and apply a wide variety of heterogeneous geospatial data and services, involving both local and remote sources, distributed throughout the Web environment.

Mark Forman, the Office of Management and Budget's (OMB) Administrator of E-Government and IT, said, "Open standards-based architectures are needed for government to achieve better results from a broad variety of technology and E-Government applications. We look forward to working with OGC in creating open standards

based solutions that better serve state and local government and ultimately the citizen. OGC's work in support of the Geospatial One-Stop Initiative shows that we can achieve true interoperability in the near term. We are excited about working with OGC over the coming months to expand on what we have already accomplished." [Contact: Mark Reichardt, OGC, at mreichardt@opengis.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 **Joseph Lovett**, California State University, San Bernardino: I have chaired our university's IRB for around eight years now and find that I cannot answer the following: A graduate student in geography has received a data set from a local police department that contains 911 calls for a one year period. The calls include the telephone number of the caller which, of course, can be reverse coded to an address. The intent of the student is to map 911 calls. I have been singularly unsuccessful in locating anything in the GIS literature that discusses human subjects research using geocoded data. I find little, except in the health arena, that discusses privacy issues with GIS data. Can you refer me to a source (person or printed) who might be able to assist me with the issues surrounding GIS data and crime data mapping? [Contact: Joe, Associate Professor Health Science and Human Ecology, at jlovett@csusb.edu]

Editor: This is a timely issue for many researchers. Response from **Gerry Rushton**, University of Iowa- Check: (1) **Geographically Masking Health Data To Preserve Confidentiality** 1999. M Armstrong, G Rushton and D Zimmerman, *Statist. Med* 18: 497-525. Abstract. The conventional approach to preserving the confidentiality of health records aggregates all records within a geographical area that has a population large enough to ensure prevention of disclosure. Though this approach normally protects the privacy of individuals, the use of such aggregated data limits the types of research one can conduct and makes it impossible to address many important health problems. In this paper we discuss the design and implementation of geographical masks that not only preserve the security of individual health records, but also support the investigation of questions that can be answered only with some knowledge about the location of health events. We describe several alternative methods of masking

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individual-level data, evaluate their performance, and discuss both the degree to which we can analyze masked data validly as well as the relative security of each approach, should anyone attempt to recover the identity of an individual from the masked data. We conclude that the geographical masks we describe, when appropriately used, protect the confidentiality of health records while permitting many important geographically-based analyses, but that further research is needed to determine how the power of tests for clustering or the strength of other associative relationships are adversely affected by the characteristics of different masks (courtesy John Wiley & Sons, Ltd.). Also, check the web document (2) GIS and Privacy, by S Matthews, Pennsylvania State University, GIS Resource document 03-51, February 2003 (http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-51.pdf). [Contact: Gerry at gerard-rushton@uiowa.edu]

Response from **Ned Levine** (CrimeStat): Joe Lovett raised a good question about the use of data obtained from local police departments. A few years ago, the Mapping and Analysis for Public Safety (formerly the Crime Mapping Research Center) within the National Institute of Justice held a workshop on privacy and confidentiality issues relating to crime data (*Crime Mapping and Data Confidentiality Roundtable*, July 8-9, 1999, Washington, DC). The papers discuss a variety of issues relating to the use of crime data and the consequences and are available at the website: <http://www.ojp.usdoj.gov/nij/maps/Pubs/privacy.html>

Let me give you an opinion based on many years of working as a researcher with public data and with crime data. To my mind, there are three issues that need to be separated in discussing this issue. First is the issue of a human subjects review at a university or research organization. According to the National Research Act of 1974 and the subsequent regulations developed by the U.S. Department of Health, Education and Welfare (the precursor to the U.S. Department of Health and Human Services), all research organizations that receive Federal funding must have a human subject review of all human research, which is overseen by an Institutional Review Board. This is the IRB to which Joe Lovett referred. It's my understanding that the review is waived in the case of information which is publicly available, though he will be much more familiar with those policies than I am.

The second issue is the legality of presenting such information. This would normally fall under State

law. Most Federal agencies have such a restriction on information obtained for their uses (e.g., the Census, the National Health Interview Survey, the Medical Expenditure Panel Survey, the National HIV Prevalence Survey, the various economic surveys such as the Consumer Expenditure Survey, etc), but those restrictions do not normally apply to information obtained by State and local agencies unless there were Federal funds involved. Many States do have limitations on the identification of individuals from databases (e.g., California which has strict limits on the release of driver and vehicle licensing information) while others may have much looser criteria. If State law is not explicit on the criteria, local ordinances or local police practice may govern the release of such information. In some States (e.g., Virginia), data are published on crime events down to the block level; the *Washington Post*, for example, weekly presents crime data coded by block number. In other States, there is huge variability in the release of crime information. For example, the Los Angeles Police Department will only release public data on crimes by police divisions whereas the adjacent police department in the City of Santa Monica releases crime data down to the block level. It seems that if State law does not explicitly prohibit the release of publicly obtained crime information, the researcher is not legally obligated to protect such information.

However, this brings up a third point, which is the ethical responsibility of the researcher, which may have little to do with the law. If you read some of the papers in the workshop cited above, you will see that there are substantial concerns about victims right to privacy. Unfortunately, there is not a single code of ethics regarding the sharing and use of crime data. Many, if not most, professional organizations have established codes of ethics regarding the obtaining and use of information from surveys or experiments, though I'm not familiar with any that cover publicly-available crime or police information; I believe the assumption is that it is ethical to use such information if there are no legal restrictions. Nevertheless, some concern must be given by police departments and researchers about the release of data that could identify victims. For example, we (see the site <http://www.icpsr.umich.edu/nacjd/crimestat.html>) distribute sample data sets. These were actual crime data sets, but we added a random 'walk' of a quarter mile to each incident location so as not to identify any one

particular house or location. This is similar to what Gerry Rushton described above. The result is a data set that is usable and that captures the general spatial relationships in the data, but still protects individual rights.

Given the concern about violating individual rights, perhaps there is a need to develop some guidelines on the use of public information about police calls for service and crime events? I would propose that the guiding principle be similar to other confidentiality laws in that the information should not identify any individual victim or innocent person nor cause any harm by revealing that information. But, who would implement such a code of ethics? For one thing, professional organizations that deal with police data could modify their existing codes of ethics to include the limitations on the use of public police/crime data so as to restrict harm to individuals. For another, the Justice Department could issue suggestions for the sharing of crime and other police data with researchers. While these suggestions would not have the force of law, except where Federal funds were involved, many, if not most, police departments would eventually adopt the suggestions as guidelines for the release of their data. I think the Federal government has to play a role in raising the issue and a first step could be to set up some kind of task force of researchers, practitioners, and public officials to discuss the issue in depth. [Contact: Ned at ned@nedlevine.com; There are also various papers about data sharing arrangements on the FBI web page located at site <http://www.fbi.gov/congress/congress02/rondick050802.htm> and at <http://www.fbi.gov/hq/cjisd/cc.htm>]

IV. Public Health GIS Presentations and Literature

NCHS Cartography and GIS Guest Lecture Series

Towards an Online CDC Public Health Atlas, July 23, 2003, NCHS Auditorium, Hyattsville MD, 2:00-3:15PM (EDT) by Charles Croner, CDC and Lee De Cola, U.S. Geological Survey (USGS). Abstract: CDC currently maintains a wide variety of geospatial databases on health conditions and is moving toward a unified approach to Internet and information technology infrastructure design. This new architecture will facilitate consistent access to information, more powerful analysis, and clearer visualization of patterns and trends. In response to these developments, we present a CDC/USGS proposal that demonstrates how spatio-

temporal techniques can (1) produce consistent maps and temporal graphs for diseases, (2) integrate data among health conditions, (3) use space/time variables to access knowledge, and (4) facilitate timely surveillance.

We present the concept of an electronic disease atlas that builds on existing maps and graphs within the current "Health Topics A to Z" scheme. We then explore a prototype based on the Nationally Notifiable Diseases Surveillance System that can scale up to include integrated linkages to other CDC and related online geospatial data resources and eventually become part of a distributed network of public health information. The goal of this research is to advance CDC's role in disease understanding through visualization using maps and Geographic Information Systems. [Contact: Chuck at cmc2@cdc.gov]

CDC's Emerging Infectious Diseases and MMWR Emerging Infectious Diseases

Emerging Infectious Diseases (EID) is indexed in Index Medicus/Medline, Current Contents, Exerpta Medica, and other databases. Emerging Infectious Diseases is part of CDC's plan for 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 July edition is available at <http://www.cdc.gov/ncidod/EID/index.htm>. Readers may be interested in the advanced August study: Galvani AP, Lei X, Jewell NP. Severe acute respiratory syndrome: temporal stability and geographic variation in death rates and doubling times (Vol. 9, No. 8).

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 <http://www.cdc.gov/mmwr>]: Vol. 52, No. 26- Nonfatal Dog Bite-Related Injuries Treated in Hospital Emergency Departments-United States, 2001; Heat-Related Deaths-Chicago, Illinois, 1996-2001, and United States, 1979-1999; Update: Severe Acute Respiratory Syndrome United States, 2003 Vol. 52, No. 25- Public Health and Aging: Hospitalizations for Stroke Among Adults Aged Greater than or equal to 65 Years-United States, 2000; Update: Multistate Outbreak of

Monkeypox-Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003; Vol 52, No. SS-4- *Traumatic Brain Injury-Related Hospital Discharges Results from a 14-State Surveillance System, 1997; Appendix Traumatic Brain Injury Surveillance: Statistical Methods* Vol. 52, No. 22- Surveillance Data from Swimming Pool Inspections-Selected States and Counties, United States, May-September 2002; Update: Influenza Activity-United States and Worldwide, 2002-03 Season, and Composition of the 2003-04 Influenza Vaccine; Progress Toward Poliomyelitis Eradication-Southern Africa, 2001-March 2003; Vol. 52, No. 18- Update: Severe Acute Respiratory Syndrome-United States, 2003; Adults Who Have Never Seen a Health-Care Provider for Chronic Joint Symptoms-United States, 2001.

New Journal

The Haworth Press Inc., and Co-Editors Mary Lynette Larsgaard and Paige G. Andrew, are pleased to announce a new journal to be launched in 2004. The *Journal of Maps & Geography Libraries: Advances in Geospatial Information, Collections, & Archives* (see website at <http://www.haworthpress.com/store/product.asp?sku=J230>) is intended to reach an audience worldwide that has research and other interests in all aspects and types of cartographic materials; their creation, collection, dissemination, and preservation, whether they are in hardcopy or digital form. This includes potentially a wide variety of topics, including Geographic Information Systems (GIS) and their applications, outcomes of geographic and/or cartographic research, and others. The Premier issue will include articles relating to international trends in geoinformation access; archiving remote-sensing imagery; the retrospective cataloging of maps in a small college collection; and establishing GIS laboratories within a university library setting, as well as an introductory column by the editors and two other practical columns. Theme issues based on geospatial information in the European arena and cartographic/geospatial information and the Internet are currently being "Geoscapes" as the co-editors have nicknamed it, will be published twice per year and is a peer-reviewed journal. [Contacts: Mary at mary@library.ucsb.edu; Paige at pga2@psulias.psu.edu]

Reports

Using Geographic Information Systems Technology in the Collection, Analysis, and Presentation of Cancer

Registry Data: A Handbook of Basic Practices.

Wiggins L (Ed). Springfield (IL): North American Association of Central Cancer Registries, October 2002 [<http://www.naaccr.org/Standards/Standards.html>] 68 pp. The handbook begins with a brief introduction of GIS and descriptions of some GIS success stories in cancer studies. The second section discusses the importance of address geocoding for the spatial analysis of cancer data. The third section discusses the important issue of confidentiality of data. The fourth and fifth sections provide introductions to spatial analysis and cartography. The sixth section addresses Internet accessibility issues for the disabled, and the final section presents seven recommendations to NAACCR and areas for further GIS research.

The NAACCR Board of Directors voted to accept this report of the GIS Task Force. GIS Task Force members compiled state-of-the-art information to assist all cancer registries in their decisions about GIS tools, practices, and current issues. The Handbook is a current reflection of how GIS can be applied to cancer registry operations, practices, and even research using cancer registry data. For all cancer registries that are considering a GIS initiative for their programs, this Handbook will be an invaluable resource. [Contact: Abe Toshi, Chair of the New Jersey State Cancer Registry at Toshi.Abe@doh.state.nj.us]

Geocoding Addresses from a Large Population-based Study: Lessons Learned and Applied

Jane McElroy, University of Wisconsin, Comprehensive Cancer Center and **Gaylord Nelson**, Institute for Environmental Studies, Nov 2002. The potential for spatial bias resulting from differential geocoding (address matching) in rural areas can be critical as demonstrated in this case-control study. The reasons for the differentials are examined and some very practical advice and fixes to remedy the dilemma are presented. Significant improvements in rural response rates resulted. The "Things We Learned" section will be invaluable to those faced with geocoding addresses in rural locations. *CMC*, Editor [This study was supported by National Cancer Institute grants RO1 CA47147 and U01 CA82004]

Titles

- Site management of health issues in the 2001 World Trade Center disaster, Bradt DA, *Acad Emerg Med* 10

(6): 650-660 JUN 2003;

-The application of geographic information systems and global positioning systems in humanitarian emergencies: Lessons learned, programme implications and future research, Kaiser R, Spiegel PB, Henderson AK, Gerber ML *Disasters* 27 (2): 127-140 JUN 2003;

-Redlining and the Home Owners' Loan Corporation, Hillier AE, *J Urban Hist* 29 (4): 394-420 MAY 2003;

- Real-time streaming of environmental field data, Vivoni ER, Camilli R, *Computs & Geosci-UK* 29 (4): 457-468 MAY 2003;

- The geological sources of Hg contamination in Kejimikujik National Park, Nova Scotia, Canada: a GIS approach, Page KD, Murphy JB, *Environ Geology* 43 (8): 882-891 APR 2003;

- Integrating GIS components with knowledge discovery technology for environmental health decision support, Bedard Y, Gosselin P, Rivest S, Proulx MJ, Nadeau M, Lebel G, Gagnon MF *Inter J Med Inform* 70 (1): 79-94 APR 2003;

- GIS and public health, Kirby RS, Cromley EK, McLafferty SL, *Ann Assoc Amer Geogr* 93 (1): 261-263 MAR 2003;

- Geospatial data infrastructure: Concepts, cases, and good practice, Groot R, McLaughlin J McGranaghan M, *Ann Assoc Amer Geogr* 93 (1): 257-259 MAR 2003;

- Geographic information systems and science, Lam N, Longley PA, Goodchild MF, Maguire DJ, Rhind DW, *Ann Assoc Amer Geogr* 93 (1): 259-261 MAR 2003;

-Community participation and geographic information systems, Craig WJ, Harris TM, Weiner D, Haklay M, *Environ Plann B* 30 (2): 319-320 MAR 2003;

- Geographic information systems for science and technology indicators, Rey-Rocha J, Martin-Sempere MJ, *Res Evaluat*, 11 (3): 141-148 DEC 2002;

- Prediction of aquifer vulnerability to pesticides using fuzzy rule-based models at the regional scale, Dixon B, Scott HD, Dixon JC, Steele KF, *Phys Geogr*, 23 (2): 130-153 MAR-APR 2002;

- Within-state geographic patterns of health insurance coverage and health risk factors in the United States, Pickle LW, Su Y, *Am J Prev Med* 2002;22(2):75-83.

Other Submissions

Monitoring Socioeconomic Inequalities in Sexually Transmitted Infections, Tuberculosis, and Violence: Geocoding and Choice of Area-Based Socioeconomic Measures-The Public Health Disparities Geocoding Project (US), N Krieger, PD Waterman, JT Chen, Mah-Jabeen Soobader, and SV Subramanian [Department of Health and Social Behavior, Harvard School of Public Health, Boston, MA], *Pub Health Rep*, 2003 118: 240-260. **Objectives.** To determine which area-based socioeconomic measures, at which level of geography, are suitable for monitoring socioeconomic inequalities in sexually transmitted infections (STIs), tuberculosis (TB), and violence in the United States. **Methods.** Cross-sectional analysis of public health surveillance data, geocoded and linked to area-based socioeconomic measures generated from 1990 census tract, block group, and ZIP Code data. We included all incident cases among residents of either Massachusetts (MA; 1990 population=6,016,425) or Rhode Island (RI; 1990 population=1,003,464) for: STIs (MA: 1994-1998, $n=26,535$ chlamydia, 7,464 gonorrhea, 2,619 syphilis; RI: 1994-1996, $n=4,473$ chlamydia, 1,256 gonorrhea, 305 syphilis); TB (MA: 1993-1998, $n=1,793$; RI: 1985-1994, $n=576$), and non-fatal weapons related injuries (MA: 1995-1997, $n=6,628$). **Results.** Analyses indicated that: (a) block group and tract socioeconomic measures performed similarly within and across both states, with results more variable for the ZIP Code level measures; (b) measures of economic deprivation consistently detected the steepest socioeconomic gradients, considered across all outcomes (incidence rate ratios on the order of 10 or higher for syphilis, gonorrhea, and non-fatal intentional weapons-related injuries, and 7 or higher for chlamydia and TB); and (c) results were similar for categories **Conclusions.** Supplementing U.S. public health surveillance systems with census tract or block group area-based socioeconomic measures of economic

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deprivation could greatly enhance monitoring and analysis of social inequalities in health in the United States. [Contact: Nancy at nkrieger@hsph.harvard.edu]

Public Health, GIS, and the Internet, Croner, CM. *Ann Rev Pub Health*, May 2003, 24:57-82. Abstract: Internet access and use of georeferenced public health information for GIS application will be an important and exciting development for the nation's Department of Health and Human Services and other health agencies in this new millennium. Technological progress towards public health geospatial data integration, analysis, and visualization of space-time events using the Web portends eventual robust use of GIS by public health and other sectors of the economy. Increasing Web resources from distributed spatial data portals and global geospatial libraries, and a growing suite of Web integration tools, will provide new opportunities to advance disease surveillance, control and prevention, and insure public access and community empowerment in public health decision making. Emerging supercomputing, data mining, compression and transmission technologies will play increasingly critical roles in national emergency, catastrophic planning and response, and risk management. Web-enabled public health GIS will be guided by Federal Geographic Data Committee spatial metadata, OpenGIS Web interoperability, and GML/XML geospatial Web content standards. Public health will become a responsive and integral part of the National Spatial Data Infrastructure. [Article online at the FGDC site www.fgdc.gov and the NCHS GIS web page: http://interdev2.nchs.cdc.gov/nchs/about/otheract/gis/gis_publichealthinfo.htm]

Preliminary program 2003 Joint Statistical Meetings, August 3-7, 2003

(Selected sessions)

Session 186. Tue, 8/5/03, 8:30-10:20 AM. **Measurement and Visualization of Space-Time Events in Public Health with Geographic Information Systems.** Invited Papers. Sponsor(s): Section on Statistics & the Environment, Section on Statistics in Epidemiology, Section on Statistical Graphics. Organizer(s): Charles Croner, National Center for Health Statistics Chair(s): Charles Croner. Detecting and Visualizing Space-Time Clusters of Low Birthweight Incidence, by Race, in Florida-Stephen Reader, University of South Florida; Understanding Variation in Escherichia coli Occurrence

at a Freshwater Beach Through Spatial Analyses and GIS: Implications for Beach Management and Public Health-Sharyl Rabinovici, Richard Champion and Richard Whitman, U.S. Geological Survey; DYCAST: System Identifying West Nile Virus Risk Areas-Constantinos Theophilides, Ctr. for the Analysis and Research of Spatial Information; Spatial Forecasting of Disease Risk and Uncertainty-Lee De Cola, U.S. Geological Survey.

Session 373. Wed, 8/6/03, 10:30AM-12:20 PM.

Session: **Analysis of Spatial Data**-Contributed Papers. Sponsor(s): Biometrics Section. Chair(s): James Kenyon, Bristol-Myers Squibb Company. A Spatial Scan Statistic for Survival Data-Lan Huang, Martin Kulldorff, and David Gregorio, University of Connecticut; A Power Comparison of Statistics for Surveillance of Bioterrorism-Sylvan Wallenstein, Mount Sinai School of Medicine; Joseph Naus, Rutgers University; The Use of Multiple Addresses to Enhance Cluster Detection-Al Ozonoff, Harvard School of Public Health; Parametric Models for Interpoint Distance Distributions-Marco Bonetti and Marcello Pagano, Harvard School of Public Health; Modeling Spatially Correlated Survival Data for Individuals with Multiple Cancers-Sudipto Banerjee, University of Minnesota; Testing for Spatial Correlation in Binary Data with Application to Aberrant Crypt Foci in Colon Carcinogenesis-Tatiana Apanasovich, Texas A&M University; Simon J. Sheather, University of New South Wales; Raymond Carroll, Texas A&M University; A Model for Spatially Correlated Binary Data Based on the Bahadur Representation-Thad Benefield, Pranab Sen and C. M. Suchindran, University of North Carolina, Chapel Hill.

Session 394. Wed, 8/6/03, 2:00-3:50PM.

Hotspot Detection, Delineation, and Prioritization for Geographic Surveillance and Early Warning System-Invited Papers Sponsor(s): Environmental and Ecological Statistics, Section on Statistics & the Environment, Section on Risk Analysis, Section on Nonparametric Statistics, WNAR Organizer(s): Ganapati Patil, Pennsylvania State University; Chair(s): Ganapati Patil. Upper Level Set Scan Statistic for Detecting Arbitrarily Shaped Hotspots-Charles Taillie, Jr. and Ganapati Patil; An Elliptic Scan Statistic for Geographical Disease Surveillance-Martin Kulldorff and Lan Huang, University of Connecticut; Linda Pickle, National Cancer Institute; A Simulated Annealing Strategy for the

Detection of Irregularly Shaped Spatial Clusters-Luiz Duczmal and Renato Assunção, Universidade Federal De Minas Gerais, Departamento De Estatística, Brazil; Disc: Daniel Wartenberg, University of Medicine and Dentistry of New Jersey.

Session 436. Thu, 8/7/03, 8:30-10:20AM.

Methods in Biosurveillance—Contributed papers. Sponsor(s): Biometrics Section. Organizer(s): Marco Bonetti, Harvard School of Public Health Chair(s): Marco Bonetti. Power of the Space-Time Scan Statistic for Disease Outbreak Detection-Zhenkui Zhang, Martin Kulldorff, and Lan Huang, University of Connecticut, Farzad Mostashari, NYC Department of Health and Mental Hygiene; Rick Heffernan, New York City Department, and Jessica Hartman, New York Academy; Space-time Biosurveillance: Sampling, Detection, and Parsimony?-Andrew Lawson, University of South Carolina; High- and Low-Powered Alternatives for Various Cluster Detection Approaches in the Context of Syndromic Surveillance for Bioterrorism-Ken Kleinman, Harvard University Medical School; Alternative Approaches for Syndromic Surveillance-Ikuho Yamada and Peter Rogerson, University of Buffalo; Modification of the Spatial Scan for Prospective Real-Time Outbreak Detection: Use of a Space-Time Permutation-Farzad Mostashari, NYC, Department of Health and Mental Hygiene; Martin Kulldorff, University of Connecticut; Jessica Hartman, New York Academy; Rick Heffernan, New York City Department [See full program at <http://www.amstat.org>]

Special Report

Graphical Representation, Colour Blindness & GIS.

Frank Houghton, Health Geographer, Department of Public Health, Mid-Western Health Board, Limerick, Ireland. As Geographical Information Systems continue their inexorable rise in popularity and use, so an increasing number of people globally are able to view the outputs of such systems. Despite this growth, it is interesting to note that checklists and guidelines on how to produce a good map are not in common circulation. Working in the field of spatial epidemiology/health geography it seems doubly important to remember that blindness and severe visual impairments can obviously restrict the ability to read maps. Tactile maps have in part overcome some of these issues,¹ and research has explored map use among blind and visually impaired

populations.²

However it is perhaps in relation to more limited visual impairments that widespread difficulties in the general population may emerge. Perhaps the most notable of these is colour blindness, and in particular its most common form: red-green colour blindness. This defect affects a much higher proportion of the (male) population in some countries than many people may suspect. Colour blindness affects between 7%-9% of males in caucasoid populations.³ Rates among caucasoid females are substantially lower at approximately 0.5%.

This particular form of colour-blindness is easily overlooked when creating maps. ArcView for example includes the standard colour scaling option '*greens to reds dichromatic*'. This option is not surprising. Using red to denote danger and green for safety is used so often in our societies that it feels intuitively appropriate. From traffic lights to customs lanes at airports (green = nothing to declare; red= something to declare), the use of green and red as symbols is ubiquitous.

In this vein it is not unusual to see maps of morbidity and mortality colour coded using green to represent areas of relatively low morbidity/mortality, and red to represent problem areas. Alternatively one periodically sees Poisson distribution maps using green and red to represent areas with significantly low and high illness rates.

Interestingly rates of colour blindness vary dramatically internationally. First Nation People's have the lowest rates of colour blindness, with rates among males varying from approximately 1% in groups such as Inuit⁴ to approximately 2% among Australian Aborigines,⁵ Maori⁶ and Native Americans⁷. Groups that have been identified with slightly higher rates of between 4%-5% include African-American males,⁸ as well as males from Northern India,⁹ Spain,¹⁰ and Japan¹¹.

Given the high prevalence of colour blindness in some countries (for example 8.7% among males in Denmark⁴), it is essential that disease maps are produced that avoid particular colour combinations that commonly give rise to problems (predominantly red-green, but also to a lesser extent blue-yellow). Although there may be a reluctance to move on from standard colour combinations that are widely understood, such as red-green, it is imperative that GIS outputs do not marginalize the substantial proportion of many societies that are colour blind. **References:**

1. Blades, M., Ungar, S., Spencer, C. (1999) 'Map Use by

Adults with Visual Impairments'. *Professional Geographer*, 51(4): 539-553; 2. Ungar, S., Blades, M. and Spencer, C. (1997) 'Strategies for knowledge acquisition from cartographic maps by blind and visually impaired adults'. *Cartographic Journal*, 34, 2: 93-110; 3. Malaspina, P., Ciminelli, B.M., Pelosi, E., Santolamazza, P., Modiano, G., Santillo, C., Lofoco, G., Talone, C., Gatti, M. & Parisi, P. (1986) 'Colour blindness distribution in the male population of Rome'. *Hum Hered*, 36(4): 263-5; 4. Norm, M. (1997) 'Prevalence of congenital colour blindness among Inuit in East Greenland'. *Acta Ophthalmol Scand*, 75(2): 206-9; 5. Mann, I. & Turner, C. (1956) 'Colour Vision in Native Races in Australasia'. *American Journal of Ophthalmology*, 41(5): 797-800; 6. Grosvenor, T. (1970) 'The incidence of red-green color deficiency in New Zealand's Maoris and "Islanders"'. *Am J Optom Arch Am Acad Optom.*, 47(6):445-50; 7. Clements, F. (1930) 'Racial differences in colour vision'. *Amer. J. Phys. Anthropol.*, 14: 333-334; 8. U.S. Department of Health, Education, and Welfare (1972) *Colour Vision Deficiencies in Children: United States*. Rockville, Md.: Health Services and Mental Health Administration. HEW Publication No. (HSM) 73 - 1600; 9. Naresh, S. (1995) 'Study of colour blindness in Jat Sikhs'. *Indian J Physiol Pharmacol*, 39(2): 127-30; 10. Cabrero, F.J., Ortiz, M.A., Mesa, M.S., Fuster, V., Moral, P. (1997) 'Red-green colour blindness in the Tormes-Alberch (Avila-Central Spain)'. *Anthropol Anz*, 55(3-4): 295-301; 11. Fujiki, N. & Macer, D.R.J. (1993) (eds) *Intractable Neurological Disorders*, Human Genome Research and Society. Proceedings of the Third International Bioethics Seminar in Fukui (pp. 203-209), 19-21 November, 1993. [Contact: fhoughton@mwvb.ie]

Editor: I also invited Cindy Brewer, Department of Geography, Pennsylvania State University, to add any of her observations on the topic of color blindness. Her current (forthcoming) work is *ColorBrewer in Print: A Catalog of Color Schemes for Maps*, C.A. Brewer; G.W. Hatchard and M.A. Harrower, *Cartography and Geographic Information Science* 30(1):5-32, American Congress on Surveying and Mapping. ColorBrewer is a tool that assists mapmakers in choosing and creating color schemes.

Cindy adds that cartographic research on designing map color schemes for color blind readers includes: Olson, JM and Brewer CA, 1997, *An Evaluation of Color Selections to Accommodate Map Users with Color Vision Impairments*, *Annals of the Association of American Geographers* 87(1): 103-134. Cindy has designed map color schemes for two major atlas projects that accommodate color vision impairments. Maps from both these projects are online:

Atlas of United States Mortality, NCHS (1996) at <http://www.cdc.gov/nchs/products/pubs/pubd/other/atlas/atlas.htm> and Mapping Census 2000: The Geography of U.S. Diversity, Census Bureau (2001) at website: <http://www.census.gov/population/www/cen2000/atlas.html>. Color specifications for the Census 2000 atlas are also at <http://www.personal.psu.edu/faculty/c/a/cab38/CensusAtlasCMYK.html>. Her online resource for mapmakers, available online at <http://www.ColorBrewer.org>, offers RGB and CMYK color specifications for many map color schemes. This Web tool also includes an indicator of whether each scheme can be read by colorblind people. The eye icon in the lower LEFT of the ColorBrewer screen is marked with an 'X' if the scheme is not suitable for color blind readers. [*Many thanks to Frank and Cindy for this timely discussion and guidance. CMC, Editor]

V. Related Census, HHS, FGDC and Other Federal Developments

[May 2003 **American Community Survey** Testimony (excerpts) of Census Bureau Director Charles L. Kincannon and Commerce Department Under Secretary Kathleen Cooper before the U.S. House of Representatives Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census]

Charles L. Kincannon: The American Community Survey is a critical component for a successful census in 2010. The American Community Survey will deliver useful, relevant data, comparable to the long form, updated every year instead of every ten years. The American Community Survey will allow for the elimination of the long form in the decennial census, allowing the Census Bureau to focus its entire effort in 2010 on the complete and accurate enumeration of every person living in America.

This count is the basic responsibility of the decennial census as prescribed in the Constitution; yet, the decennial census has never focused solely on the task of counting every person. The census has always focused on current needs for timely, relevant data. Significant policy decisions are supported, opposed, and evaluated according to data. The decennial census is the bedrock for the nation's statistical programs, providing the most detailed measurement of the nation's population and housing at every level of geography.

The question for today is whether the existing system of delivering data for every state, reservation, county, city, town, and census tract only once a decade

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can meet the expectations and demands of this nation. The good news is that the Census Bureau is moving to improve dramatically the way that we deliver crucial and important characteristic data. With the American Community Survey, we will eliminate the long form by collecting these data every year. While this will change the way that we get our information, we will continue to provide the long form-type data that are used throughout government and the private sector. The real difference is that, once fully implemented, the American Community Survey will offer updated data every year for every neighborhood in the country.

The 2004 President's budget includes funding to implement the American Community Survey at full sample next year, in the final quarter of 2004. This will provide tract level data comparable to the long form two years before long form data could possibly be available from the decennial census in 2010. The American Community Survey will provide data for areas and groups of 65,000 persons or more even earlier, in 2006. This means there will be detailed characteristic data for areas such as New York City, including each of the five boroughs, Los Angeles, Sacramento, Dallas, St. Louis, Atlanta, Hillsborough County, Tampa, as well as Warren County, Ohio and Brockton, Massachusetts in 2006. Detailed summary data at the national level for large minority groups, including Blacks, American Indians, Asians, Native Hawaiians or Other Pacific Islanders, and Hispanics will also be available. And, in many cases, the Census Bureau will be able to provide similar summaries for these communities at the state or city level where the population size can support such data every year from 2006 on.

In 2008, we will start providing data for every county, town, and community between the sizes of 20,000 and 65,000 persons. This means there will be summary data for Gila County, Arizona; Port Huron, Michigan; Bethel Park, Pennsylvania; Hudson, New Hampshire; and Redmond, Washington, and they will be updated every year thereafter.

The tract level data will be available in 2010. The American Community Survey will produce tract level information based on data gathered from three million households each year and averaged over five years. There are two basic distinctions from the long form, however, with regard to data quality. On the one hand, because the five-year aggregations of the American Community

Survey will involve fewer household cases than a long form, there will be a higher sampling error in the estimates. However, we believe that this will be offset by more complete responses to the American Community Survey questionnaire that the permanent staff of field representatives will collect.

Even in the context of the success of Census 2000, the Census Bureau was aware that the operational boundaries of the traditional census were stretched as never before. Knowing this, and anticipating the range of changes taking place throughout this country, has motivated the Census Bureau to develop a new and innovative strategy. This strategy, known as the 2010 Reengineered Census, includes the American Community Survey, modernization of the **Master Address File and TIGER® [Topologically Integrated Geographic Encoding and Referencing] system**, and a short form-only census in 2010. The components of this strategy are inextricably linked to one another.

Kathleen Cooper: The defining difference between the American Community Survey and all other data products, including the decennial census, is that this program will deliver detailed data for every geography on a yearly basis.

The long form from the decennial census offers a comprehensive and in-depth snapshot of the conditions as of Census Day; it cannot provide timely, annual data. Delivering data once in a decade served this nation well in the past. Today, however, we believe that the American Community Survey offers an alternative that is more timely and more relevant to meet the needs-- both public and private--of our nation. And the Department of Commerce believes the need for these annual data obliges us to pursue the American Community Survey.

The American Community Survey offers an alternative that is more timely and more useful to you and other census data users. The American Community Survey will deliver quality data comparable to the long form each year. The American Community Survey questionnaire is essentially the same as the long form from Census 2000, because the data must meet the same statutory and regulatory obligations and responsibilities. The Census Bureau has worked many years with other Federal agencies to ensure that the answers to those questions will provide the data they require to run programs and meet the needs of their stakeholders. For instance, one of the most intrusive questions, "does this

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house, apartment, or mobile home have complete plumbing facilities?" is used by several Federal departments and agencies, including the Department of Health and Human Services, the Department of Housing and Urban Development, and the Indian Health Service. This question has direct implications on issues of public health and well-being, including access and efficiency of sanitation services and the condition of housing in remote, rural areas and in low-income neighborhoods.

The Commerce Department believes that the American Community Survey is the best source for timely, yearly data that will serve this nation more effectively and this is an important goal for this Administration. We are encouraged by the work that the Census Bureau has done thus far to meet this goal and we hope that Congress will support these efforts. [Editor: For the full testimonies please contact Elaine Quesinberry, who web publishes *The American Community Survey Alerts*, at elaine.v.quesinberry@census.gov]

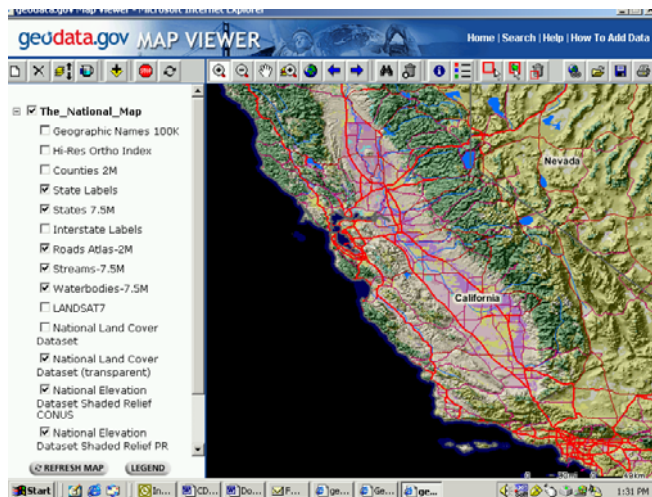
Federal Geographic Data Committee (FGDC)

[The Federal Geographic Data Committee (FGDC) is an interagency committee, organized in 1990 under OMB Circular A-16, that 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 17 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>]

GEODATA.GOV Launched

<http://www.geodata.gov>

Geodata.gov is a web-based portal for one-stop access to maps, data and other geospatial services that will simplify the ability of all levels of government and citizens to find geospatial data and learn more about geospatial projects underway. Geodata.gov is part of the Geospatial One-Stop initiative, one of the 24 OMB electronic-government initiatives that will enhance government efficiency. The geodata.gov portal will accelerate the development and implementation of the National Spatial Data Infrastructure (NSDI) and includes state, local and tribal governments along with the private sector and academia as participants.



Governmental Unit Boundary Data Exchange Standard, FGDC

The purpose of the Geographic Information Framework Data Content Standards-Governmental Unit Boundary Exchange Standard is to establish the content requirements for the collection and interchange of governmental unit (GU) and other legal entity boundary data and to facilitate the maintenance and use of that information.

It seeks to decrease the costs of acquiring and exchanging governmental unit and other legal entity boundary data for Federal, Tribal, State and local users and creators through a common means of describing the data content. Other benefits of adopting this standard include facilitation in maintenance of governmental unit boundaries.

This standard has been developed to fulfill one of the objectives of the National Spatial Data Infrastructure (NSDI), i.e., to create common geographic base data for seven critical data themes. These core themes are considered framework data, of critical importance to the geographic information infrastructure. The Geospatial One-Stop initiative, a Federal e-government initiative, is designed, in part, to expedite the creation of the seven framework layers.

Homeland Security Working Group FGDC

The Geospatial Working Group of the Emergency Response Team (ERT-N) for the National Capital Region (NCR), is the newest of its kind, and is dedicated to support emergency response that might occur in and

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around the Nation's capital. The Federal Emergency Management Agency (FEMA) organized an operations center for the region, and soon found that it needed geospatial data to support center operations. This working group was organized to fill this data need. The team is working to accumulate data and technology that can be used to respond to catastrophic events that may occur in the Capital Region. Because the area is so rich in data, the team is not only working with data traditionally available from FEMA to respond to emergencies, but also data available from other federal, state, and local groups. Near-term tasks include establishing an initial geospatial database to meet immediate needs, establishing an infrastructure to support the center, and assuring that these geospatial capabilities are flexible, adaptable, and integrated with other information components. In the longer term, the team will establish a capability for seamless spatial information fusion and integration across the NCR enterprise, and will include data nodes from federal, state, and local governments. The team has several tasks underway, including working with operations center to understand its expectations for geospatial information, completing a data inventory, and compiling a geospatial skill sets assessment across involved agencies. [Contact: Mike Domaratz, Committee Co-Chair, at mdomaratz@usgs.gov; this report excerpted from June 2003 draft meeting notes]

· GEOGRAPHIC INFORMATION SYSTEMS:

Challenges to Effective Data Sharing [excerpts]

Statement of Linda D. Koontz, Director, Information Management Issues. General Accounting Office, June 2003 Testimony Before the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Committee on Government Reform, House of Representatives; the full text appears at <http://www.gao.gov/new.items/d03874t.pdf>.

Geospatial One-Stop is aimed at promoting coordinated geospatial data collection and maintenance across all levels of government. Among its objectives are (1) deploying an Internet portal for one-stop access to geospatial data; (2) developing data standards; and (3) encouraging greater coordination among federal, state, and local agencies. While these objectives are important, Geospatial One-Stop has focused on limited, near-term tasks and was not intended to fully address the longer-term challenges of implementing the NSDI. A much more substantial effort will be required to attain the

broader vision of seamless integration of GIS data nationwide. Existing draft standards may need further revision, and more extensive coordination efforts may be required to ensure broad adoption at all levels of government. Further, the effort is likely to require a continuing effort over an extended period of time, due to the fact that significant investments have already been made in existing non-standard systems.

Developing common geospatial standards to support vital public services has proven to be a complex and time-consuming effort. The number of types of geospatial data and the complexity of those data make developing geospatial standards a daunting task. For example, 34 different broad categories of geospatial data, called "data themes," were identified in OMB Circular A-16 as a necessary foundation for the NSDI. These basic themes relate to all types of services provided by the federal government- including climate, flood hazards, federal land ownership, public health, soils, and transportation. Each of these themes, in turn, may have any number of subthemes. The transportation theme, for example, includes such divergent subthemes as road, railroad, air, transit, and waterway, each the domain of a different organization or group of organizations. For data associated with the NSDI's themes and subthemes to be effectively shared, standards must be developed that allow interoperability and integration of the many disparate formats of data that are currently collected for each theme and subtheme.

Circular A-16 further identifies seven of the themes as the core set of most commonly used data, called "framework themes" [e.g., the seven framework themes are **transportation, hydrography, government units, geodetic control, elevation, digital ortho imagery, and cadastral** (relating to land ownership)]. FGDC has been working to coordinate the development of these themes as well as other standards since it was established 13 years ago. Although FGDC has developed versions of several of these standards, it has not attempted to finalize a complete set of the seven framework standards. These framework standards would define the simplest level of geographic data commonly used in most geospatial data sets.

Given that most federal agencies-including large agencies such as DOE, Justice, and Health and Human Services-have not participated in the NSDI framework standards development process, the risk is substantial that

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the proposed standards will not meet their needs. In addition, agencies could be faced with a potentially expensive effort at “migrating” to the new standard. Substantial investments have already been made to independently develop geospatial systems using formats and standards that meet the specific needs of the agencies that developed them. The potential for agencies to continue to deploy agency-specific, noninteroperable geospatial systems was another high risk identified by Interior [DOI] in its January 2003 Geospatial One-Stop plan.

Many states and localities have established Web sites that provide a variety of location-related information services, such as updated traffic and transportation information, land ownership and tax records, and information on housing for the elderly. Existing commercial products using a variety of formats are already meeting the needs of the states and localities in providing this information. Hence these organizations are likely to have little incentive to adopt potentially incompatible federal standards that could require substantial new investments. According to Arizona’s state cartographer, many local governments currently do not comply with existing FGDC standards because most of their GIS applications were created primarily to meet their internal needs, with little concern for data sharing with federal systems.

Geospatial One-Stop’s Objectives Are Limited... we believe that until these challenges are addressed, the goal of a single, coordinated, nationwide system of geospatial data will remain out of reach.

Geospatial One-Stop is intended to accelerate the development and implementation of the NSDI by promoting coordination and alignment of geospatial data collection and maintenance across all levels of government. Specifically, its objectives include (1) deploying an Internet portal for one-stop access to geospatial data as an extension to the NSDI Clearinghouse network; (2) developing data standards for the seven NSDI framework data themes; (3) creating an inventory of federal data holdings related to the seven framework themes; and (4) encouraging greater coordination among federal, state, and local agencies about existing and planned geospatial data collection projects.

While Geospatial One-Stop’s objectives are

important, they do not represent a significantly new or different approach to the GIS integration problem that the government has been struggling with for more than a decade. First, while developing and implementing an Internet portal may offer users additional functionality over the existing Clearinghouse, unless the underlying geospatial data offered through the portal are standardized across data providers, the additional functionality offered by the portal may be of limited value.

Second, the objective of finalizing the seven framework standards, while important, is limited. As I discussed earlier, a total of 34 data themes was identified in OMB Circular A-16 as a necessary foundation for the NSDI. Geospatial One-Stop’s objectives do not include plans to address any of the remaining 27 themes. Before the broader vision of a unified nationwide network of geospatial data and systems can be achieved, standards for all of NSDI’s foundation data themes will need to be established. Further, definition of the standards is only the first step in gaining their benefits; Geospatial One-Stop has not yet addressed the challenge of gaining consistent implementation of the standards across government, which I have already discussed. In order to attain the broader vision of seamless integration of GIS data on a nationwide basis, a longer-term effort will be required.

Third, creating a complete and useful inventory of federal data holdings will require much more substantial work than is planned through the Geospatial One-Stop initiative. For example, according to the FGDC Metadata Coordinator, the extent to which agencies have posted metadata about their geospatial data sets is unknown. In addition, obtaining complete metadata from all federal sources is likely to be very challenging. If the metadata were not created when the data were originally captured, they could be expensive and time-consuming to generate after the fact, and agencies may not have resources available for the effort. Accordingly, unless Geospatial One-Stop devotes more resources to working with agencies on generating and posting metadata, its objective of creating an inventory of federal data holdings may be delayed.

Finally, despite the creation of the Board of Directors, questions have been raised about the breadth of participation in Geospatial One-Stop. The chair of the board acknowledged that the small group of nonfederal

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representatives on the board may not be able to speak for all the states and thousands of local governments. It is also not known how well these representatives are disseminating information about the initiative and encouraging collaboration among the states and localities that are not directly represented. As with the initiative's other objectives, limited actions have been taken aimed at achieving near-term results that only partially address the broader objective of building the NSDI. To fully achieve that broader objective, Geospatial One-Stop will need to better ensure that it has coordinated with all relevant governmental entities and that they understand the initiative and their role in it. [[Contact Linda Koontz at (202) 512-6240 or koontzl@gao.gov]

Web Site(s) of Interest for this Edition

New FGDC GIS Resources Website

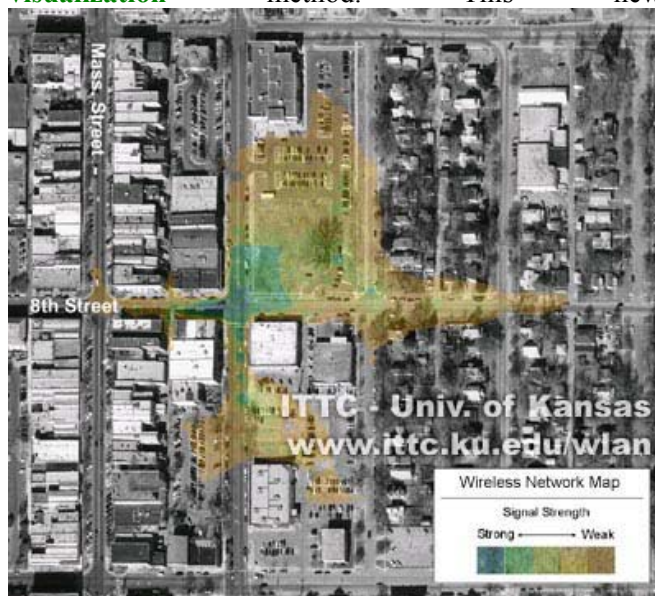
<http://www.fgdc.gov/apps/glist.new/index.php> National Spatial Data Infrastructure- **Geographic Information Resources**. This new site is a partnership of the Federal Geographic Data Committee and the Topographic Engineering Center. The Federal Government in the United States is extensively involved in the generation, maintenance, analysis, and distribution of spatial data. This responsibility is spread across numerous agencies. Use any of the 'three ways to search' to find items of interest including: keywords, type of information, and organization.

<http://nationalatlas.gov/whatsnew.html> **Need a map of your Congressional District?** The National Atlas recently supplied the Congress with printable maps for each of the 108th Congressional Districts. These maps are now available for your use, too. Each map illustrates the District boundary and includes roads, streams, and cities for easy reference. The maps are provided in two formats you can view and print. The National Atlas of the United States® is intended to provide a comprehensive, map-like view into the enormous wealth of data collected by the Federal Government.

<http://www.fcc.gov/broadband> **Broadband technologies**, which encompass all evolving high-speed digital technologies that provide consumers integrated access to voice, high-speed data, video-on-demand, and interactive delivery services, are a fundamental component of the communications revolution. Fully-evolved broadband

will: Virtually eliminate geographic distance as an obstacle to acquiring information, and dramatically reduce the time it takes to access information

<http://www.ittc.ku.edu/wlan> While computer networks and geography may not appear to have much in common, a collaborative effort was launched between the University of Kansas' Information & Telecommunications Technology Center and Kansas Applied Remote Sensing Program to create a **more advanced wireless 802.11b mapping and network visualization** method. This new



procedure uses wireless network data collected from walking and/or driving scans, aerial photography, and interpolation techniques to create highly detailed network coverage and signal strength maps.

This example image represents the signal emitted from a single wireless access point located in downtown Lawrence, Kansas. The signal strength degrades from the stronger values in blue to weaker values in orange. [Permission: Kansas Applied Remote Sensing Program] <http://cancercontrolplanet.cancer.gov> This PLANET portal provides access to data and resources that can help planners, program staff, and researchers to design, implement and evaluate **evidence-based cancer control programs**. The PLANET portal provides access to Web-based resources that can assist in: *Assessing the cancer and/or risk factor burden within a given state; *Identifying potential partner organizations that may already be working with high-risk populations;

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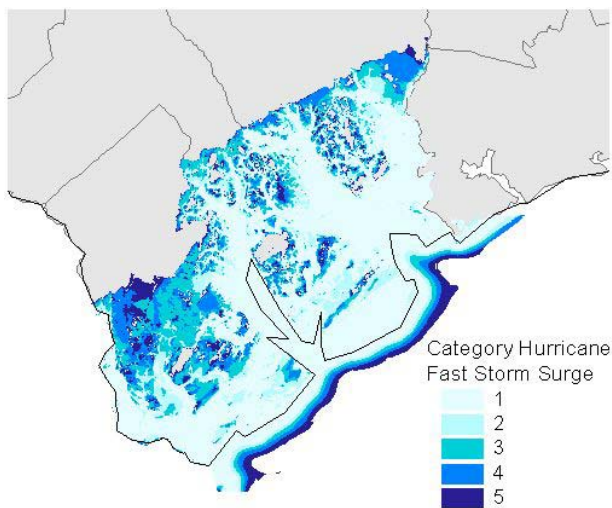
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*Understanding the current research findings and recommendations; *Accessing and downloading evidence-based programs and products; and, *Finding guidelines for planning and evaluation.

http://www.scdhec.net/eqc/gis/html/maps_eqcdist.asp

This is the South Carolina Department of Health and Environmental Control website. Once registered, users can create an interactive GIS environment with a variety of GIS data layer topics and data themes.



GIS Layer: SC Fast Speed Hurricane Surge, Beaufort County 1999

<http://statecancerprofiles.cancer.gov> The objective of the State Cancer Profiles Web site, a collaborative effort of the National Cancer Institute (NCI) and CDC, is to provide a system to **characterize the cancer burden in a standardized manner** in order to motivate action, integrate surveillance into cancer control planning, characterize areas and demographic groups, and expose health disparities. The focus is on cancer sites for which there are evidence based control interventions. Interactive graphics and maps provide visual support for deciding where to focus cancer control efforts. Interactive Graphs and Maps include: 1) 5-Year Rate Changes in cancer mortality or incidence for all major cancer sites by user selectable criteria; 2) Historical Trends (compare trends in cancer mortality and incidence by user selectable criteria); and 3) Latest Rates, Percents, and Counts (explore relationships across geography of mortality, incidence, demographics, or risk factors).

http://www.terraser.com/CA/atlas_features.html The **TerraSeer Cancer Atlas Viewer** provides new methods for the visualization and evaluation of space-time patterns. You can use this product to: Evaluate patterns in the National Atlas of Cancer Mortality e.g., visualize differences over space and time in maps, histograms, boxplots, scatterplot, Moran scatterplot, tables, and animations and evaluate clustering Innovative features include: Interactive linking and brushing provide simultaneous updates to queries and data selections, univariate and bivariate LISA (Local Moran) statistics, a utility to mask sparse data, and database for easy access to complex data. This product runs on Windows operating systems. The software will only load and analyze data from the National Atlas of Cancer Mortality.

<http://www.fcw.com/fcw/articles/2003/0616/web-gis-06-17-03.asp> Officials at the Centers for Disease Control and Prevention are creating a system to allow health officials and first responders to access geographic information to aid in the response to a bioterrorist attack. The Health Informatics Office is finishing the final phase of the geographic information system (GIS) architecture that will soon bring maps and geospatial data to emergency workers and epidemiologists in the field. This final phase is known as the **Spatial Epidemiology and Emergency Management (SEEM)** system. The system draws on data from the environmental public health spatial data repository at CDC, which includes census data, maps, aerial and satellite photos, and locations of landmarks such as schools and hospitals.

<http://www.oasisnyc.org/mapsearch.asp> **NYC OASIS mapping service.** This is New York City's Open Accessible Space Information System (OASIS) featuring online customized mapping of existing and potential open space in New York City. A community-based undertaking, local organizations design and test the first city wide, web-based, open space mapping resource for NYC. OASIS facilitates and focuses the delivery of Geographic Information Systems (GIS) resources to provide timely and accurate information about the green infrastructure of NYC.

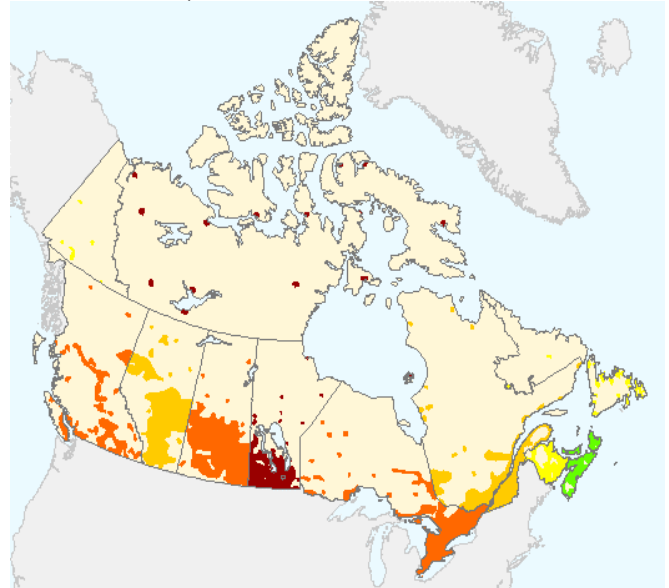
OASIS will enable NYC community residents, for the first time, to: create maps of open space by zip code, borough, tax block and lot, and/or neighborhood; identify key open space resources within or near a user-

defined area; locate these resources by name, type, and other attributes in addition to geographic-based searches; identify other natural resources and landmarks near or adjacent to open spaces in the city; calculate statistics based on open space patterns by zip code, borough, tax block and lot, and/or neighborhood; undertake "what if" scenarios, such as, what would my neighborhood look like if these vacant lots remained community gardens, or how would new bike lanes or bus routes improve my access to a park in the Bronx?; and use other mapping and data analysis tools.

<http://63.192.169.198/index.asp> **First 5 California**. This release of the First 5 California GIS displays the location of, and information about, a variety of local conditions that are relevant to First 5 eligible children, including risk factors, resources, and community information. Risk factors available in the GIS are inadequate prenatal care "hot spots", teenage birth hot spots, and the location of First 5's School Readiness Initiative, High Priority elementary schools. Among the community resources available in the GIS are the location of Healthy Start elementary schools, Early Start Family Resource Centers, WIC service sites, and thousands of American Medical Association affiliated obstetricians, gynecologists, pediatricians, and general or family practitioners located throughout California.

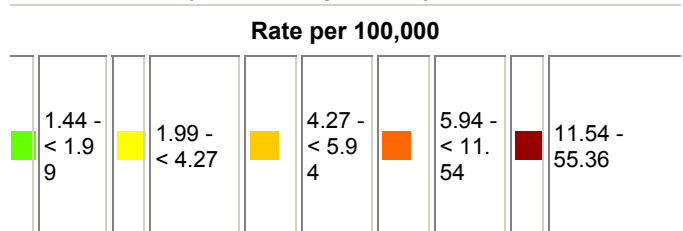
<http://www.tec.army.mil/gis/index.html> **GIS Internet Resources** provides **extensive** pointers to GIS companies, associations, and government web pages as well as sources of software, data, publications, and services. Information does not reflect use or endorsement by the U.S. Government. A new section on Geographic Calculators has been added to the Geodesy section, a new Federal Jobs section has been added to Jobs, and the Orienteering section has been moved from Cartography to Education. The Orienteering section has been renamed to Navigation Fun and includes other navigation activities, like Letterboxing, Geocaching, and Road Rallies. [Editor: one could spend days exploring these many resources; it has been developed by the FGDC and U.S. Army Topographic Engineering Center]

http://dsol-smed.hc-sc.gc.ca/dsol-smed/ndis/index_e.html **Notifiable Diseases On-Line** is a web based application developed by the Centre for Infectious Disease Prevention and Control of Health Canada to enhance dissemination of surveillance data collected on notifiable diseases in Canada. The application contains information on the number of cases reported for several of the notifiable diseases as well as their rate in the population. The data are available for each province and territory for each year starting at 1987 up to the end of 1999 and will be updated as each year of new data becomes available (*For 1999, Northwest Territories and Nunavut data have been combined*).



Tuberculosis

**Both Sexes Combined (Incl. Not Specified), All Ages
(Incl. Not Specified), 1999**



Final Thoughts

Perspective on GIS and Public Health-Midyear 2003

There is much to report on GIS and public health activities. Our field is dynamic and in a constant state of growth and exploration. Regardless of the country in which you reside and work, one goal is to help build a responsive national public health infrastructure. GIS (and its science) is critical to this effort. In this July 2003 edition of *Public Health GIS News and Information*, we see a variety of events that are helping to shape the direction and state of our field.

From my perspective, few things are as important as having U.S. State health departments (SHDs) and local health departments (LHDs) connect to Intranet and Internet environments and share geospatial data holdings and metadata, standardized for interoperability. SHDs and LHDs are the public health building blocks for the National Spatial Data Infrastructure (NSDI). In this edition (see Web Sites of Interest), several noteworthy example developments are taking place in South Carolina and California. The South Carolina Department of Health and Environmental Control and the First 5 California [formerly California Children and Families Commission], respectively, have created online public GIS accessibility to a variety of small area public health geospatial databases that only a few years ago might not have been publicly available.

Key issues of spatial data standards, metadata and confidentiality may well dictate the pace at which we roll out the public health spatial data infrastructure. The Mapping Science Committee of the National Research Council has made this message clear over the years to the entire GIS community. In the January 2003 edition, I reiterated some of these conditions as they pertain to the Department of Health and Human Services (DHHS). If we proceed without uniform geospatial data content standards, we will be relegated to the lowest resolution format of spatial data integration. Much higher resolution data will not be part of the national picture and much resource will be expended to reconcile disparities. Standardized protocols are needed for data collection, data sharing and the protection of individual privacy.

In this edition, I call your attention to the latest (2003) General Accounting Office testimony, "Geographic Information Systems: Challenges to Effective Data Sharing". It clearly warns that the federal government Geospatial One-Stop initiative, in the absence of (1) standardized geospatial data, (2) consistent implementation of standards across government, (3) creation of a complete and useful inventory of federal data holdings and their respective metadata, and (4) inclusion of all representative stakeholders in the decision making process, will face serious challenges to implementing the NSDI anytime soon. It serves to remind us to continue to work diligently on the bindings that insure integration.

In other news, there is much GIS activity at CDC. The 2003 CDC Cancer Conference (third biennial) offers an excellent series of GIS short courses by leading researchers in their respective areas of expertise. All have in common the use of spatial statistics and one will focus on the Spatial Scan statistic. The latter is a useful public health tool for determining disease clusters and corresponding statistical significance. The importance of this procedure and the spatial statistics theme is evident in the selected programs shown in this edition for the 2003 joint meetings of the American Statistical Association. In addition to the short courses, the 2003 Conference also will include an additional 90 minute topic session on Monday Sept 15 (offered as part of the main conference) on "Using Geographic Information Systems (GIS) and Spatial Analysis to Address Community Concerns about Cancer Incidence."

CDC also has a new online, and first-ever, Atlas of Reproductive Health. It takes an important step towards vertical integration as the atlas data are compatible with locally developed databases. Moreover, CDC's Environmental Public Health Tracking System, which addresses a variety of chronic disease conditions and includes GIS, is evolving and now offers online progress reports. Additionally, it is noteworthy that staff from CDC/ATSDR are playing key roles in the daily GIS surveillance activities of the DHHS Command Center (main center in Washington, D.C. and subcenter in Atlanta). I hope to report more about this activity in the next edition.

CDC recently dedicated a new operations center that will use geographic information and other data to help manage health crises. The Marcus Emergency Operations Center was dedicated in spring 2003. As reported in the June

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27, 2003 edition of *Geo Resources*, “CDC now has a world-class operations center equipped to handle any public-health emergency, whether it’s a bioterrorism attack or an outbreak of a new disease,” said Julie L. Gerberding, CDC director. The center has 85 workstations, nine team rooms and a central command station as well as high-frequency radio support and GIS/disease-mapping capabilities. The center went into operation after the Columbia Space Shuttle disaster in February 2003, communicating and sharing information with state and local public-health officials about possible health hazards from shuttle debris. During the recent outbreak of SARS, CDC workers used the center to develop databases of sick and exposed patients. [Reprinted by permission of Adams Business Media/GeoPlace.com]

In news just received, the National Academy of Sciences will host this month a NASA Public Health Applications Program: Confidentiality & Geospatial Workshop. It is organized by CIESIN (Center for International Earth Science Information Network) at Columbia University. In addition to a variety of speakers, several panels have been formed to address key questions on confidentiality, and the intersection of remote sensing (RS) and confidentiality. A. Government Agency Panel Discussion: 1) When have problems related to confidentiality arisen? 2) How have you or your agency overcome these problems? 3) What barriers remain? 4) What would be your agency requirements if sharing data with other agencies? 5) Does your agency have different requirements when funding projects vs. sharing data?; and B. Research Panel Discussion: 1) What key questions can be answered with the integration of RS and socioeconomic data? 2) How does the use of RS data potentially compromise the confidentiality of demographic, socioeconomic, and health data or related research results? 3) What approaches have succeeded or failed to preserve confidentiality in order to make data accessible to researchers, policymakers, or the public? 4) In what form or with what restrictions do you or your institution release data? 5) Do you or your institution have a data preservation plan?

Mention should also be made of the upcoming GeoMed, an international conference showcasing the latest tool developments, research, and accomplishments in the application of geo-spatial analysis techniques to the problems of public health. The first meeting was held in 1997 in Rostock, Germany. In 1999 and 2001, GeoMed was hosted in Paris.

This year will mark GeoMed's first meeting in the Americas. It will be held at the University of Maryland Medical School, October 15-17, in Baltimore, MD (see: <http://www.geomed03.org>).

Special Appreciation... Fred Broome

In closing I want to call your attention to the approaching retirement of an individual who has provided dedicated GIS leadership beyond the call of duty. Fred Broome, Chief, National Geographic Partnerships Team, Geography Division, U.S. Census Bureau, deserves our collective expression of appreciation for a job and career well done. He has applied supportive skills to many GIS activities on behalf of the Census Bureau, the Federal Geographic Data Committee, American National Standards Institute (ANSI), Department of Housing and Urban Development, NASA, Office of then President Carter, National Oceanic and Atmospheric Administration, Federal Emergency Management Agency, U.S. Coast Guard, National Institutes of Health, CDC, and other national and international agencies.

From Fred’s perspective, he has enjoyed three careers. “I retired from the military after 26 years. As a member of the faculty of the University of Maryland (and occasionally at other institutions) for more than 22 years, I have had the pleasure of teaching courses. And obviously, my career here with the Census Bureau, where I have worked for more than 35 years on many different problems. Among them are, participated in the 1970, 1980, 1990 and 2000 censuses, played a role in the development of the Address Coding Guides of the 60s, the GBF/DIME program of the 70s, TIGER creation in the 80s, the development of the Bureau’s automated cartographic system up through 1990, and research and development of the GPS and imagery update techniques of the 90s now used in the current geographic data update work.”

Further, “my entire career has been based on providing both the access and the data, i.e., building the NSDI. In line with the variety of activities in which I have been involved is the fulfillment that I received by seeing my work touch the lives of people. And nowhere has this been more fulfilling than my work with people in the health community. My work with the Long Island Breast Cancer Study is just one example. Teaching the courses [CDC related- annual GIS module at Maternal and Child Health Conferences] to the nurses and public health workers is another.”

Few people have had such an important impact on my professional life as has Fred. He has been a role model in his abilities and work ethic, and as a team player and teacher. He is unsurpassed in professional knowledge, personal

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integrity and good old fashion humility. I think the best way for public health to remember Fred Broome is the special guidance he provided to the NCI Long Island Breast Cancer Study and, most recently, the CDC National Health and Nutrition Examination Survey. At issue is the challenge to determine the best geocoding procedure from a wide range of competition and choices. In the absence of a federal standardized geocoding solution, Fred's instruction for these types of situations follows below.

A Fred Broome lesson on benchmark geocoding from which we all may benefit...

“As to commercial geocoding sources, each has its strengths and weaknesses. Unfortunately, the responsibility falls on the Government to benchmark the proposals, and select the best from the benchmark. A suggested procedure:

1. Create a test dataset of about 2,000 addresses. This is a large enough sample that one can get a good set of statistics. Such a dataset can be created by taking addresses from several sources and sanitizing them to just an ID number and the address. The actual purpose for that address is not revealed, e.g., this address has a cancer patient, this address was on a doctor's research list, this address receives Reader's Digest, whatever. For purposes of the benchmark, this is just a legal address.

2. Salt this list with about 50 bad addresses, i.e., addresses that do not exist. (This will test how they handle bad addresses. Did they report a no-match, or did they force it, thereby leaving you thinking that you have a good match?)

3. Change about 50 of the good addresses by introducing a known error into each, i.e., change ZIP code, change Green St to Green Av, and so forth. (This will test how they handle errors. Again, what do they do with the address? Some will geocode because the error was detected, e.g., there is not Green Av in the ZIP and place, but there is a Green St. Others will not be so clear.)

4. Determine the acceptable geographic level of geocoding. Say the need is for a coordinate and other associated geocodes to be assigned to each address. Say Level I is a good match and assignment of imputed (or actual if it is part of the source) coordinate and the Census state/county tract/block number. Say Level II is less than a good match, but can still give an estimated structure coordinate and other geocodes. Then say Level III, Level IV, and so forth are progressively poorer matches until all you can get is a coordinate for the ZIP. These will become the levels that the contractor will report for each address.



5. Have the U.S. Census Bureau verify and geocode the 2,050 addresses to give you a "truth" deck. This is not just a geocoding to TIGER, but can even be a field or Census Master Address File verification.

6. Have each vendor that bids the contract geocode all 2,050 addresses. Compare their results with the "truth" deck. See how they do and what they charge. Pick the best. (Ability to handle the task volume and geographic extent are two considerations, not just ability to geocode.)

Sounds like a lot of work, but this is the best way to get a handle on the geocoding error statistics, hence a more defensible results, and to test the truth of the sales pitches.”

[Editor: Fred may be reached at Frederick.R.Broome@cdc.gov or voice 301-763-1056]

Charles M. Croner, PhD, 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 53rd 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 July 23, 2003, at NCHS 2:00PM EDT: “Towards an Online CDC Public Health Atlas”