PUBLIC HEALTH GIS NEWS AND INFORMATION
March 2004 (No. 57)
Dedicated to CDC Scientific Excellence and Advancement in
Disease, Injury and Disability Control and Prevention, and Occupational Safety, using GIS

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

Please join us: March 25, 2004, at NCHS, "Mapping Environmental Indicators: A Demonstration of Dynamic Choropleth Maps (DC Maps), a Java-based Web Application," William P. Smith, Ph.D., Senior Statistician, Computer Scientist, U.S. Environmental Protection Agency (US EPA). See **abstract** this edition. Please join us at NCHS, RM1406, from **2:00-3:30PM**, Hyattsville, MD; The NCHS GIS Guest Lecture Series has been presented continuously since 1988. Envision will be available to offsite CDC locations; Web access will be available on the Internet but only at the time of this presentation. Please contact Editor if you wish to view on the Web. 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). [NCHS Cartography and GIS lectures are open to all. Contact: Editor, *Public Health GIS News and Information* at cmc2@cdc.gov]

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

* U.S. Geological Survey (USGS) Fifth Biennial Geographic Information Science (GIS) Workshop (USGS-GIS 2004), on March 1-5, 2004, in Denver CO [Contact: Yvonne Baevsky at yhalpern@usgs.gov]

* 1st International Neonatal Vaccination Workshop, CDC's National Immunization Program, on March 2-4, 2004, taking place in McLean, Virginia [See website: http://www.cdc.gov/nip/events/neonatal_wkshop/default.htm]

* International Conference on Biomarkers for Toxicology and Molecular Epidemiology: New Tools for 21st-Century Problems, CDC, March 15-17, 2004, Atlanta GA [See: http://www.cdc.gov/nceh]

* Obesity and The Built Environment: "Improving Public Health Through Community Design," National Institute of Environmental Health Sciences, NIH, May 24-26, 2004, Washington, DC [See conference website at: http://www.niehs.nih.gov/drcpt/beoconf]

* Spruce Advanced Workshop on Spatial/Temporal Models and Methods, March 24-27, Costa do Estoril, Lisbon Portugal [See website: http://spruce.deio.fc.ul.pt]

* National States Geographic Information Council (NSGIC) 2004 Midyear Conference: "Capitolizing on Coordination", March 26-28, 2004, Reston, VA [See site: http://www.nsgic.org]

* The 4th International Symposium on Mobile Mapping Technology, March 29-31, 2004 Kunming, China [See: http://www.geoict.net/mmt2003/index.htm]

* 4th National Asthma Conference: "Winning with Asthma", CDC and American Lung Association, April 14-16, 2004, Atlanta GA [See: http://www.cdc.gov/nceh]

* International Symposium on Spatial Data Quality, April 15-17, 2004, Vienna Austria [See symposium site: http://www.geoinfo.tuwien.ac.at/events/ISSDQ04/ISSDQ_call.html]

* 53rd Annual Scientific Epidemic Intelligence Service (EIS) Conference, CDC, April 19-23, 2004, Atlanta GA [See: http://www.cdc.gov/eis/conference/conference.htm]

* 2nd National Steps to a HealthierUS Summit, April 29-30, 2004, Baltimore MD [See summit website at: http://www.healthierus.gov/steps]

* Joint EuroSDR/Dublin Institute of Technology workshop on Impacts of improving the positional accuracy of GI databases, May 5-7, 2004, Malahide Co, Dublin [See: www.eurosdr.org]

* 2004 American Society for Photogrammetry and Remote Sensing Conference: "Mountains of Data- Peak

Decisions," May 23-May 28, 2004, Denver CO [See: http://www.asprs.org/denver2004]

*2nd Public Health Information Network (PHIN) Stakeholder's Conference: "Connecting for the Public's Health," CDC, May 24-27, 2004, Atlanta GA [Email: phin2004@cdc.gov]

* US EPA Science Forum 2004: Healthy Communities and Ecosystems, June 1-3, 2004, Washington DC [See: http://www.epa.gov/ord/scienceforum]

* 12th International Conference on Geoinformatics Geospatial Information Research: Bridging the Pacific and Atlantic, June 7-9, 2004, Gävle, Sweden [See site at: http://www.hig.se/geoinformatics]

* 37th Annual Meeting of the Society for Epidemiologic Research (SER) will be held in Salt Lake City, Utah, June 15-18, 2004 [See: http://www.epiresearch.org]

* Graybill Conference 2004: "Spatial Statistics-Agricultural, Ecological, and Environmental Applications," June 16-18, 2004, Fort Collins, CO [See: http://www.stat.colostate.edu/graybillconference]

* Radiation in Realistic Environments: "Interactions Between Radiation and Other Factors," June 27-30, 2004, Beaver Creek, CO [See: http://www.amstat.org]

* 24th International Symposium on Forecasting, July 4-7, 2004, Sydney Australia [See the symposium website at: http://www.isf2004.org/info.htm]

* 2004 NCHS Data Users Conference, July 12-14, 2004, Washington DC [See the NCHS conference website at: http://www.cdc.gov/nchs/about/bsc/bsc_main.htm]

* Sixteenth Conference of the International Society for Environmental Epidemiology: "Addressing Urban Environmental Problems," August 1-4, 2004, New York [See: http://www.iseepi.org/index1.htm]

* Joint Meetings of the American Statistical Association: "Statistics as a Unified Discipline," August 8-12, 2004, Toronto Canada [See: http://www.amstat.org]

* Sixth International Conference on Social Science Methodology, August 16-20, 2004, Amsterdam city, The Netherlands [See: http://www.siswo.uva.nl/rc33]

* International Symposium on Spatial Data Handling, August 23-25, 2004, University of Leicester, in United Kingdom [See: http://www.geog.le.ac.uk/sdh2004]

* 2004 IACA (International Association of Crime Analysts) Conference, "Analyze This: Responses to Common Crime Problems," on September 8-11, 2004, Seattle WA [See: http://www.iaca.net]

* GIScience 2004: Third International Conference on Geographic Information Science, October 20-23, 2004, University of Maryland, College Park [See website at: http://www.giscience.org]

* International Conference on Environmental and Public Health Management: Persistent Toxic Substances, November 17-19, 2004, Hongkong [See conference site: http://www.hkbu.edu.hk/~inrem/home/home.htm]

II. GIS News

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

A. General News and Training Opportunities

1. At the upcoming centennial meeting of the Association of American Geographers in Philadelphia, PA, Luc Anselin and Julia Koschinsky will hold a two hour workshop on **"Exploring Spatial Data with GeoDa"**, March 15, 2004. The workshop will review methodological issues as well as illustrate "how to" carry out ESDA using GeoDa. GeoDa 0.9.5-i is available for downloading from the Spatial Analysis Laboratory (SAL) site http://sal.agecon.uiuc.edu/csiss/geoda.html, Department of Agriculture and Consumer Economics, University of Illinois at Urbana-Champaign (UIUC). It is now the official release of GeoDa. It has several exciting new features such as a cartogram, a refined map movie, parallel coordinate plot, 3D visualization, conditional plots (and maps) and spatial regression. It also is now fully documented with a set of release notes. [Contact: Luc Anselin at anselin@uiuc.edu]

2. The dates for this summer's **Inter-university Consortium for Political and Social Research (ICPSR)** courses on spatial data analysis have now been set: **Introduction to spatial data analysis**, June 14-18, 2004 and **Spatial regression analysis**, August 2-6, 2004, at the UIUC campus. [See details and logistics at website http://sal.agecon.uiuc.edu/courses/index.html#reg;: Contact: Henry Heitowit, Program Director, ICPSR Summer Program, at hank@icpsr.umich.edu]

3. 2004 CSISS Summer Workshop Program. The **Center for Spatially Integrated Social Science (CSISS)** is accepting applications for positions in its summer workshops. The application deadline is April 18, 2004. Located at the University of California, Santa Barbara, CSISS is funded by the National Science Foundation under its program of support for infrastructure in the social and behavioral sciences. Workshops include: (1) **Introduction to Spatial Pattern Analysis in a GIS Environment**, June 28- July 2, 2004, by Arthur Getis (coordinator), John Weeks, and Jared Aldstadt (all of San Diego State University) and Michael Goodchild (CSISS, University of California, Santa Barbara) and (2) **Geographically Weighted Regression and Associated Statistics**, July 26-30, 2004, by A. Stewart Fotheringham (coordinator) and Martin Charlton (both of the University of Newcastle) and Chris Brunsdon (University of Glamorgan). [See: www.CSISS.org/events/workshops for application procedures and workshop content]

B. Department of Health and Human Services

(http://www.hhs.gov)

4. The U.S. Department of Health and Human Services (HHS) announced the release of an additional $191.5 million in **Low Income Home Energy Assistance (LIHEAP)** funds for states, territories, and tribes. "January was a particularly cold and difficult month in many states," Secretary Thompson said. "These funds will help provide heat to low-income Americans keeping their homes and families safe and warm." LIHEAP is a block grant program that helps eligible families pay the costs of heating their homes in the winter and cooling their homes in the summer. About 4.6 million low-income households receive assistance each year. [To view state allotments, see article in HHS News at site http://www.hhs.gov/news/press/2004pres/20040205.html]

5. On February 7, 2004, HHS observed the fourth annual National Black HIV/AIDS Awareness and Information Day. This day serves as a springboard for action against the devastating effects HIV/AIDS continues to have on the African-American community--stressing the need for increased awareness and testing, and access to care and treatment. Approximately **900,000 Americans** are living with HIV/AIDS--many unknowingly--and some 40,000 are newly infected with HIV every year. Minority communities are disproportionately hit by this epidemic. For example, though African Americans comprise 12 percent of the U.S. population, they comprised 51.7 percent of all estimated AIDS cases diagnosed in 2002. **HIV/AIDS is one of the top three leading causes of death for African-American women ages 25-44, and men ages 25-54**. [Excerpts, HHS Weekly Report, February 9-15, 2004, at the newsletter website at http://www.hhs.gov/news/newsletter/weekly]

Administration for Children and Families

http://www.acf.dhhs.gov

6. Head Start programs will have until June 21, 2004 to put in place **new transportation safety requirements for Head Start students**. The regulation that was to have gone into effect on January 20, 2004 requires that Head Start children ride to and from school in a vehicle which is equipped with age-appropriate child restraints systems. In addition, a person acting as a monitor would be required on every bus. Since publication of the regulation, the Department has become aware of major issues that make implementation of these requirements difficult.

Agency for Healthcare Research and Quality

http://www.ahrq.gov

7. **The health care safety net**--the Nation's system of providing health care to low-income and other vulnerable populations--was recently described as **"intact but endangered."** The Agency for Healthcare Research and Quality and the Health Resources and Services Administration are leading a joint initiative to monitor it.

Centers for Disease Control and Prevention

[Includes the Agency for Toxic Substances and Disease Registry (ATSDR), in CDC's National Center for Environmental Health]

http://www.cdc.gov

8. **Announcement and Call for Presenters**: The

Geospatial Research, Analysis, and Services Program ("GRASP") of NCEH/ATSDR announces **GIS Open House 2004**, May 5-6, 2004. At this time, GRASP would like to solicit presenters from throughout CDC, state/local health agencies, and educational institutions to present projects/research that leverage geospatial data and techniques to affect the practice of public health in powerful ways. Tracks will include themes GIS 101, Data, Research, Surveillance, GIS Systems and Interoperability, Modeling, and Cartography. Also, a Map Gallery will also be provided as a forum for poster display and discussion. Abstract submissions are open until March 15, 2004. [Contact: Andy Dent, GIS Specialist, at adent@cdc.gov]

9. From **Charles Rothwell**, NCHS: New NCHS report ***Deaths: Preliminary Data for 2002***. Note: Among other findings, this report shows an increase in the infant mortality rate … the first such increase since 1958 and the increase is statistically significant. We have done additional analyses of 2002 data which came in after the closing of the preliminary file and are convinced that the increase is real and will be confirmed in the final report which will come out in a few months. We have also examined the provisional record counts of infant deaths for 2003 and it looks as if the rate will go down for 2003 but we are unsure whether it will reach or go below the infant mortality rate for 2001. [See Health E-Stat report http://www.cdc.gov/nchs/products/pubs/pubd/hestats/infantmort/infantmort.htm]

10. CDC's new **Environmental Public Health Tracking Program**. Environmental public health tracking is the ongoing data collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards, and human health effects potentially related to exposure to environmental hazards. It includes dissemination of information learned from these data. [See: http://www.cdc.gov/nceh/tracking]

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

11. The Centers for Medicare and Medicaid Services (CMS) announced the adoption of the **National Provider Identifier (NPI)** as the standard unique health identifier for health care providers to use in filing and processing health care claims and other transactions. The standard unique health identifier is mandated by the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The NPI is a new number that will be issued through the National Provider System, which is being developed by CMS. The NPI replaces all "legacy" identifiers that are currently being used.

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

12. FDA is the Agency responsible for assuring that all FDA-regulated products remain safe and uncompromised from **Bovine Spongiform Encephalopathy (BSE) and related diseases**. Many FDA-regulated products contain bovine ingredients, for example, heart valves, ophthalmic devices, dental products, wound dressings, injectable drugs, vaccines, soups, gravies, sausage casings, and animal feeds. [See January 27, 2004 testimony of FDA Commissioner at this site]

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

13. Area Resource File CD ROM. Copies of the Access version of the **HRSA 2003 Area Resource File (ARF) CD ROM** are available for purchase. ARF is a database containing over 6,000 variables for each county in the US. ARF is used for health service research, health policy analysis, and other geographically based activities. [For details, see: http://www.arfsys.com]

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

14. **Primary Prevention Focus Areas**. Measuring health status can be a complicated and bewildering task. The best known system of measuring health in the U.S. is Healthy People 2010, which contains a total of 467 separate indicators of the health of the country. It would be impossible for Indian communities to use this entire document as their guide for improving health. However, a small subset of health indicators, called **Primary Prevention Focus Areas**, can serve as the roadmap

Indian communities need for assessing current health status, designing and implementing programs to improve health, and evaluating the effectiveness of these programs. These focus areas can be used as "building blocks for community health initiatives". [See HIS site: http://www.ihs.gov/HPDP/index.cfm]

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

15. From National Institute for Drug Abuse (NIDA): Presentation **"Physical and Mental Health Disparities among African Americans,"** James Jackson, University of Michigan, 9:30-10:30 AM, March 24, 2004, Neuroscience Center, Conference Room C, 6100 Executive Blvd, Rockville MD [Contact: Aria Crump at email acrump@mail.nih.gov]

16. A new vaccine, made with several proteins from the bacterium that causes tuberculosis, will soon enter the first phase of human safety testing. The National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, has supported research on the candidate vaccine from its earliest stages. "This is the first recombinant tuberculosis vaccine to reach human trials in the United States," says NIAID Director Anthony Fauci. "Indeed, this is the **first new TB vaccine to be tested in our country in more than 60 years**. This candidate vaccine, as well as other novel products emerging from the TB research and development pipeline, offer hopes for reducing the burden of a disease that claims some two million lives each year." [See: HHS Weekly Report 1(95) 2004 at the HHS News website http://www.hhs.gov/news/newsletter/weekly]

17. From **Ronald Abeles**, Office of Behavioral and Social Research (OBSSR), Office of the Dir: The website http://obesityresearch.nih.gov presents information about NIH-supported research to facilitate progress towards **obesity prevention and treatment**. Through its research mission, the NIH seeks to identify genetic, behavioral, and environmental causes of obesity; to understand how obesity leads to type 2 diabetes, cardiovascular disease, and other serious health problems; and to build on basic and clinical research findings to develop and study innovative prevention and treatment strategies. The NIH, other federal agencies and public and private organizations will all play important roles in reducing the epidemic of obesity in the U.S. [Contact: Ron at abeles@nih.gov]

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

18. The searchable **Prevention Registry**, Center for Substance Abuse Prevention (CSAP) now includes descriptions of prevention programs and initiatives submitted by their developers. Although maintained by a Federal Agency, the **Prevention Registry** encourages registration of programs from any source, public or private. CSAP does not necessarily endorse the efficacy of these programs. You will be able to search the registry by searching various fields. For example: Name of Program; **Geographical Location**; Target Population; Types of Interventions Used; and Number of completed evaluations.

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. **New Census File Tracks the Nation's Occupations-Where Workers Work and Live**. How many New York City taxi drivers and chauffeurs live in Jersey City, N.J.? What do they earn, how old are they and what is their gender and race? And how about geological and petroleum technicians living in Arlington, Texas, who work in Dallas? The answers can be found in the ***Census 2000 Special Equal Employment Opportunity (EEO) Tabulation*** (publicly released December 29, 2003). [See http://www.census.gov/hhes/www/eeoindex.html].

The Census 2000 file contains data on the number of people employed in nearly 500 occupations, from actors to veterinarians. Data cover gender, race, ethnicity, education, age, industry and earnings. In addition, users may find where workers live, where they work and how many who work in one place live somewhere else. Summary geographic levels include the nation, states, metropolitan areas, counties and places with populations of 50,000 or more.

In addition, a new Census 2000 EEO data tool showing occupation information by where workers live or where they work is available on the Census Bureau's Web site at www.census.gov. All of the tabulations, including the characteristics of workers, as well as the files showing the flow of workers from residence to

workplace, are available on CD-ROM.

Four federal agencies that play major roles in enforcing antidiscrimination laws and regulations in the workplace sponsored the special tabulation. They are the **Equal Employment Opportunity Commission**, the **Department of Justice**, the **Department of Labor's Office of Federal Contract Compliance Program** and the **Office of Personnel Management**. The agencies use these data to help monitor hiring practices. They compare the sex and race composition of the workforce by occupation with the corresponding composition of the labor pool in the same area.

[Note: The Census 2000 Special EEO Tabulation CD-ROM is available, for a fee, in either ASCII or SAS format from the Census Bureau's Customer Services Center on (301) 763-INFO. The CD-ROM contains data and technical documentation, but no software]

20. **Summary of Recent Congressional Activity: Report on Legislative Activities 2004** (NCHS reporting, excerpts). Legislators have introduced an assortment of bills directed toward a variety of health promotion objectives. For example, far-reaching bills (S.1833/ H.R.3459) containing a range of proposals to improve the **health of minority populations** have been introduced in both chambers. The bills also include a proposal to reauthorize NCHS through 2010; the Office of Minority Health would also be reauthorized.

Among the bills' many provisions are a number related to data, including provisions requiring HHS and the Secretary to: -Increase data collection on incidence, prevalence, and circumstances of diseases and adverse events experienced by adults and adolescents that may be associated with **immunizations**; -improve research and data collection related to the **health and environment** of minority, low income, and Native American populations; -collect data on the prevalence and severity of asthma, including telephone surveys and facility specific surveillance, and compile and annually publish data on the prevalence of **children suffering from asthma** in each state and the childhood mortality rate associated with asthma nationally and for each state; -for health programs operated by or receiving funding from HHS, require the collection of **data on race, ethnicity, and primary language** of applicants for health-related assistance under the programs, and protect such data consistent with the HIPAA Privacy Rule; -develop and implement a national plan to improve the collection, analysis, and reporting of racial, ethnic, and primary language data at federal, state, and local levels, obtaining recommendations on the plan from the HHS Data Council and the National Council on Vital and Health Statistics (NCVHS), and other groups; and -provide technical assistance, through the Agency for Healthcare Research and Quality (AHRQ) and in coordination with the Centers for Medicare and Medicaid Services (CMS), to HHS agencies in meeting **racial, ethnic, and primary language data collection standards** and in analysis of **racial and ethnic disparities in health and healthcare** in public programs. No action has been taken on these bills which have not yet gained bipartisan support.

A bipartisan diabetes prevention and treatment bill (S. 1666) introduced in the Senate includes a strong data component. It would: -require the Secretary to collect, analyze and publish biennial data on the **prevalence and incidence of diabetes**, including improving mortality data collection by assessing diabetes as a primary or underlying cause of death and analyzing under reporting to provide an accurate estimate of deaths, and permitting the Secretary to promote the addition of language to death certificates to improve collection of diabetes mortality data; -require the Secretary to give priority to activities that **reduce disparities in diabetes prevention and care for high risk or underserved populations**, which may include fine-tuning the National Health and Nutritional Examination Survey (NHANES) to address the lifestyles of such populations and strategies to enhance the quality of diabetes-related morbidity and mortality data for such populations; and -require the Director of CDC to submit an annual report that, among other things, assesses the accuracy of diabetes data. Bills have been introduced in both chambers to address the problem of **premature births and pregnancy-related deaths**.

One bill would charge NIH and CDC with expanding research and other activities related to **preterm births and infant mortality**. The National Institute for Child Health and Development's (NICHD) current responsibility to conduct a longitudinal study of the impact of **environmental influences on children's health and development** (mandated in the Children's Health Act of 2000) would be expanded to incorporate the **impact of assisted reproduction technologies on maternal and child health** and development. Another pair of bills would address the preterm birth problem by

giving states **new options to cover pregnant women under Medicaid and SCHIP**. No action has occurred on these bills. [Source: Kathy Moss, Program Analyst, NCHS, at KMoss@cdc.gov]

21. **Characteristics of American Indians and Alaska Natives by Tribe and Language: 2000**- A two-volume report (released December 30, 2003) on both the 100-percent and sample questions for respondents who reported as American Indian or Alaska Native and specified only one American Indian or Alaska Native tribe that met a specified threshold. Sample subjects include American Indian and Alaska Native languages; family and household size; educational attainment; disability status; journey to work; income in 1999; poverty in 1999; units in structure; house heating fuel; vehicles available; value of home; telephone service available; selected monthly owner costs; and renter costs. These data are shown for the United States, regions, divisions, states, and selected metropolitan areas. This report [see http://www.census.gov/census2000/pubs/phc-5.html] is a companion to the Census 2000 American Indian and Alaska Native Summary File (AIANSF). It is somewhat similar to the 1990 CP-3-7, Characteristics of American Indians by Tribe and Language report.

D. Other Related Agency or Business GIS News

22. From **Mark Reichardt**, Open GIS Consortium, Inc: At meetings held at United Nations Headquarters, OGC members approved the OpenGIS(R) Location Services (OpenLS™) Specification for public release (See the OGIS site http://www.opengis.org/specs/?page=specs). The OpenLS Implementation Specification defines a set of core interfaces for implementing interoperable location service applications. The core interfaces are for accessing directory services (such as yellow pages), route determination, as well location determination gateway, geocoding, reverse geocoding, and portrayal services using standard Web protocols. The interfaces allow telecommunications companies, telematics service providers, traditional GIS technology companies, and location-based services (LBS) providers to efficiently implement interoperable LBS applications that seamlessly access multiple content repositories and service frameworks that work across the world's many different wireless networks and devices. [Contact: Mark 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 **Russell Kirby**, University of Alabama at Birmingham: Are you aware of any software that can convert ZIP+4 values to lat-longs? I have a student who is preparing to do a dissertation analysis involving multi-level modeling, linking patient level data with census tract level data by lat-lons. We have a number of records for which we can match the addresses to ZIP+4 but not to the address database we currently have - about 80% of the records geocode directly in ArcView StreetMap 2000 (and naturally we don't have funds to acquire an update, but in any event these clinical records are from 1997-2001). Any advice or suggestions will be appreciated. [Contact: Russ, Professor, Department of Maternal and Child Health, at rkirby@uab.edu]

Early Response-**Fred Broome** (GIS Consultant): My response is more by way of a question: Do you need the implied increase in positional accuracy that geocoding to a ZIP+4 would get? Without knowing more about the dataset and given (1) there is no readily available ZIP+4 centroid file, e.g., inexpensive, if at all and current, (2) most existing geocoding software [absent an accurate ZIP+4 centroid file] will assign a lat/lon based on address range and some offset, not actual location of addressed structure, (3) high positional accuracy is not only expensive, it begs questions such as, front door vs. center of structure footprint, location of apartment within structure vs. structure coordinate, and so forth, and, finally, (4) the U.S. Census Bureau has begun suppressing selected +4 information when the range of addresses assigned to the +4 info only includes one house, thereby making coding using their files at +4-level questionable, then, why not just code to address? Dr. Kirby stated, "We have a number of records for which we can match the address ..." If all one has is ZIP+4 without structure number and street designation, then there is a problem, but if the structure number and street designation are available, one can use existing geocoding packages such as ArcView against current TIGER/Line files. [Contact: Fred at fred.broome@att.net]

From **Juan Chaviano**, Central Province of Hygiene and Epidemiology in Cienfuegos Cuba: Licenciada (MA) Chaviano Quesada asked that I bring the following work to the attention of the Public Health GIS Users Group. Though not created with GIS, it is a spatial statistical

analysis (with map) of low birth weight by various small area political, health and economic geographies in Cienfuegos Province- **"Distribution of low birth weight by selected characteristics of areas in Cienfuegos Province, Cuba,"** Quesada JC and Rodriguez MGF, *Rev Cubana Aliment Nutr* 15(2):101-108 2001 [Contact: Lic.Juan Chaviano at chaviano@hecf.cfg.sld.cu]

IV. Public Health GIS Presentations and Literature

NCHS Cartography and GIS Guest Lecture Series (live at NCHS)

March 25, 2004 (save date). **"Mapping Environmental Indicators: A Demonstration of Dynamic Choropleth Maps (DC Maps), a Java-based Web Application,"** William P. Smith, Ph.D., Senior Statistician, Computer Scientist, U.S. Environmental Protection Agency. **Abstract**: This is a demonstration of Dynamic Choropleth Maps (DC Maps), a dynamic Web-based geographic mapping tool that the U.S. Environmental Protection Agency (U.S. EPA) uses for visualizing possible relationships between environmental, health, and demographic indicators. Interactive visualization focuses on using map slider controls to make spatial contexts and data interactions visible. This tool can be used to visualize environmental indicators spatially and to allow one to interact with up to three indicators at once for dynamic real-time map rendering. Patterns that would be almost impossible to discern from static maps may become apparent through dynamic views of these indicators on a choropleth map. Multiple indicators may be selected for mapping from a list of over 300 data sets. Data are displayed using a county-level choropleth map of the United States. A choropleth map displays numerical data for geographic areas by sorting the data into classes and assigning each class a color on the map.

DC Maps can be used to create quick map-based displays or to identify possible associations between indicators for further study. For each indicator displayed on the map, a slider bar allows the user to condition or filter the data to observe possible relationships between the indicators. As the sliders are moved, the map is updated instantly to reflect interactions in the data. This enables the user to see, for example, the change in the distribution of chemical releases as the user varies poverty rates. The list of indicators can be customized to reflect user needs. Also, the geographic boundary data can be varied to accommodate these needs and display alternative data sets.

Currently DC Maps displays environmental, health, demographic, and economic data at the county level from a number of key sources, including the following. The data used for the indicators listed are available for export and use outside DC Maps: Census 2000 Demographic Data; HHS Health Indicators; NCI Cancer Mortality Data; U.S. EPA Toxics Release Inventory, Air and Water Quality Data; and Other Economic, Labor, Agricultural, and Health Statistics. **NCHS mortality data will be shown as well**. [Contact: Will at smith.will@epamail.epa.gov]

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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 February and March editions, the former devoted mostly to SARS and the latter to a wide range of topics including syndromic surveillance, are available at the CDC EID website http://www.cdc.gov/ncidod/EID/index.htm].

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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]: Note: Efforts are made to include themes that lend themselves to spatial distribution. Vol. 53(7). Asthma Prevalence and Control Characteristics by Race/Ethnicity United States, 2002; Vol. 53(6)- Disparities in Premature Deaths from Heart Disease, 50 States and the District of Columbia, 2001; Release of Interactive Atlas of Reproductive Health; Vol. 53(5)-Brief Report: Global Polio Eradication Initiative Strategic Plan, 2004; Vol. 53(3)- 40th Anniversary of the First Surgeon General's Report on Smoking and Health; Prevalence of Cigarette Use Among 14 Racial/Ethnic Populations, United States, 1999--2001; State Medicaid Coverage for Tobacco-Dependence Treatments, United States, 1994--2002; Economic Costs Associated with Mental Retardation,

Cerebral Palsy, Hearing Loss, and Vision Impairment; Vol. 53(1)- see Medical Expenditures Attributable to Injuries, United States, 2000; Neonatal Vaccination Workshop; Vol. 52(53)- State-Specific Prevalence of Current Cigarette Smoking Among Adults, United States, 2002; Update: Influenza-Associated Deaths Reported Among Children Aged <18 Years, United States, 2003--04 Influenza Season

Titles

- **Physician accessibility: an urban case study of pediatric providers**, Guagliardo MF, Ronzio CR, Cheung I, Chacko E and Joseph JG, *Health & Place*, In Press, Corrected Proof (Available online 19 February 2004);

- **Geocoding crime and a first estimate of a minimum acceptable hit rate**, Ratcliffe JH, *Int. J. Geogr Info Sci* 18(1):61-72 JAN-FEB 2004;

- **GIS, cartography, and the "third culture": Geographic imaginations in the computer age**, Sui DZ, *Prof Geogr* 56 (1): 62-72 FEB 2004;

- **Geographic distribution of prostate cancer incidence in the era of PSA testing, Connecticut, 1984 to 1998**, Gregorio DI, Kulldorff M, Sheehan TJ, Samociuk H, *Urology* 63(1):78-82 JAN 2004;

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- **On digital soil mapping**, McBratney AB, Santos MLM, Minasny B, *Geoderma* 117 (1-2): 3-52 NOV 2003;

- **Occurrence and distribution of Anopheles (Diptera : Culicidae) larval habitats on land cover change sites in urban Kisumu and urban Malindi, Kenya**, Jacob BG, Regens JL, Mbogo CM, Githeko AK, Keating J, Swalm CM, Gunter JT, Githure JI, Beier JC, *J Med Entomol* 40 (6):777-784 NOV 2003;

- **An analysis of emergency map symbology**, Dymon UJ, *Int. J. Emergency Management* 1(3):227-237 2003;

- **A geospatial study of the potential of two exotic species of mosquitoes to impact the epidemiology of West Nile Virus in Maryland**, Kutz FW, Wade TG, Pagac BB, *J Amer Mosquito Contr Assoc* 19(3):190-198 2003;

- **Marginalization and health geomatics**, Alexander GL, Kinman EL, Miller LC, Patrick TB, *J Biomed Inform* 36 (4-5): 400-407 AUG-OCT 2003;

- **Using geographic information systems to assess risk for elevated blood lead levels in children**, Roberts JR, Hulsey TC, Curtis GB, Reigart JR, *Public Health Rep* 118 (3): 221-229 MAY-JUN 2003.

New Book

Brookmeyer R, Stoup DF. **Monitoring the Health of Populations: Statistical Principles and Methods for Public Health Surveillance**. Oxford University Press (See: http://www.oup.com/us/?view=usa, 0195146492, 390 pages), 2003. Advances in statistical techniques, computing power and the Internet have led to an

explosion of new approaches to monitoring population health, analyzing the data, and rapidly sharing it. This text explores the critical issues in the statistical analysis and interpretations of health surveillance data. It will serve as a reference for public health practitioners and as a textbook for students of statistics, biostatistics, epidemiology or public health taking courses on disease surveillance.

Contents: Foreword by Stephen Thacker and Jeffrey Koplan; 1. Public Health Surveillance in Action: A Framework, Donna Stroup, Ron Brookmeyer, William Kalsbeek; 2. The Use of Surveys in Public Health Surveillance: Monitoring High Risk Populations, William Kalsbeek (UNC); 3. Exploring Temporal and Spatial Patterns in Public Health Surveillance Data, Owen Devine (CDC); 4. Temporal Factors in Public Health Surveillance: Sorting Out Age, Period, and Cohort Effects, Theodore Holford (Yale U); 5. Temporal Factors in Epidemics: The Role of the Incubation Period, Ron Brookmeyer; 6. Using Public Health Data to Evaluate Screening Programs: Application to Prostate Cancer, Ruth Etzioni, Larry Kessler, Dante di Tommaso (Fred Hutchinson Cancer Research Center, all); 7. Detecting Disease Clustering in Time or Space, Lance Waller (Emory U); 8. Outbreak Detection: Application to Infectious Disease Surveillance, Paddy Farrington, Nick Andrews (PF: The Open U, UK; NA: Communicable Disease Surveillance Center, UK); 9. On-line Monitoring of Public Health Surveillance Data, Peter Diggle, Leo Knorr-Held, Barry Rowlington, Ting-li Su, Peter Hawtin, Trevor Bryant (Lancaster U, all except TB, who is with the U Southampton); 10. Bayesian Hierarchical Modeling of Public Health Surveillance Data: A Case Study of Air Pollution and Morality, Scott L. Zeger, Francesca Dominici, Aidan McDermott, Jonathan Samet (Johns Hopkins U, all); 11. Some Considerations in Spatial-Temoral Analysis of Public Health Surveillance Data, Andrew Lawson (U South Carolina); 12. Ecologic Inference Problems in the Analysis of Surveillance Data, Sander Greenland (UCLA); 13. Completeness of Reporting: Capture-Recapture Methods in Public Health Surveillance, Ernest Hook, Ronald Regal (EH: U California, Berkley; RR: U Minnesota, Duluth).

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Centennial Meeting of the
Association of American Geographers
March 14-19, 2004
Section on Medical Geography (selected papers)

A Climatic Analysis of Lyme Disease in the United States, Sharon Trotter, U GA; A Geographically Weighted Regression Analysis of Bladder Cancer Mortality, David Wheeler, Ohio State U; An Analysis of the Spatial Distribution of Lead Poisoning in Memphis, TN, Christopher Stanfield, U Memphis; An Online Multiscale Spatial-Temporal Infectious Disease Atlas, Lee De Cola, US Geological Survey; Area-based deprivation and its effect on cancer survival, David Gregorio, U Connecticut; Area effects on health variation over the life-course in England and Wales 1939-1991, Sarah Curtis, U London; A Spatial Database for Measuring Physical Characteristics of Trails: Methods for Physical Activity Research, Ellen Cromley, U Connecticut; Association of Soil and Leaf Litter Moistures with Nymphal Deer Tick (Ixodes scapularis Say) Activity, Peter Gogol, U Kansas; Associations between Daily Ambient Air Pollutant Concentrations and Daily Asthma Hospital Admissions; Montreal 1992-1999, Kim Deschamps, U Alberta; A Tale of Two Cities: SARS in Beijing and Toronto, Paul Frederic, U Maine; Cardiovascular Disease and Food Consumption: Regional Variations and Socio-Cultural Context, Akihiko Michimi, Cal State U, Los Angeles; Comparison of Getis and Ord G* statistics between point and polygon representation using cancer data, Marsaili Aspinall, Montana State U; Design Problems for a Revised Software Model for Mapping Disease Rates (DMAP III), Chetan Tiwari, U Iowa; Diabetes in the United States: An Analysis of Spatial Variations by States, Monique Hernandez, Cal State U, Los Angeles; Distance Effects on Birth Control Choices in the Ecuadorian Oriente, Christine Erlien, U North Carolina; Distribution of Nutritional Levels Among Age, Gender, and Geographic Location : An Indian Case Study, Emily Sjostrom, U Memphis; Effects of network topology of human connection on spatial and temporal dispersion of infectious diseases, Ling Bian, SUNY, Buffalo; Emerging Roles of GIS in Public Health Care Planning: A US Perspective, Gregory Elmes, West Virginia U; Evaluating spatial correlation between two groups of values points using surface comparison, Xun Shi, Dartmouth College; Geographic clustering of hospitalization visits by asthmatic children in Buffalo Neighborhoods near a U.S.- Canada Border Crossing Point, Tonny Oyana, Southern Illinois U; Geographic Clustering of Residence in Early Life and Subsequent

Risk of Breast Cancer, Daikwon Han, U Buffalo; Geography Based Assessment of Lead Contamination in Syracuse, NY, Daniel Griffith, U Miami; GIS as a Health Districting Analytic, Wayne Gearey, U British Columbia; Health Inequalities in a 'Mobile' City: Women's Health and Migration in New York City, Sara McLafferty, U Illinois; Homicide clusters in Los Angeles County: the importance of community characteristics, Paul Robinson, California State U, Northridge; Housing age, housing condition and childhood blood lead levels in Erie County, New York, Francis Boscoe, New York State Department of Health; paper Identifying Marginalized Populations in Boone County Missouri with GIS, Edward Kinman, Longwood U; Impact of Definitional Issues on Estimates of Community Variables in Epidemiological Research, presenter Zarija Tatalovic, USC; Improving Accessibility to Health Care in Rural Honduras, Jonathan Baker-U Cincinnati; Is it possible to know the shape of place based risk factors influencing disease outcomes? - Identifying consistent patterns of place-based risk factors affecting disease outcomes using Markov Chain Monte Carlo methods, Aniruddha Banerjee, Pacific Institute of Research and Evaluation (PIRE); Medical Geography over 50 years: what would Jacques May study about emerging diseases?, Melinda Meade, UNC Chapel Hill; Mental Health Reform and Mental Health Geographies: Core/Suburban Patterns of Service Use in Winnipeg 1985-2000, Geoffrey DeVerteuil, U Manitoba; Minority report: trends in Latino health status indicators in the Southeastern United States, Jonnell Allen, UNC Chapel Hill; Modeling the Spatial Distribution of Buruli Ulceration in Equatorial Africa: A Remote Sensing and GIS Approach, Minhe Ji, U North Texas; Monitoring Peanut Quality and Predicting Health Risk in Africa Using GIS and Satellite Data, Vijendra Boken, UGeorgia; Perception of Risk to HIV in Low Socioeconomic Income Areas of Lilongwe, Malawi, Jayati Ghosh, Dominican U California and Ezekiel Kalipeni, U Illinois; Predicting Human West Nile Infection, Stephen Guptill, US Geological Survey; Public health consequences of sparse population distribution, Max Lu, Kansas State U; Reconstructing the Spatial Epidemiology of SARS, Jonathan Mayer, U Washington; Reducing mosquito-borne virus vulnerability in equine populations through GIS-based management strategies, Sara All, Western Kentucky U; Remote Sensing of Coastal Habitats for Mosquito Surveillance and Control , Thomas Allen, Old Dominion U; Residential Segregation and Low Birth Weight: Discrete or Continuous?, Sue Grady, Hunter College; Risk Zones of Waterborne Diseases in Beira, Mozambique, Franklin Graham, West Virginia U; Seasonal association between child blood lead levels, fine atmospheric particulates, and soil moisture in Indianapolis IN and Syracuse NY, Mark Laidlaw, Indiana U and Gabriel Filipelli, Purdue U; Service Rich and Service Poor Communities across Canada: Does Access Matter?, Mark Rosenberg, Queen's University; Spatial Analysis in Vaccine Trials: Spatially Heterogeneous Efficacy and Spatial Effect Modifiers, Michael Emch, Portland State U; Spatial and temporal association between remotely sensed agricultural patterns and malaria transmission in Mali, Maria Diuk-Wasser, Yale University; Spatial and Temporal Variability of the Aedes albopictus Mosquito in Hawaii, Korine Kolivras, U Arizona; Spatial Configuration of Malaria Risk Profiles In The Brazilian Amazon, Marcia Castro, Princeton U; Spatial distribution of drug resistant (*Pyrazinamide*) Mycobacterium tuberculosis in Quebec, Canada, Kevin Henry, McGill U; Spatially explicit, individual-based simulation of transmission and control of SARS, Yuxia Huang, SUNY Buffalo; Temporal Changes in Elevated Childhood Blood Pb Levels in the 1990's in Syracuse, NY, Andrew Hunt, UNYSPEC; Temporal Climate Patterns Associated with Hantavirus Pulmonary Syndrome in the Western United States, Heather Conley, U Iowa; The Association Between Air Quality and Health in a Designated 'Area of Concern': The Case of Windsor, Ontario; Isaac Luginaah, U Windsor; The Evolving Distribution of Celiac Disease: Where Genetics and Food Habits Intersect, Gina Thornburg, Cal State U, Northridge; The geography of gender and HIV risk in Cuba and Jamaica, Cynthia Pope, Central Connectucut State U; The Geography of HIV Prevention for Asian/Pacific Islanders, Lois Takahashi, UCLA; The Geography of Infant and Child Deaths in Toronto, 1901: Public Health and the Urban Environment, Michael Mercier, McMaster U; The geography of malaria in a tropical island nation: A GIS/RS approach to risk and vulnerability, Sandy Johnson, Xavier U; The Geography of Molecular Strains of Tuberculosis in Tarrant County, Texas, Joseph Oppong, U North Texas; The Geography of Tuberculosis Risk within a Homeless Night Shelter in the City of Fort Worth, Curtis Denton; The HAPiNZ Project: Health and

Air Pollution in New Zealand, J Wilson, U Canterbury (NZ); The Influence of Neighborhood Environments on the Prevalence of Childhood Asthma in New York City, Jeffrey Osleeb, CUNY; The Influence of Neighborhood Environments on the Prevalence of Childhood Asthma in New York City, Jeffrey Osleeb, CUNY; The Political Ecology of Lead Poisoning: Urban and Rural Case Studies, Carol Hanchette, U Louisville; The provision of adequate elder health care for ethnic communities in Los Angeles County, Regan Maas, Cal State U, Northridge; The Relationship between Landcover and West Nile Virus in South Dakota, Christopher Barnes, South Dakota State U; The Rise and Spread of SARS, Clifton Pannell and Alan Langford, U Georgia; The Social Epidemiology of Tuberculosis Transmission in a Homeless Shelter Courtney Queen; The Spatial clustering of West Nile Virus Cases in the Chicago 2002 Outbreak, Carmen Tedesco, U Illinois Urbana-Champaign; The Spatial Distribution of Chronic Obstructive Pulmonary Disease in California, Robert Lipton, Pacific Institute of Research and Evaluation (PIRE); The Spatial Dynamics of Poliomyelitis in the USA: From Epidemic Emergence to Retreat, 1910–71, Trevelyan Barry, U Nottingham; The Use of a Geographic Information System (GIS) and Satellite Remote Sensing for Small-Area Mortality Analysis, James Holt, Centers for Disease Control and Prevention; Urban Neighbourhoods and Long Term Home Care: Deciphering the Importance of Residential Location, Janine Wiles, McGill U; Using Geographic Information Systems to Identify Places in Rural America at Risk of Not Being Able to Support Adequate Health Services, Michael Shambaugh-Miller, from U Nebraska Medical Center; Using GIS to Identify the Spatial Origin of Epidemics in New Orleans, Andrew Curtis, LSU; Using spatial analysis Geographical Information Systems in process evaluation of large-scale HIV/AIDS prevention programs, Itamar Katz, Cambridge U, UK; Variations in Travel Patterns for Obstetrical Services, Tanya Morgan, West Chester University; Women's Roles, Women's risk: A Genderized Meta-Analysis of Heat Wave Mortality, Karen Smoyer-Tomic, U Alberta. [For complete program listings see 100th annual AAG meeting program at http://www.aag.org]

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Special GIS-EPI Commentary

Nancy Krieger, Department of Health and Social Behavior, Harvard School of Public Health (reprinted courtesy Lippincot, Williams and Wilkens, **Place, space, and health: GIS and epidemiology**, ***Epidemiology* 14 (4): 384-385 JUL 2003, *Commentary***. **Place. Area. Neighborhood. Latitude. Longitude. Distance.** These geographic terms are increasingly finding their way into the epidemiologic literature, as advances in geographic information system (GIS) technology make it ever easier to connect spatially referenced physical and social phenomena to population patterns of health, disease, and well-being.[1-3]

Indeed, links between location and health have long captured the imagination of perceptive observers. Consider the Hippocratic treatise, "Airs, Waters, and Places," written about 2,400 years ago, which roundly (and rather deterministically) declared: "You will find, as a general rule, that the constitutions and habits of a people follows the nature of the land where they live"[4 (p. 168)]. Early 19th century research decisive to epidemiology's development as a discipline[5] likewise looked to geography to discern etiologic clues.

For example, neighborhood mortality rates were linked to poverty rates[6,7] and the risk of outbreaks of yellow fever was analyzed by distance from docks.[8,9] A celebrated late 19th century text went so far as to call epidemiology the science of "geographical and historical pathology,"[10, p. 2] a definition embraced by Wade Hampton Frost[11,p.494] and other prominent epidemiologists well into the early 20th century. Yet, despite epidemiology's longstanding concern with "time, place, and person"[12] (or, perhaps more accurately, "time, place, and population"[13]), "place" had receded into the background by the mid-20th century, conceptually unmoored from increasingly influential etiologic frameworks based on characteristics of the individual.[5,13] Fortunately, GIS has contributed in recent years to a reviving awareness that any epidemiologic explanation worth its salt must encompass geographic-and temporal-variations in population health. Discussions are being enlivened by new research drawing on multilevel frameworks and methods exploring the public health salience of "place."[5,13–18]

GIS unquestionably offers epidemiology a wonderful new tool. If poorly used (or poorly made), however, a well-intended tool can do more damage than good. Underscoring this concern are two issues raised by four papers in this issue on aspects of GIS.[19–22] First, "completeness" in geocoding does not equal "success". Accuracy-and choice of geographic level-matters as

much if not more. Research from our Public Health Disparities Geocoding Project,[23] for example, has found not only significant variability in geocoding accuracy by diverse commercial firms[24] but also introduction of major bias by spatiotemporal mismatches between census-defined areas and zip codes.[25] Extending this work, Hurley et al[19] powerfully demonstrate that serious misclassification can occur if post office boxes are geocoded to their zip code centroid and then analyzed as if the centroid were where people actually live. Their study also found that persons with post office boxes differed from those with residential addresses on such key characteristics as age, race/ethnicity, and whether data on tumor stage at diagnosis were missing. McElroy and colleagues spell out the costs of attempting to geocode every single address, using multiple methods of unknown accuracy (a time-consuming strategy that cost $12,500 to geocode approximately 15,000 records[20]). A likely preferable, albeit less complete, alternative would be to use a single cost-effective method with verified high accuracy (eg, one costing approximately $550 for 15,000 addresses[24]), and then thoughtfully consider how selection bias could potentially affect results.

Second, requirements for geocoding accuracy and types of spatially linked data will vary depending on study needs. Investigations such as Floret's[21] on cancer incidence and incinerator emissions require precise distance between a given address and a specified location. Such studies can benefit from methodologic research like Bonner's[22] on positional accuracy, which reassuringly found generally good agreement between latitudes and longitudes assigned by a widely used software package and by a global positioning system receiver. Positional accuracy, however, is only one piece of the picture. Studies investigating links between an area's characteristics and health additionally face the challenge of defining relevant areas, choosing apt area-based measures, and delimiting appropriate exposure periods.[15-18,23-26] These choices depend on the study's objective, eg, enhancing public health surveillance, or delineating and testing particular etiologic pathways.[23]

In summary, and as usual, both methodological and conceptual precision matter, as does attention to practical details of cost and time. There are no ready-made answers. If GIS is to generate valid data for testing hypotheses about population health, epidemiologists will need to document the validity of our GIS methods and provide conceptual justification for the geographic levels we choose to study, as well as for the measures we employ.

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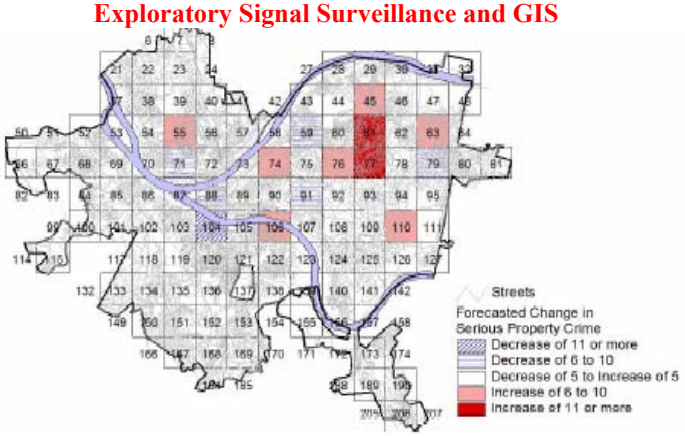
Exploratory Signal Surveillance and GIS



Application of Tracking Signals to Detect Time Series Pattern Changes in Crime Mapping Systems. Wilpen Gorr, H. John Heinz III School of Public Policy and Management Carnegie Mellon University and Shannon McKay, Department of Urban Studies and Planning, Massachusetts Institute of Technology (Revised January 22, 2004). **Abstract**. Tracking signals are widely used in industry to monitor inventory and sales demand. These signals automatically and quickly detect departures in product demand, such as step jumps and outliers, from "business-as-usual". This paper explores the application of tracking signals for use in crime mapping to automatically identify areas that are experiencing changes in crime patterns and thus may need police intervention. Detecting such changes through visual examination of time series plots, while effective, creates too large a work load for crime analysts, easily on the order of 1,000 time series per month for medium sized cities. We demonstrate the so-called smoothed-error-term tracking signal and carry out an exploratory validation on 10 grid cells for Pittsburgh, Pennsylvania.

Underlying the tracking signal is an extrapolative forecast that serves as the counterfactual basis of comparison. The approach to validation is based on the assumption that we wish tracking signal behavior to match decisions made by crime analysts on identifying crime pattern changes. We present tracking signals in the context of crime early warning systems that provide wide area scanning for crime pattern changes and detailed drill-down maps for crime analysis. Based on preliminary results, the tracking signal is a promising tool for crime analysts. [A copy of this working paper is available at http://www.heinz.cmu.edu/wpapers/detail.jsp?id=4893]

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Invited Paper

A New Approach to Measuring Spatial Accessibility of Physicians in Urban Areas

Mark F. Guagliardo[a,b,c] and Cynthia R. Ronzio[a,b,d]
[a]Department of Pediatrics, The George Washington University School of Medicine and Health Sciences, [b]Center for Health Services and Community Research, Children's National Medical Center, [c]Department of Prevention and Community Health, and [d]Department of Epidemiology and Biostatistics, The George Washington University School of Public Health and Health Services, Washington, DC. **Abstract.** It is well recognized that there is inequitable spatial distribution of healthcare providers. Yet we have a very poor understanding of the quantitative relationship between **spatial accessibility (SA)** of care and population health. How should SA be measured? What is the minimum level of SA necessary for maintenance of population health? Is there a point of diminishing returns for increasing SA level? Where does SA rank with other barriers to care? In this brief we focus on primary care, the most important type of care for overall population health, and on urban areas, where most underprivileged Americans live. We consider reasons for this lack of understanding, and briefly review common measures of SA to care. Finally, we present a new measure designed to explore SA to primary care in congested urban areas.

Introduction

For over a century distance to, and availability of

healthcare providers has been recognized as a significant barrier to healthcare access. Accumulating evidence eventually put the issue on the national agenda with the publication of the 1967 Report of the National Advisory Commission on Health Manpower, which attributed maldistribution of healthcare professionals to their preference for affluent neighborhoods. Since that time, the measurement of what is coming to be referred to as spatial accessibility (SA) to healthcare, and our understanding of its role in healthcare utilization has progressed. However, the majority of this work has concerned rural areas, where distance is an obvious impediment to access, and large geographies of mixed urban and rural areas, for which summary statistics of providers and populations are readily available and relevant for "big picture" impressions.

However, most Americans live in densely populated urban areas, where very little work on SA has been conducted. There are probably several reasons for this, one being that the popular measures of SA to care are less relevant for urban environments. The more common measures of SA are described and critiqued below, followed by a presentation of a new measure that may be suitable for urban and rural areas alike.

Common Measures of Spatial Accessibility (SA)

Most measures can be classified into four categories. ***Provider-to-population ratios*** are computed within bordered areas. Theses measures are good for gross comparisons of supply between large geographic areas. They are important because they are intuitive and are used by policy analysts to set minimal standards of local supply and identify underserved areas. However, these ratios ignore the problem of patient border crossing, which can be substantial for small geographies such as urban census tracts. Also, supply ratios are blind to within-area variations in SA.

Distance to nearest provider, and its related measure, travel time to nearest provider, may be a sufficient measure for rural areas where there are few provider choices. In these situations it is commonly assumed that patients will use the nearest provider. This assumption does not hold for urban areas, where an array of providers may be located at similar distances from any reference point.

Average distance to providers within a system, e.g. all providers in a city, is an attractive measure of SA because it combines distance and availability of provider options. Unfortunately, it over-weights the influence of peripherally located providers, who are not a practical option for distant patients.

Gravity models, also a combined indicator of distance and options, may be the most valid measures of SA. They estimate the potential spatial interaction between any population reference point and all service points within a reasonable distance. With these models SA improves as the number of provider points increases, their summed capacity for service increases, the distance to any provider decreases, or the model's travel friction coefficient decreases. The latter represents the change in strength of attraction with change in distance, and may be linear, exponential or otherwise nonlinear. However, its nature is not well understood for health services. Another problem with gravity-based SA estimates is that their scale is not intuitive. Healthcare workforce policy makers most commonly report spatial accessibility in provider-to-population ratios, despite the aforementioned difficulty of applying ratios to urban communities. A measure is needed that is as intuitive as the ratios and as relevant as gravity models.

Kernel Density–A New Approach

In 1975 Guptill used density calculations to model healthcare accessibility. To our knowledge this approach has not been revisited until recently by our lab. Density formulas "smooth" the influence of each provider location over a user-specified distance. Where the influence of multiple providers overlaps, the assigned density value is the sum of influence from all involved providers. We use the kernel density model, available in ArcGIS 8.3 Spatial Analyst for estimating map density layers. Provider influence is smoothed outward from the clinic location following a Gaussian formula. Density is highest near the location and decreases toward the user-defined limit. The computational details are explained at the web site of Quantitative Decisions, Inc., located at www.quantdec.com/SYSEN597/GTKAV/section9/density.htm. Density layers are output as a raster of cells covering the field of interest, in our case an entire city. The field cell size is user-defined.

In a pilot study we created two density layers for Washington, DC-one based on provider locations and the other based on census block centroids. In the calculations the provider locations were weighted by the number of pediatric primary care providers (PCPCs) employed

there, and the block centroids were weighted by the number of children <18 years old in the block. Both layers were output as rasters of 0.1 square mile cells. Each PCPC's influence was smoothed over a 3-mile radius, a distance suggested by a previous survey taken of underprivileged city residents. Then the Block centroids were smoothed to a radius of 1 mile. The PCPC density layer depicts supply, and represents SA of primary care for children (see Fig. 1), unadjusted for demand. The population density layer depicts demand for services (Fig. 2). Our final step was to adjust supply for demand with map algebra. We simply divided the PCPC density cell values by their corresponding population density cell values. The value of each cell in the resulting data layer (Figure 3) is a provider-to-population ratio. These were multiplied by a factor of 100,000 to scale them to units familiar to healthcare workforce policy analysts. Thus, Figure 3 depicts the demand-adjusted SA.

Fig. 1

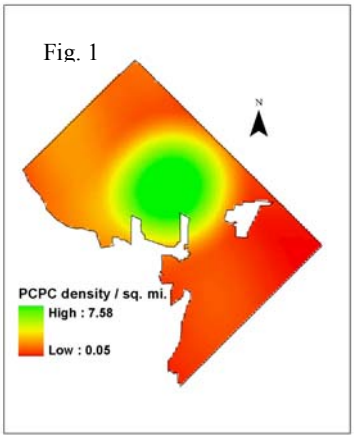
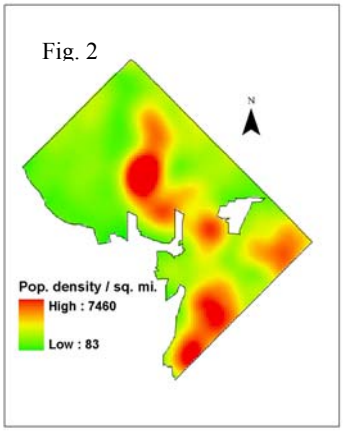


Fig. 2



The southeastern third of the city has relatively poor SA, in spite of the fact that the city's overall PCPC workforce level is high (95 per 100,000 children) by external benchmarks (45-55 per 100,000 children). We also found a strong negative relationship between SA and minority composition of neighborhoods, and a strong positive correlation between SA and neighborhood income. The findings and a discussion of their implications will be published in Guagliardo, et al. 2004. Our purpose here is to present the method and invite feedback from the readership.

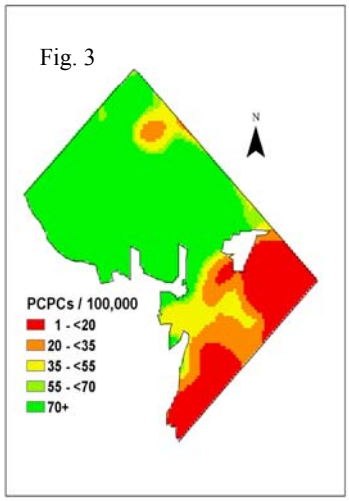
Limitations and Challenges

Analysts must specify two parameters for the density computations: smoothing radius and raster cell size. We experimented with several settings and obtained similar results. However, there is very little guidance from the literature for setting these parameters. We are planning some empirical work to gain insight, and we welcome comment on these problems.

Gaussian smoothing is the only option available in Spatial Analyst. Yet, it is not certain that Gaussian smoothing is the best technique. Just as gravity modelers must select a suitable distance decay coefficient, we too seek the most suitable shape for representing provider influence and population locations.

Also of concern is that density calculations do not take into account travel barriers and uninhabitable areas. We believe an ideal solution would involve smoothing provider and population points through transportation networks, rather than by straight-line distance as was done here. In other words provider influence would extend to all network locations within, say, 30 minutes travel time, decaying as travel time increases. We are not aware of the existence of such a density calculating algorithm, and invite reader assistance in further developing or locating software with this capability.

Fig. 3



Acknowledgements

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and Human Services Grant from ESRI, Inc., and a grant from the Child Health Center Board of Children's National Medical Center.

Suggested Reading

-Guagliardo, MF, CR Ronzio, I Cheung, E Chacko, JG Joseph (2004). "Physican accessibility: an urban case study of primary care." *Health & Place,* forthcoming; -Joseph, AE and PR Bantock (1982). "Measuring potential physical accessibility to general practitioners in rural areas: a method and case study." *Soc Sci Med* 16: 85-90; -Khan, AA and SM Bhardwaj (1994). "Access to health care. A conceptual framework and its relevance to health care planning." *Eval Health Prof* 17: 60-76; -Longley, PA et al. (2001). *Geographic Information Systems and Science.* Chichester, NY: Wiley; -McLafferty, S, D Williamson, PG McGuire (1999). "Identifying Crime Hot Spots Using Kernel Smoothing." In *Analyzing Crime Patterns: Frontiers of Practice.* V Goldsmith et al. eds., Thousand Oaks, CA: Sage Publications; -Shannon, GW, RL Bashshur, CW Spurlock (1978). "The search for medical care: an exploration of urban black behavior." *Int J Health Serv* 8: 519-30; -Shannon, GW and MP Cutchin (1994). "General practitioner distribution and population dynamics: Munich, 1950- 1990." *Soc Sci Med* 39: 23-38; -Shannon, GW, JL Skinner, RL Bashshur (1973). "Time and distance: the journey for medical care." *Int J Health Serv* 3: 237-44; -Silverman, BW (1986). *Density Estimation for Statistics and Data Analysis.* New York: Chapman and Hall.

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

New capability in MapStats, Jon Sperling (HUD)

FedStats, the gateway to statistics from over 100 U.S. federal agencies, provides community stakeholders, journalists, researchers, businesses, students, and everyday data users with one click access to key government-wide statistical data and information. MapStats eliminates the need to search multiple confusing sites to get information on income, poverty, housing, crime, education, retail sales and many other community indicators. This website integrates two award winning internet applications to provide easy access to the latest government statistics for states, counties, and cities as well as comparative statistics over time. Data for metropolitan areas, congressional districts, and federal judicial districts are also linked to this site.

The FedStats MapStats for Cities was funded, led and assisted by the U.S. Department of Housing and Urban Development/Office of Policy Development & Research (HUD/PD&R) through an interagency agreement with FedStats and the U.S. Census Bureau. This new interface seamlessly integrates and links with HUD/ PD&R's award winning State of the Cities Data System to provide current and historical federal-wide information on cities, suburbs and metropolitan areas. For those cities under 25,000 population and all other places in metropolitan areas not covered by MapStats, users can click "other places" on the city pull down menu to go directly to HUD's State of the Cities Data System.

Easy access to key indicators for states, counties, and cities is complemented by a wealth of helpful tools, documentation, and links. For example, if you don't know the county name but know a place or ZIP Code, MapStats "place search" function will not only tell you the county but will link directly to the statistics page for that state, county or city. Click the "?" to the left of any data item and get easy to read and useful documentation as well as hyperlinked sources for more information…and same for the 'browse more data sets" function.

Other useful features include **Federal Information Processing Standard (FIPS) Codes** referenced for every state, county, or city selected and thematic mapping for some data items; many more useful features are planned. Future enhancements will be based, in large part, on user feedback so go ahead, start using this site, and provide your comments. This site promises to be one of the most widely accessed government sites on the web. Get to know your community better with the e-gov application, FedStats MapStats (see website at: http://www.fedstats.gov).

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Census Survey News

Voluntary American Community Survey Would Cost $60M More Per Year, Test Shows

Mail response would drop significantly and costs would increase by almost $60 million a year if the American Community Survey (ACS) were administered on a voluntary basis, the Census Bureau reported. These and other conclusions were based on a test last year that compared voluntary response with the mandatory response being used in 31 ACS test sites and the national Supplementary Survey. Concerns over the length and content of the traditional census long form prompted Congress to request a test of how voluntary participation in the ACS would affect costs and data quality.

The Census Bureau tested two different approaches to a voluntary ACS in the March and April

2003 ACS samples, one with a standard message used in other voluntary surveys and one with a more explicit message about voluntary response. (Telephone and in-person interviews were conducted through June 2003.) One quarter of sample households received a mandatory questionnaire in the mail phase of the survey, with a portion of those receiving the current mandatory version of the ACS (for control purposes) and others receiving a "user friendly" version of the mandatory survey. However, follow-up by telephone and personal visit with unresponsive households was conducted entirely with the voluntary approach. The analysis the Bureau released last month primarily compares the standard voluntary approach with the March and April 2002 ACS samples, in which response was required by law. Future reports will analyze alternative voluntary and mandatory survey approaches from the 2003 test.

Roughly 20 percent fewer households contacted for the survey returned their form by mail when told their response to the ACS was voluntary. The absolute drop in mail response was greater for households in areas that had high response rates in Census 2000, than for households in low response areas, but the relative decrease for both types of areas was comparable. "Low response areas" are younger, more Hispanic and non-White, poorer, and less educated than "high response areas." Cooperation by mail was already significantly lower in low response areas under the mandatory survey.

Telephone response also fell, by more than 14 percent overall, when ACS participation was voluntary. The Census Bureau follows up by telephone with households that don't mail back a questionnaire. The relative decline in cooperation by telephone was greater in high response than low response areas, suggesting, the report said, a "greater impact [of the change to voluntary response]…in areas that are traditionally more cooperative." Overall, 55.7 percent of occupied households were "interviewed" by mail or telephone with the voluntary approach in the 2003 test, compared to 68.4 percent using mandatory methods in March/April 2002.

Only a portion of households that fail to respond to the ACS by mail or telephone are visited in person. In the ACS Voluntary Test, lower mail and phone cooperation increased the workload for personal visits. Nearly 7 percent fewer households that received follow-up visits responded to the voluntary survey, compared to previous results when the survey was mandatory.

The evaluation showed that the large drop in cooperation by mail and telephone under voluntary methods reduced data reliability and increased survey costs. Without an increase in the sample size, there would be a smaller number of completed interviews in a voluntary survey (1.7 million) than in a mandatory survey (2.2 million). The Census Bureau estimates it would have to increase the ACS sample by 700,000 housing units a year in order to produce data of comparable reliability to a mandatory survey, at an additional annual cost of $59.2 million. The current mandatory design would cost an estimated $155.3 million a year, compared to $214.5 million for a voluntary survey of comparable reliability.

The current ACS design includes three million housing units a year, a number the Census Bureau said is "just barely adequate" to produce data of acceptable reliability. If response to a voluntary ACS followed the patterns seen in the 2003 test, the resulting data would be as statistically reliable as data produced by a survey of only 2.4 million housing units annually, an outcome that "would not allow the ACS to produce data of sufficient quality to replace the long form," the Bureau concluded.

In addition, under the current mandatory ASC design, a higher proportion of Black and Hispanic households than households of other race groups fail to respond by mail or telephone, resulting in a larger proportion of Black and Hispanic households being subject to the one in three sampling rate for personal follow-up visits. Increasing the sample size in a voluntary survey would not overcome this problem without modifying the sample design for the personal visit phase of the ACS.

The difference in rates of item non-response under voluntary versus mandatory methods was relatively low, although statistically significant overall, suggesting that "once the respondent made the choice to participate, the data provided were nearly as complete," the report said.

Chip Walker, a majority professional staff member of the House Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, which requested the report, told the Association of Public Data Users annual conference last fall that the American Community Survey likely would be launched nationwide next year as a mandatory survey, based on the findings of the 2003 test. [The full report is available at http://www.census.gov/acs/www/Downloads/Report03.pdf]

GAO Report

Military Munitions: **DOD Needs to Develop a Comprehensive Approach for Cleaning Up Contaminated Sites** [GAO-04-147, a report to the Honorable John D. Dingell, Ranking Minority Member, Committee on Energy and Commerce, House of Representatives, December 2003]. Over 15 million acres in the United States are suspected of being, or known to be, contaminated with military munitions. These sites include ranges on closing military installations, closed ranges on active installations, and formerly used defense sites. Under the Defense Environmental Restoration Program, established in 1986, the Department of Defense (DOD) must identify, assess, and clean up military munitions contamination at these sites. DOD estimates these activities will cost from $8 billion to $35 billion. Because of the magnitude of DOD's cleanup effort, both in terms of cost and affected acreage, as well as the significant public safety, health, and environmental risks that military munitions may pose, you asked us to evaluate (1) DOD's progress in implementing its program to identify, assess, and clean up military munitions sites and (2) DOD's plans to clean up remaining sites in the future. We are recommending that DOD develop a comprehensive approach by revising its plan to (1) establish deadlines for completing its site inventory and initial evaluations, (2) reassess the timetable proposed for completing its risk assessment reevaluations, and (3) establish service-specific targets. We are also recommending that after DOD revises its plan, it should work with the Congress to develop budget proposals that will allow timely completion of cleanup activities. [http://www.gao.gov/new.items/d04147.pdf]

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]

The National Geospatial Data Clearinghouse

More than 4 billion dollars are estimated to be spent annually by the U.S. Federal Government on the production, management, and dissemination of geospatial data. Many of these funds may be expended to collect already existing data, but the ability to determine the availability and accessibility of spatial data has been restricted. The National Geospatial Data Clearinghouse is a means of finding geospatial data from a variety of governmental and non-governmental sources, determining their fitness for use, and identifying the means for obtaining, accessing, or ordering data as economically as possible.

What Is The National Clearinghouse? The Clearinghouse is a distributed, electronically connected network of geospatial data producers, managers and users. It is neither a central repository where data sets are stored nor a set of web sites referencing spatial data. **It is a federated system of compatible geospatial data catalogs that can be searched through a common interface.**

Government, academic, commercial, and non-profit organizations are now making information about spatial data, called metadata, available on the Internet in support of the National Spatial Data Infrastructure (NSDI). Executive Order 12906, signed by President Clinton in 1994, and reaffirmed in 2003, requires all Federal agencies that produce geospatial data to document new data sets produced after January 1995 using the Content Standards for Digital Geospatial Metadata (Version 1.0, 1994; Version 2.0, 1998) adopted by the Federal Geographic Data Committee.

The Executive Order also requires that **metadata** be made available through the Clearinghouse so that the government and the public can determine what geospatial data exist, the condition of these data, and how to access them. Although the Executive Order applies only to Federal agencies, a wide variety of data producers and users throughout the nation and in other countries are participating in the Clearinghouse.

How Does The Clearinghouse Work? The Clearinghouse is essentially a group of metadata collections made searchable through common protocols. Each data producer or maintainer is expected to describe available data in electronic form and prepare these descriptions (the metadata) for Clearinghouse access using a variety of free and commercially supported software tools.

One of the essential requirements of the National Clearinghouse is to support search for spatial data over the Internet. **The communications protocol known as**

Z39.50 has been implemented within the library, museum, scientific, and spatial data communities as a standard to allow searching of multiple catalogs in real-time. Metadata are managed in collections maintained by each organization, and are searchable through fields and full-text. Users build simple or complex queries to search the metadata -for example, geographic location, date of creation, or title. Most users only need a common Web browser to connect to one of several search interfaces hosted by the FGDC as search **"Gateways"** at six locations around the country. For Clearinghouse Nodes that are registered with the Geospatial One-Stop Portal, their content can also be searched through the **geodata.gov portal**.

Based on evaluation of the metadata via the search interface, a user can decide if the data or maps appear suitable to their needs and identify how the data producer provides access to the data: via order form, shopping cart, direct hyperlink download, or links to online mapping services. Where online mapping services are available, the Clearinghouse Gateways and geodata.gov portals now facilitate the display of these map datasets together with other data, without the need for special GIS client software.

Benefits. The abilities to search for spatial data and to determine their relevance are critical skills in a knowledge-driven economy. The use of geographic information systems technology is spreading, and along with it the demands for more and better geospatial data. The spatial data access utilities of the future will support an even more dynamic ability to publish, find, share, and automatically access spatial data over Web services in support of individual user and application requirements.

How To Participate? The FGDC is the primary contact organization for prospective participants in the Clearinghouse and Geospatial One-Stop Portal activities. If your organization is interested in advertising your spatial data through the Clearinghouse or Geospatial One-Stop: •Learn and use the FGDC metadata standard on data you wish to publish. •Provide public access to your collection of metadata on the Internet using ONE of the following methods: o a server (Clearinghouse Node) that supports the Z39.50 "GEO" Profile, o a service that supports the Open Archive Initiative, Protocol for Metadata Harvesting (OAI-PMH), a Web-accessible, browseable directory on your Web server that contains only FGDC metadata as XML •Use the latest version of your GIS or metadata software to manage and publish your metadata into your metadata collection. •Register your metadata collection with the NSDI Clearinghouse or the Geospatial One-Stop Portal. If you are a data user: •Provide feedback to data producers on what information about data is important to you. • Learn the basics of FGDC metadata to meet your needs •Use the Clearinghouse and the Geospatial One- Stop Portal at geodata.gov to find spatial data. [More information about the Clearinghouse and the Geospatial One-Stop Initiative as well as the geodata.gov portal can be obtained from http://geodata.gov and the http://www.fgdc.gov/clearinghouse websites; FGDC Clearinghouse Coordinator: Douglas Nebert at e-mail dnebert@fgdc.gov.

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To Appear in *Federal Register* (Mid-March, 2004)

Principles and Guidance for the Evaluation of Homeland Security Implications of Public Access to Geospatial Data [Homeland Security Working Group, Federal Geographic Data Committee]: OBJECTIVES: Provide principles and guidance for use in evaluating the need to reduce or eliminate public access to specific geospatial data for Homeland Security reasons. The guidelines provide procedures to identify sensitive information content of geospatial data sets that might significantly aid an adversary to plan or execute an attack. Should such content be identified, the guidelines help organizations select restrictions that provide access to data sets and still protect sensitive information content. SCOPE: Clarify concerns related to the homeland security implications of publicly accessible geospatial data, as well as the implications of reduced access to heretofore or prospectively publicly available geospatial data; Provide criteria for thinking about the sensitivity of a particular data holding; Identify ways that organizations can balance security concerns and public information access. [Follow development of proposed guidelines at http://www.fgdc.gov/fgdc/homeland/index.html; **Your review and comments are solicited**]

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Web Site(s) of Interest for this Edition

http://ewatch.sandiego.gov/eWatch/index.jsp All law enforcement agencies in San Diego County, including the San Diego Police Department, have developed an **Interactive Mapping Application** for citizens to use to see crime activity in their neighborhoods. Citizens can specify a geographical area, select a date range and select

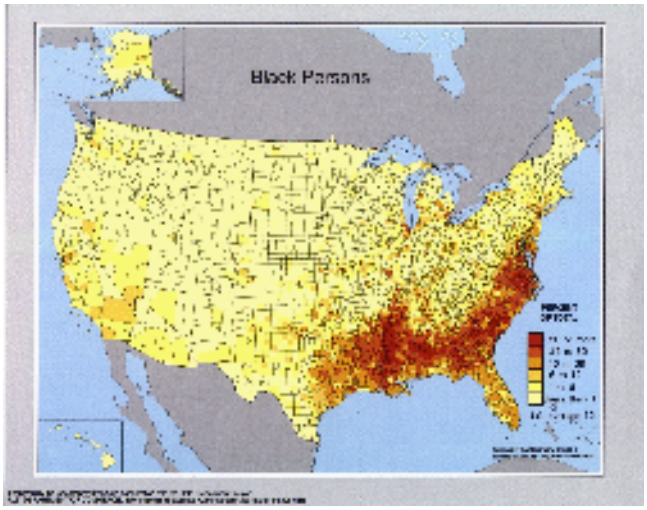
types of activity they'd like to see. Available activity includes crimes, arrests, citations, and traffic incidents. The result of an inquiry is a map of the specified activity. Citizens can click on any incident on the map to get the details of that particular incident. This site includes citizen signup for email notification of crimes linked to maps.

http://www.clark.wa.gov What is **Ortho-Photography**? The process begins with an airplane flying over the land taking a series of very high quality photos. These photos are then computer enhanced to account for the movement of the airplane, and the terrain on the ground. The result is a set of digital images that can be used with Clark County, Washington State's online Geographic Information System.

http://www.phpreparedness.info **The NYAM/NLM (New York Academy of Medicine/National Library of Medicine) Resource Guide for Public Health Preparedness** now provides access to more than 1180 electronic publications related to public health preparedness. These include articles, bibliographies, conference presentations, congressional testimony, monographs (e-books), planning and assessment documents, teaching tools and websites.

http://mapserver.gis.umn.edu MapServer is an OpenSource development environment for building spatially enabled Internet applications. MapServer is **not** a full-featured GIS system, nor does it aspire to be. It does, however, provide enough core functionality to support a wide variety of web applications. Beyond browsing GIS data, **MapServer allows you create "geographic image maps"**, that is, maps that can direct users to content. For example, the Minnesota DNR "Recreation Compass" provides users with more than 10,000 web pages, reports and maps via a single application. The same application serves as a "map engine" for other portions of the site, providing spatial context were needed. In the works are OpenGIS Consortium Web Mapping Testbed (WMT) compliance, productivity code and utilities to make developing applications even easier.

http://www.census.gov/main/www/subjects.html The U.S. Census Bureau produced four choropleth maps entitled **Race and Hispanic Origin Population Density**



of the United States: 1990 as part of the GE-90 map series (GE-90 No. 6). The four map themes are: American Indian, Eskimo, and Aleut Persons; Asian and Pacific Islander Persons; Black Persons (shown here); and Hispanic Origin Persons. Each map portrays the Race or Hispanic Origin population by county as a percentage of the total population.

Final Thoughts

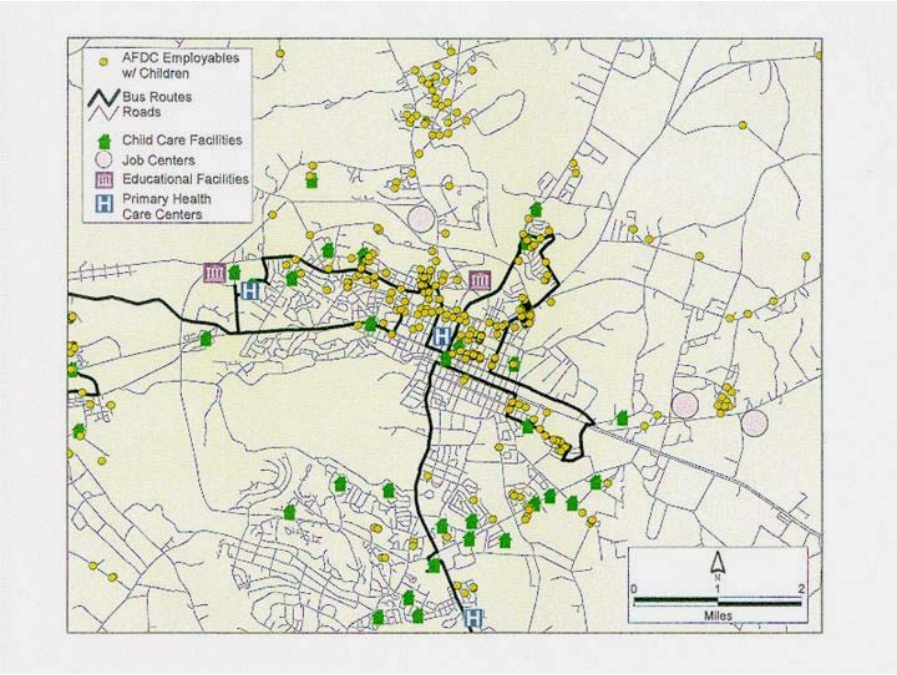
Health Disparities in the United States-
An Invitation to Display GIS Maps

I invite our Public Health GIS Users Group, especially those of you who map community and small area health events, to submit GIS maps on the important topic of health disparities in the U.S. No other group in this country is better qualified or positioned to address this invitational GIS map initiative. Moreover, there is no better mechanism to accomplish this goal than through the GIS toolkit and the display of visual evidence of space and space-time related human health inequalities. Public Health GIS Users are uniquely situated to help public health advance this crucial agenda that can benefit those whose public health burden is disproportionate to mainstream society. Overcoming health

disparities is essential to improving the health and wellbeing of our nation and incorporated into the DHHS Strategic Plan 2003-2008.

Background. GIS maps provide powerful visualizations of space and space-time relationships that cannot be conveyed through tabular information. In 1999, CDC colleague Tom Richards and I published a Roundtable (two volume reference *J Pub Health Manage Pract*, particularly vol. 5, no. 2) on the use of GIS to improve community health. It included an atlas of maps prepared by state and local health practitioners, and others, and was extremely well received by health planners, associated professionals and communities. Several of these maps addressed health disparities (theme of this current invitation) including lead poisoning, immunization and teen live births. In the below example, the map "Improving Delivery of Health and Community Services to Welfare Recipients, Columbia, South Carolina, 1997," by David Morrison, David Alexander, Jonathan Fisk and Jack Maguire, all with the Office of Research and Statistics, Columbia State Budget and Control Board, shows the critical elements required to make welfare (AFDC-Aid to Families with Dependent Children) to work reform program a success. Research has identified three main barriers to socioeconomic independence: lack of child care, lack of transportation, and lack of training.

Topics to Consider. The following list provides some suggested topics to consider for your GIS maps but is not intended to be inclusive: infant, neo and post-neonatal mortality; low birth weight; maternal and child health; social and mental health; asthma; tuberculosis; diabetes; teen and out-of-wedlock births; screening for all types of health conditions; utilization of health services; access to health care and services; domestic violence; lead exposure and poisoning; injury and homicide; occupational safety; environmental quality and exposure; extreme cold and heat; ambulatory surgery; home and hospice care; diet and nutrition; school lunch; physical activity; obesity; risk health behavior (smoking, drug use, sexually transmitted disease, HIV/AIDS, and others); hepatitis C; cancer; stroke; chronic lung disease; and underlying causes of disparity.



Guidelines for Submission. Your electronic map(s)-no hardcopy at this time-and accompanying information will be formatted to fit on one (1) page in *Public Health GIS News and Information* (for copy directly into a Word document). The **Map Title** should appear independent of the map to allow for placement near it and more space on the map face (include appropriate study measures, the study population or event, place or location of study, geographic study unit (i.e., block group), and year data collected. **Map face information** must include legend; "Data Source"; and, directional and, if appropriate, scale bar indication (small, discrete symbols). **Map design elements** (fonts, colors, symbology, neat line, etc.) are to be decided by the responsible author or agency. Provide accompanying **text**, in less than 250 words, to describe the use of this map to better understand health disparity in the community or population shown. Remember, this is the theme of the invitation. Include in your **e-mail cover letter** your title, agency and all others who you want to be recognized in the preparation of

the map(s). State the software(s) and versions used to generate the maps. Multiple maps and themes from an individual author will be considered if space permits. Maps will be reviewed by the Editor. Readability of your map e.g., clarity and comprehension, and how well it addresses the disparities theme, will be key considerations for acceptance. Map authors will be notified of acceptance for publication in *Public Health GIS News and Information*. The Editor exercises the right to reject or request editorial or stylistic change for any submission.

Timetable. Maps will be reviewed on a first-come basis. The number of submissions may dictate the schedule for publication in *Public Health GIS News and Information*. Maps could begin to be published as early as the May 2004 edition or as a special map supplement in a later 2004 edition. **Submissions are now open until further notice**. Note: Authors or lead map contacts will be notified for their concurrence in the event other third-parties express interest to the Editor in publishing the collection of maps which appear in *Public Health GIS News and Information*.

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 57th 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