

PUBLIC HEALTH GIS NEWS AND INFORMATION

September 2003 (No. 54)

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

Selected Contents: Events Calendar (pp.1-2); (pp.5-6); Public Health and GIS Literature 19); Website(s) of Interest (pp. 19-20); Final



News from GIS Users (pp.2-5); GIS Outreach (pp.6-14); DHHS and Federal Update (pp.14-22); Thoughts (pp.20-22)

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

September 16, 2003. "Biosurveillance: Applying Scan Statistics with Multiple, Disparate Data Sources", presentation by **Howard S. Burkom**, National Security Technology Department, Johns Hopkins Applied Physics Laboratory and coauthor **Eugene Elbert**, Walter Reed Army Institute of Research. See **abstract** this edition. Please join us for this NCHS Cartography and GIS Guest Lecture Series to be held at NCHS in RM1406, from **2:00-3:30PM**, Hyattsville, MD; The NCHS GIS Guest Lecture Series has been presented continuously since 1988. Envision is available to offsite CDC/ATSDR locations; Web access will be available on the Internet but only at the time of this presentation. Please contact me if you did not receive the URL. Cosponsors to the NCHS Cartography and GIS Guest Lecture Series include CDC's Behavioral and Social Science Working Group (BSSWG) and Statistical Advisory Group (SAG). [All NCHS Cartography and GIS presentations are open to the public. Contact: Editor, *Public Health GIS News and Information*]

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

* The Science of Real-Time Data Capture: Self-Reports in Health Research Conference, Behavioral Research Program of the National Cancer Institute, September 5-7, 2003, Charleston SC [See: <http://www.scgcorp.com/real-timedata03/index.asp>]

* 3rd International Symposium on Digital Earth, September 21-25, 2003, Brno Czech Republic [See: <http://digitalearth03.geogr.muni.cz>]

* XXIII annual meeting of the North American Cartographic Information Society (NACIS), October 8-12, 2003 Jacksonville, FL [See: <http://www.nacis.org>]

* GEO-INTEL 2003, October 14-17, 2003, New Orleans

LA [See: <http://www.geointel.org>]

* GeoMed03, University of Maryland Medical School, taking place October 15-17, 2003, Baltimore MD [See: <http://www.geomed03.org>]

* National Syndromic Surveillance Conference, CDC and New York City Department of Health and Mental Hygiene, October 20 – 24th, 2003 · New York, New York [At: <http://www.nyam.org/events/syndromicconference>]

* Meetings of the 2003 Southern Demographic Association, October 23-25, 2003, Arlington VA [See : <http://www.fsu.edu/~sda>]

* Ninth Annual Maternal and Child Health Epidemiology Conference, December 10-12, 2003, at Tempe, Arizona [See: <http://www.cdc.gov/nccdphp/drh>]

* Second Mid-Atlantic Land Use/Land Cover Conference, Towson University Center for Geographic Information Sciences, January 8-9, 2004, Towson MD [See: <http://cgis.towson.edu/lulc04/about.htm>]

* 21st annual Behavioral Risk Factor Surveillance System Conference, CDC, February 9-12, 2004, Scottsdale AZ [See: <http://www.cdc.gov/brfss/conference>]

* Eighth Conference on Health Survey Research Methods (CHSRM), February 20-23, 2004, Atlanta GA [See: <http://www.srl.uic.edu>]

* **Centennial** Meeting, Association of American Geographers, March 14-19, 2004, Philadelphia PA [See: www.aag.org]

* CART Data Mining Conference 2004, San Francisco, CA, March 23-25, 2004 [See conference website at: <http://www.cartdatamining.com>]

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* Seventh Annual International Crime Mapping Research Conference, National Institute of Justice's Mapping & Analysis for Public Safety (MAPS) program and formerly known as the Crime Mapping Research Center (CMRC), March 31-April 3, 2004, Boston MA [See: <http://www.ojp.usdoj.gov/nij/maps>]

II. GIS News

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

A. General News and Training Opportunities

1. Seminar Announcement: **“New Metropolitan-Micropolitan Areas: Implications for Statistical and Policy Decision Making,”** posted for November 4, 2003, Alexandria, VA, will be hosted by the Council of Professional Associations on Federal Statistics (COPAFS). Session Topics include: What We Have and Why; Using the New Classifications at the National Level; Regional Uses of the New Classifications; and Where Do We Go From Here? [To register, contact the COPAFS office at copafs@aol.com]

2. **American Community Survey (ACS) 2002 Data Are Now Available.** The U.S. Census Bureau released this month ACS 2002 estimates of population and housing characteristics for more than 800 geographical areas. The data are for the nation, states, counties and places with populations of 250,000 or more, approximately 200 congressional districts, and include narrative and tabular profiles and ranking tables. Change profiles (2001-2002 and 2000-2002) for the nation, states and areas of 1 million population or more were also released. Have you seen our new Web site? The redesigned site found at <http://www.census.gov/acs/www> was also launched September 3, 2003 and provides quick and easy access to basic survey information and statistical data. The site combines ACS and supplementary survey information in one location and includes a page on new quality measures (under "Advanced Methodology").

3. The University of Tennessee Health Science Center, the University of Arkansas School of Public Health, the Social Science Research Center at Mississippi State University, and the Memphis Regional Chamber of Commerce will hold a one-day conference in Memphis

on Thursday, November 20, 2003, titled **“Health as an Economic Engine in the Delta Region”**. The basic concept is that ill health and forms of disability act as a hindrance to economic development; they are a drain on the “health capital” of the residents of a region. There will be four separate panel presentations: What is Going on in the Delta? Health and Economic Status of the Region; Health as an Economic Engine: Why Should It Work? (Theory); Health as an Economic Engine: What is the Evidence? (Empirical); and, Where Do We Go From Here? Setting a Realistic and Actionable Research Agenda for the Delta. [Contact: **Teresa Waters** at twaters@utm.edu]

B. Department of Health and Human Services

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

More than \$30 million was awarded in grants to states to improve health care for rural Americans by strengthening rural hospital networks, supporting State Offices of Rural Health and encouraging rural health care coalitions. A complete listing of the Rural Hospital Flexibility and Offices of Rural Health grants are posted.

Administration for Children and Families

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

4. **“Strengthening Head Start: What the Evidence Shows”** is a DHHS report released in June 2003 and is at <http://aspe.hhs.gov/hsp/StrengthenHeadStart03/index.htm>.

Agency for Healthcare Research and Quality

<http://www.ahrq.gov>

5. **Grants Awarded To Help Health Care Providers Promote Healthy Behaviors Among Their Patients.** Research shows that unhealthy behaviors account for 40 percent of premature deaths in this country. More than 46.5 million American adults continue to smoke, despite the well-known risks, while nearly 14 million adults drink too much alcohol, raising their risk for liver disease, accidents, and trauma. Over 60 percent of American adults are overweight and nearly 40 percent are too sedentary-increasing their susceptibility to heart disease, diabetes, and high blood pressure.

Agency for Toxic Substances and Disease Registry

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

6. ATSDR announced on August 25, 2003, the finding of its public health consultation that **exposure to beryllium**

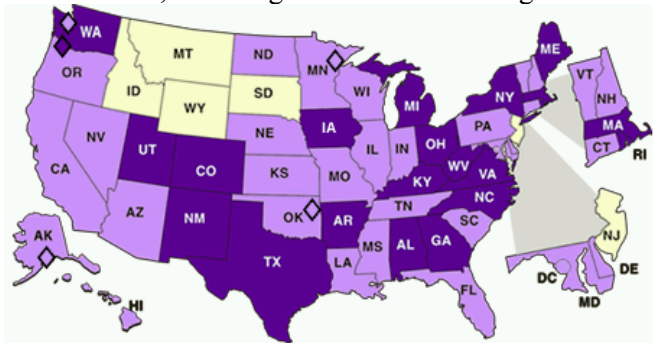
and depleted uranium, if any occurred, at the Iowa Army Ammunition Plant (IAAAP) in Middletown, Des Moines County, Iowa, was not at levels significant enough to cause a public health hazard. The agency therefore places the IAAAP site in the **no apparent public health hazard** category.

Centers for Disease Control and Prevention

<http://www.cdc.gov>

7. **Preventing Chronic Disease (PCD)**, CDC's new E-journal, announces the launch of its Web site at www.cdc.gov/pcd. The new journal will be published quarterly by the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), with the first issue scheduled for December 15, 2003. You are invited to subscribe, sign up as a peer-reviewer, or submit a manuscript. The *PCD* office may be reached at pcdeditor@cdc.gov or (404) 498-2905.

8. On June 30, 2003, CDC announced a major expansion of the **National Comprehensive Cancer Control Program (NCCCP)**-adding 26 new programs. With \$12 million this year, CDC will support 51 comprehensive cancer control capacity building programs across the United States, including 5 tribes and tribal organizations.



CCC Contacts by Funding Status [Key: ■ Funded State Programs: Capacity building for implementation. CDC has established cooperative agreements with these states for help in implementing their CCC plans; ■ Capacity building for planning. CDC has established cooperative agreements with these states for planning their CCC plans; Diamond symbols refer to Funded Tribes and Tribal Organizations; ■ Unfunded Programs. [See: <http://www.cdc.gov/cancer/ncccp/contact.htm>]

9. **CDC's Environmental Public Health Tracking Program.** CDC's goal is to develop a national network

that will (1) be standards-based; (2) allow direct electronic data reporting and linkage within and across health effect, exposure, and hazard data; and (3) interoperate with other public health systems. Environmental public health tracking [See website: <http://www.cdc.gov/ncch/tacking>] is the ongoing 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.

10. A new edition of CDC's online kids magazine, **BaM! Body and Mind**, is available at <http://www.bam.gov>. Full of exciting information and activities, this issue focuses on stress-what causes it, and what kids can do about it. New interactive features are designed to help kids determine their stress level, identify the physical and mental signs of stress, and reinforce positive coping mechanisms to deal with common situations.

The previous issue about physical activity helps kids--find out what physical activity best suits their personalities, create their own physical activity calendar, or run a hurdle race! Features address how other health areas--infectious disease, asthma, safety/injury, disability, etc. are related to physical activity. While future editions will address other interrelated health issues, the content for all editions will remain accessible on the site.

Centers for Medicare and Medicaid Services

<http://cms.hhs.gov>

11. The **Interim Final Rule for Electronic Submission of Medicare Claims** was published in the Federal Register (FR) on August 15, 2003. This interim final rule implements the statutory requirement found in the Administrative Simplification Compliance Act (ASCA). ASCA requires all claims sent to the Medicare Program be submitted electronically starting October 16, 2003.

Food and Drug Administration

<http://www.fda.gov>

12. In a comprehensive 5-part strategic action plan entitled "**Protecting and Advancing America's Health: A Strategic Action Plan for the 21st Century**," the Food and Drug Administration (FDA) outlined on August 20, 2003 how it is taking new steps to protect and advance public health for America. The plan, which sets

some new specific actions and performance measures directly related to achieving FDA's public health mission, establishes a framework for achieving five broad priority goals, one of which is Counterterrorism, for FDA. The action plan is not an exhaustive list of the Agency's many ongoing regulatory activities; rather, it highlights some of the specific steps that FDA is taking to address new challenges facing the agency.

Health Resources and Services Administration

<http://www.hrsa.gov>

13. HHS Secretary Tommy G. Thompson announced August 26, 2003 his intention to award 204 grants worth \$56.1 million that will **increase health care services to hundreds of thousands of low-income and uninsured Americans**. The grants will create new service sites in the nation's network of health centers and expand the range of health care services offered at existing health centers. Health centers deliver preventive and primary care to patients regardless of their ability to pay. Almost 40 percent of patients treated at health centers have no insurance coverage, and others have inadequate coverage. Charges for services are set according to income, and fees are not collected from the poorest clients.

Indian Health Service

<http://www.ihs.gov>

14. **Primary Prevention Focus Areas: Access To Healthcare**. American Indians and Alaska Natives face multiple challenges in accessing care, including lack of fiscal resources, transportation and remoteness of communities. The Indian Health Service is working to meet these challenges in ways such as **telemedicine and mobile mammography**.

National Institutes of Health

<http://www.nih.gov>

15. **NIAID Opens Innovative Treatment Study for West Nile Virus**. A clinical trial evaluating an experimental treatment for patients infected with West Nile virus (WNV) has begun enrolling volunteers at 36 sites nationwide, the National Institute of Allergy and Infectious Diseases (NIAID), one of the National Institutes of Health, announced September 8, 2003. This study is part of a larger effort by NIAID to develop new ways to prevent and treat the disease.

Substance Abuse and Mental Health Services Administration

<http://www.samhsa.gov>

16. **22 Million In U.S. Suffer From Substance Dependence or Abuse**. In 2002, an estimated 22 million Americans suffered from substance dependence or abuse due to drugs, alcohol or both, according to the newest results of the Household Survey released September 5, 2003 by the Substance Abuse and Mental Health Services Administration in the Department of Health and Human Services (HHS). There were 19.5 million Americans, 8.3 percent of the population ages 12 or older, who currently used illicit drugs, 54 million who participated in binge drinking in the previous 30 days, and 15.9 million who were heavy drinkers.

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>]

17. Appreciation is extended to Howard University Urban Environment Institute, the Office of Surface Mining/Department of Interior, the Washington GIS Consortium at the National Capital Planning Commission, ESRI, Dr. Peggy Berry, Howard University Continuing Education (HUCE) Director, and Pamela R. Bingham, GIS Coordinator for instrumental commitment to the **2003 HBCU Summer GIS Workshop** for minority faculty and students. Pamela R. Bingham, HUCE GIS Coordinator is also Program Manager, Bioterrorism Grant, Environmental Health and Bioterrorism Task Force (EHBTF), of the National Medical Association. Faculty and graduate students participated from Alabama A&M University, Coppin State University, Howard University, Florida A&M University, Southern University (New Orleans), Southern University (Baton Rouge), Jackson State University, Dine College (a 2 year tribal college) Dr. David Padgett of Tennessee State University, as well as staff of BLM, ESRI, NCPC, USGS, and the Census Bureau, presented and coordinated GPS field exercises. [Contact: Pamela at Howard University Continuing Education, 301-585-2295, environmentally1@aol.com]

D. Other Related Agency or Business GIS News

18. **An Opportunity to Move Sensor Web Specifications Forward**. In working to define interface

specifications to enable connection to disparate sensor webs, the Open GIS Consortium, Inc. (OGC) has developed something of extraordinary social and commercial value, a perfect example of the power of open IT infrastructure. Applications ranging from environmental monitoring and traffic monitoring to emergency response and disaster management will reap extraordinary benefits from an open, global standards framework for exploiting real time, connected in-situ (in place) and dynamic (moving) sensors.

Much work has already been done. The challenge now is for OGC members and industry to mature and marshal these specifications through the Consortium's consensus process. As the OGC membership adopts interface specifications, sensor networks will be more and more available to "internetwork" through wireless networks and the Internet. Scientific and engineering professionals will have a great opportunity to make a wide variety of sensor data universally discoverable, accessible, comparable and usable via the World Wide Web to fulfill a range of critical social, environmental and economic goals. OGC promotes the development and use of advanced open systems standards and techniques to enable full integration of geospatial data and geoprocessing resources into mainstream computing and widespread use of interoperable, commercial geoprocessing software throughout the global information infrastructure. [Contact: **Adena Schutzberg**, Editor, OGC News, at adena@opengis.org]

19. From **Dunrie Greiling**: TerraSeer releases free software for exploring cancer mortality patterns. This exciting new tool will help interested parties, from citizens to health practitioners, better understand the data in the National Cancer Institute's online Atlas of Cancer Mortality in the United States.

TerraSeer's Cancer Atlas Viewer provides seamless interactive mapping, graphing, and animations for intuitive exploratory data analysis. The software links all of the views of the data together to provide true interactive data exploration. For instance, you can simultaneously view the data in maps, statistical graphs, animated slideshows, and traditional data tables. When you select objects (such as states or counties) in one view, you will see the position of those objects light up on all other views of the data, instantly revealing hidden relationship patterns. You can also "brush" the maps and

plots with a selection rectangle and the other plots will respond dynamically, updating the selection as you move it. [See <http://www.terraseer.com>; Contact: **Dunrie** at dunrie@biomedware.com]

III. GIS Outreach

[Editor: All requests for Public Health GIS User Group assistance are welcomed; readers are encouraged to respond directly to colleagues]

From **Sean McGinnis**, GIS Technician, Somerset County: Is anyone using the product developed by Pictometry? If yes, how are you using it? I got a call from someone in my Prosecutor's Office showing interest but wasn't sure if other LEA were using it and how they were using it. Response from **Nicole DeMotto**: We're just got Pictometry at the Kansas City, Kansas Police Department. We use it mainly for display purposes in court, if we have large crime scenes. However, our Special Enforcement Unit plans on using it for tactical entry. We plan on using it for critical incident planning, like tornadoes or industrial fires.

From **Allan Sadowski**, NC State Highway Patrol, Data Network Manager: North Carolina is being forecast to be hit by another major hurricane. By what mechanism do the list members support geocoding-when there is a disaster and all the street and address signs are gone (ex: tornado, floods, hurricanes)?

Similarly, I'm curious about hearing the percentage of successful geocoding in rural areas, wilderness, parks, waterways, interstates (w.o. linear reference signs)? Success in this case is that you get the position correct within 100meters.

How much GIS analyst time is taken up in verification and validation of address/position data (I have heard as much as 50% of time expended to translate addresses into position information-and then verifying data accuracy-similarly, how is the verification and validation performed? What percentage of "addresses" never get successfully translated into coordinates (I've gotten as low as 40% success in rural areas)?

As we are starting up GIS for targeted enforcement of road safety, it seems that conventional geocoding isn't very good other than in urban environments. Given GPS's are now less than \$200 in small quantities including external antenna, and power cord... and the software is free to capture the coordinate, time, and associated event... the ROI is a matter of a few days GIS Analyst time. But I'd like to get an update from

the group as to what their experience has been. Thanks in advance. [Contact: **Allan** at allan.sadowski@ncshp.org]

IV. Public Health GIS Presentations and Literature

NCHS Cartography and GIS Guest

Lecture Series

September 16, 2003. "Biosurveillance: Applying Scan Statistics with Multiple, Disparate Data Sources"

presentation by **Howard S. Burkom**, National Security Technology Department, Johns Hopkins Applied Physics Laboratory and coauthor **Eugene Elbert**, Walter Reed Army Institute of Research. Abstract: Researchers working on the Department of Defense Global Emerging Infections System (DoD-GEIS) pilot system, the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), have applied scan statistics for early outbreak detection using both traditional and nontraditional data sources. These sources include medical data indexed by ICD-9 diagnosis codes as well as less specific but potentially timelier indicators such as over-the-counter remedy sale totals and school absenteeism records.

Early efforts have employed the Kulldorff scan statistic as implemented in the Satscan software of the National Cancer Institute. A key obstacle is that the input data streams are typically based on time-varying factors such as consumer behavior rather than simply on the populations of the component subregions. Both modeling and recent data have been used to obtain background spatial distributions. Data analyses have provided guidance for determining baseline periods to avoid excessive clustering. We have used a simple covariate approach to combining data sources and are evaluating alternative fusion methods in a testbed setting.

Experience with this methodology has included combinations of data sources for both retrospective studies of known outbreaks and surveillance of high-profile events of concern to local public health authorities. We have developed a capability to test the detection performance of scan statistics as an outbreak unfolds. Spatial and temporal epicurve simulations are used to inject cases into the various streams of authentic data to enable day-by-day performance analysis.

CDC's Emerging Infectious Diseases and MMWR Emerging Infectious Diseases

Emerging Infectious Diseases (EID) is indexed in Index

Medicus/Medline, Current Contents, Excerpta 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 September edition is available at <http://www.cdc.gov/ncidod/EID/index.htm>.

Morbidity and Mortality Weekly Report

Selected articles from CDC's **Morbidity and Mortality Weekly Report (MMWR)**: [Readers may subscribe to MMWR and other CDC reports, without cost, at site <http://www.cdc.gov/subscribe.html> as well as access the MMWR online at <http://www.cdc.gov/mmwr>]: Vol. **52**, No. **36**- Increasing Infant Mortality Among Very Low Birthweight Infants-Delaware, 1994-2000; Global Progress Toward Universal Childhood Hepatitis B Vaccination, 2003; Vol. **52**, No. **SS-10**- *Surveillance for Elevated Blood Lead Levels Among Children-United States, 1997-2001*; Vol. **52**, No. **35**- Prevalence of Diabetes and Impaired Fasting Glucose in Adults-United States, 1999-2000; Severe Morbidity and Mortality Associated with Influenza in Children and Young Adults-Michigan, 2003; Self-Reported Concern About Food Security Associated with Obesity-Washington, 1995-1999; Cigarette Smoking-Attributable Morbidity-United States, 2000; Notice to Readers: Satellite Broadcast and Webcast on Managing Rodents and Mosquitoes; *MMWR Surveillance Summaries*, Vol. **52**, No. **SS-7**- Surveillance for Health Behaviors of American Indians and Alaska Natives Findings from the Behavioral Risk Factor Surveillance System, 1997-2000; Vol. **52**, No. **30**- Health Disparities Experienced by American Indians and Alaska Natives; Injury Mortality Among American Indian and Alaska Native Children and Youth-United States, 1989-1998; Diabetes Prevalence Among American Indians and Alaska Natives and the Overall Population-United States, 1994-2002; Cancer Mortality Among American Indians and Alaska Natives-United States, 1994-1998; Bronchiolitis-Associated Outpatient Visits and Hospitalizations Among American Indian and Alaska Native Children-United States, 1990-2000; Vaccination Coverage Levels Among Alaska Native Children Aged 19-35 Months-National Immunization Survey, United States, 2000-2001; *Surveillance Summaries*, Vol. **52** (**SS-6**)- *Trichinellosis Surveillance-United States, 1997-2001*;

Vol. 52 (SS-5)- *Malaria Surveillance-United States, 2001 and Appendix Microscopic Procedures for Diagnosing Malaria*; Vol. 52, No. 29- Contribution of Selected Metabolic Diseases to Early Childhood, Deaths-Virginia, 1996-2001; Progress Toward Poliomyelitis Eradication-Afghanistan and Pakistan, January 2002-May 2003; Vol. 52, No. 28- Update: Severe Acute Respiratory Syndrome-Worldwide and United States, 2003; Vol. 52, No. 27- Surveillance for Acute Insecticide-Related Illness Associated with Mosquito-Control Efforts-Nine States, 1999-2002; HIV Diagnoses Among Injection-Drug Users in States with HIV Surveillance-25 States, 1994-2000; Update: Cardiac and Other Adverse Events Following Civilian Smallpox Vaccination-United States, 2003;

Titles

- **A new look at neighborhoods near National Priorities List sites**, Heitgerd JL, Lee CV, *Soc Sci Med* 57(6):1117-1126, SEP 2003;

- **A disaggregate approach to crash rate analysis**, Kam BH, *Accident Anal Prev*, 35 (5): 693-709 SEP 2003;

- **Consideration of driver home county prohibition and alcohol-related vehicle crashes**, Gary SLS, Aultman-Hall L, McCourt M, Stamatiadis N, *Accident Anal Prev*, 35 (5): 641-648 SEP 2003;

- **Estimating the global burden of disease of mild mental retardation and cardiovascular diseases from environmental lead exposure**, Fewtrell LJ, Prüss-Üstün A, Landrigan P, Ayuso-Mateos JL, *Envir Res*, AUG 2003 (online, in press);

- **Spatial stochastic simulation offers potential as a quantitative method for pest risk analysis**, Rafoss T, *Risk Anal* 23 (4): 651-661 AUG 2003;

- **Introduction to geographic information systems in public health**, Uzych L (book review), *Fam Community Health* 26 (3):250-250 JUL-SEP 2003;

- **Geographic variation of pediatric burn injuries in a metropolitan area**, Williams KG, Schootman M, Quayle KS, Struthers J, Jaffe DM, *Acad Emerg Med* 10 (7): 743-752 JUL 2003;

- **Positional accuracy of geocoded addresses in epidemiologic research**, Bonner MR, Han D, Nie J, Rogerson P, Vena JE, Freudenheim JL, *Epi* 2003 Jul;14(4):408-12;

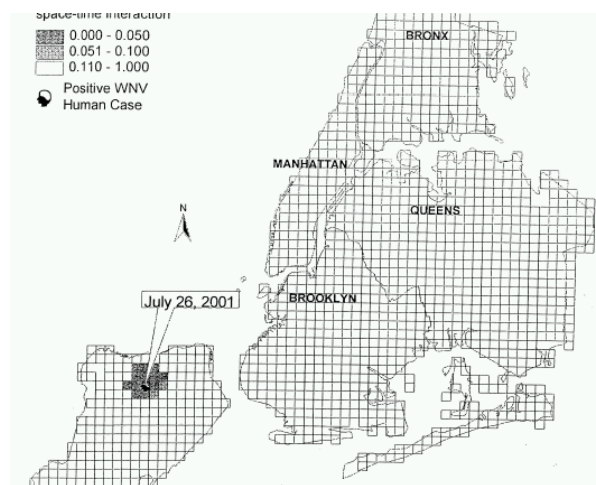
- **Experiences with GIS-based planning tool for spatial eco-balances**, Lenz, RJM and Beuttler, A, *Envir Mod Soft* 18(6):581-585, JULY 2003

- **Geographic Information Systems and spatial analysis of adult *Ixodes scapularis* (Acari : Ixodidae) in the Middle Atlantic region of the USA**, Bunnell JE, Price SD, Das A, Shields TM, Glass GE, *J Med Entomol* 40(4):570-576, JUL 2003;

- **Health effects on nearby residents of a wood treatment plant**, Dahlgren J, Warshaw R, Thornton J, Anderson-Mahoney P, and Takhar H, *Envir Res* 92(2): 92-98 JUNE 2003;

- **Exposure assessment of residents living near a wood treatment plant**, Dahlgren J, Warshaw R, Horsak RD, Parker FM and Takhar H, *Envir Res* 92(2): 99-109 JUNE 2003;

- **Identifying West Nile Virus Risk Areas: The Dynamic Continuous-Area Space-Time System**, Theophilides CN, Ahearn SC, Grady S, and Merlino M, *Am J Epi* 157(9):843-854, 2003;



- **How to improve the social utility value of geographic information systems for French local governments? A Delphi study**, Roche S, Sureau K, Caron C, *Environ*

Plann B 30 (3): 429-447 MAY 2003;

- **Geocoding Addresses from a Large Population-based Study: Lessons Learned**, McElroy JA, Remington PL; Trentham-Dietz A, Robert SA, and Newcomb PA, *Epi* 14(4):399-407, 2003;

- **Time-integrative geographic information systems: management and analysis of spatio-temporal data**, Dragicevic S (book review), *Environ Plann B* 30 (3): 465-466 MAY 2003;

- **Public participation geographic information systems across borders**, Sieber RE, *Can Geogr-Geogr Can* 47 (1): 50-61 SPR 2003;

- **The use of interactive graphical maps for browsing medical/health Internet information resources**, Boulos MNK, *Inter J Health Geogr* 2:1; JAN 2003 [See: <http://www.ij-healthgeographics.com/content/2/1/1>];

- **The spatial clustering of Amyotrophic Lateral Sclerosis in Finland at place of birth and place of death**, Sabel, CE, Boyle PJ, Löytönen M, Gatrell AC, Jokelainen M, Flowerdew R and Maasilta P, *Amer J Epi*, 2003. 157(10):898-905;

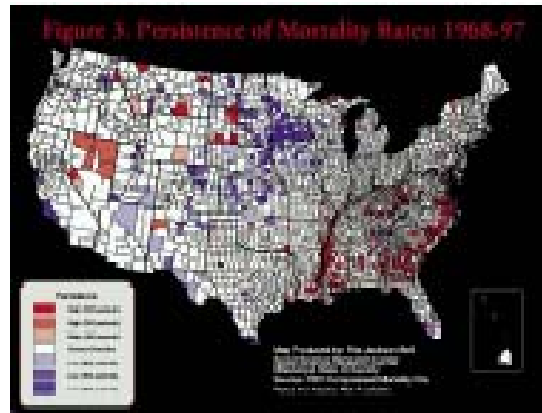
- **The Exposure Fallacy: Migration, Mobility & Ecological Analysis of Health Status in Ireland**, Houghton F, Kelleher K, *Irish Geogr* 36 (1): 47-58 2003 [See: www.ucd.ie/~gsi/journal.html]

- **Think local, search global? Comparing search engines for searching geographically specific information**, Smith AG, *Online Information Rev* 27 (2): 102-109 2003;

- **ESRI Health GIS Conference Proceedings 2003**: (1) Thorpe N, **Childhood cancer in Maryland** (SaTScan; buffer to define exposed versus non-exposed population) <http://gis.esri.com/library/userconf/health03/papers/pap3006/p3006.htm> and (2) Kennedy TC, Brodgy JG, Gardner JN, **Modeling historical environmental exposures using GIS: Implications for disease surveillance** (spatial proximity tool for pesticide exposure) at <http://gis.esri.com/library/userconf/health03/papers/pap3020/p3020.htm>.

- **Healthy and Unhealthy Places in America**, Cossman

R, Blanchard T, James W, Jackson-Belli R, Cosby A, HealthyGIS, Spring 2003 (See: www.esri.com/health)



Special Reports

An Internet-Based GIS in support of Complex Statewide Resource Allocation for Young Children, Don Taylor, Epidemiologist, First 5 California, Sacramento, California. California's 1998 Proposition 10¹ taxes cigarettes to fund programs and services that improve the health, education, and family functioning among children aged 0-5. It also created a state commission, known as First 5 California, and 58 county commissions. These commissions allocate approximately \$600 million per year in program funding, equating to about \$200 per child among the 3 million California children this age. This small amount of money per capita means that First 5 California and the local county commissions, as do most public agencies, must optimize the use of these funds by targeting young children who have the highest needs. In support of this goal, First 5 California has developed a statewide multi-dimensional internet-based GIS. This article will briefly discuss how this GIS was created and examples of its use.

Building on hard copy, one-dimensional prototypes previously reported,²⁻⁴ the current version of the First 5 California GIS is the result of a two-year, part-time effort by the First 5 California epidemiologist and a GIS internet site development company. The epidemiologist acted as project manager and conducted all work related to developing the desktop GIS model. The internet site development company then translated this model to the First 5 California web site.

Computer software needed to develop the GIS model included a statistical analysis package, a dedicated geocoding engine, a desktop GIS, and an internet map

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server. A computer with additional random access memory (RAM), and a larger hard drive and monitor was used for the desktop GIS modeling. Beyond the desktop GIS, a LAN server and a gateway to the internet were required to maintain the GIS internet site.

Similar to the multi-dimensional services approach outlined in Proposition 10, a multi-dimensional GIS required many types of data from diverse sources. Federal, state and private sources were reviewed in search of statewide community level risk factors, resources and demographic data.

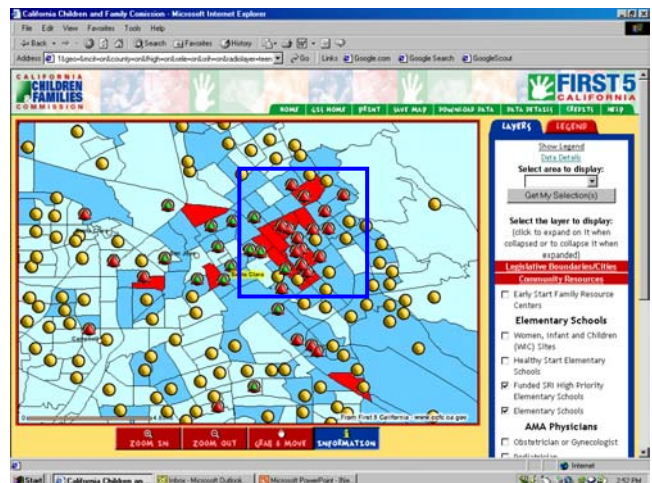
In accessing these data, different strategies proved to be useful. For example, in identifying state program sites from other state agencies, First 5 California managers and staff were often familiar with them and provided agency contact points. In other cases, data was purchased (AMA physicians) or a formal review by a Committee for the Protection of Human Subjects (birth data) was required to gain access.

Geocoding the 530,000 birth records was among the most time consuming tasks. Though never a simple process, it was generally made more efficient due to the quality of California's computerized data collection. Records were initially geocoded using a standardized automated process. However, subsequent zip code level analysis found some areas that were disproportionately underrepresented using this method. Consequently over 3,000 records in these underrepresented zip codes were manually re-geocoded.

Once geocoded, census tract boundaries were overlaid and counts of births with commensurate rates calculated for each birth characteristic. In identifying teenage birth "hot spots", a Chi Square or Poisson statistical significance test ($p < .05$) was used depending on the number of observations⁴. For the more common occurrences of inadequate prenatal care, a binomial significance test was used ($p < .05$). This analysis produced a wealth of census tract level data about maternal prenatal care utilization,⁵ race/ethnicity, income, education, total number of children,⁶ and teenage births.

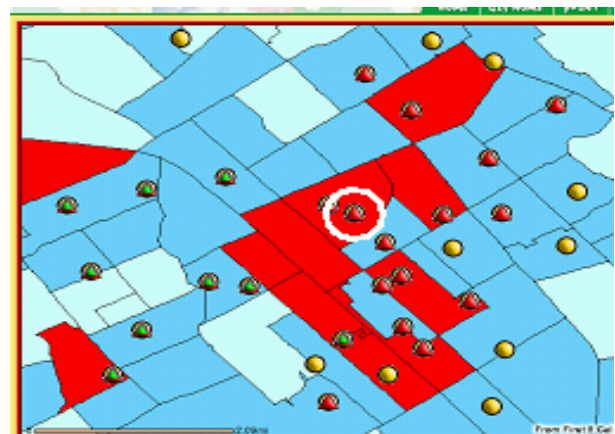
As previously mentioned, an internet site development company competitively bid the work of translating the desktop GIS to the map server. As this site was developed, First 5 California and local county commission staff were asked to review and provide feedback. This review became an important way of both improving the site and familiarizing staff with its

potential uses. Consequently new data sets and functionalities were added, including the ability to paste maps directly into other applications and the ability to



download most of the data underlying the GIS. This most recent version of the First 5 California GIS can be viewed at <http://63.192.169.198/index.asp>.

An example of the utility of the site follows. Figure 1 shows the San Jose area within Santa Clara county. The red census tract "hot spots" are those with teenage birth rates that are statistically significantly higher than the statewide rate. Overlaid on these are elementary schools, represented as gold globes. Of the elementary schools, those that scored in the lower 3 deciles of California's Academic Performance Index (API) are designated as First 5 California's School



Readiness Initiative (SRI) High Priority schools, and overlaid with a red triangle. SRI High Priority schools that have received SRI funding are further overlaid with smaller green triangles.

Of interest within the dark blue box in Figure 1 is

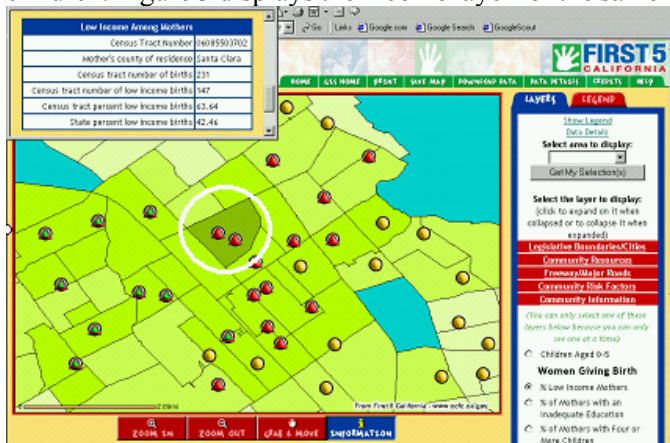
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the large area of contiguous “hot spots” and many unfunded SRI High Priority schools. Figure 2 focuses in on this area and shows how any particular point can be selected for further information. In this case when the SRI High Priority elementary school in the white circle is clicked on, information on the school and the census tract it resides in appears in a pop-up window. This school has ranked one (the lowest score) on the API and has 133 kindergarteners enrolled. There were 45 teenage births in this census tract and it has a teenage birth rate of 155.7 per 1,000 compared to the state rate of 44.8 per 1,000.

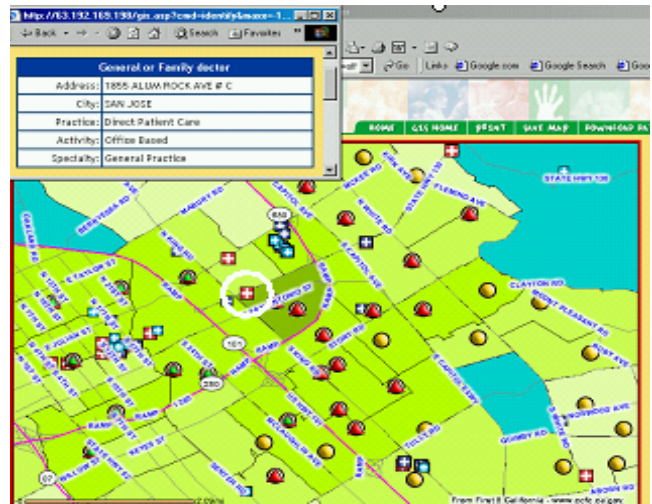
Additional layers available that describe the population include the number of children aged 0-5 from the US Census and, among women giving birth, their race/ethnicity, education, income and total number of children. Figure 3 displays the income layer for the same



census tract. Again, by clicking on the census tract, we find that 63.6% of births were low income compared to the state's 42.5%.

Figure 4 adds roads, freeways, and AMA affiliated physicians on this map. By clicking on the physician located in the census tract, we can see their address, practice, activity and specialty in the pop-up window. Also visible are the location and names of local streets and freeways.

The First 5 California GIS provides this type of significant detail at the local, sub-county level across the entire state. Consequently, program managers can make informed decisions about funding using an objective needs assessment tool with multi-dimensional characteristics that allow them to fine-tune health and educational messages or programs to a community's population size, culture and specific needs.



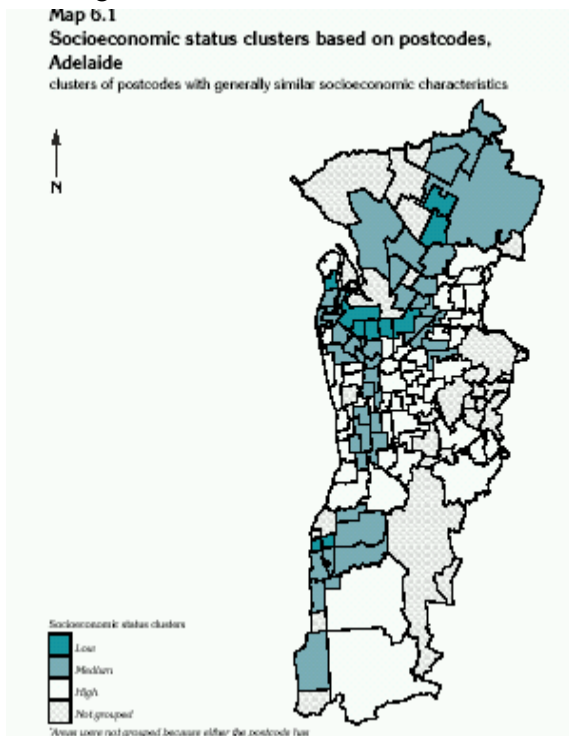
The First 5 California GIS is designed to evolve over time. This means that data will be updated and trends analyzed over time. Further, new sources of relevant data are being developed through interagency agreements, and First 5 California program site data will be available from a recently developed statewide program data collection system. The future of GIS in public health and education holds great promise once data systems such as these can be fully developed. [Contact: Don Taylor, Epidemiologist, California Children and Families Commission (renamed First 5 California), at dtaylor@ccfc.ca.gov]

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A Social Health Atlas of Young South Australians, Tennant S, Hetzel D and Glover J (2003). Public Health Information Development Unit, Adelaide. This second edition *A Social Health Atlas of Young South Australians* edition (2003) of the atlas reveals the existence of considerable disparities across many aspects of the lives of South Australian children and young people.

Increasing numbers of children and young people face socioeconomic and other forms of disadvantage, resulting in significant adverse effects on their wellbeing that are likely to continue into adult life. This is particularly relevant in the case of many Indigenous children.

Many of the indicators in this atlas demonstrate that the health and wellbeing of South Australian children and young people has improved. This is most evident in the decline in death rates of infants, children and young people. However, in other areas, outcomes have remained static or widened in an environment that has been marked by rapid social change. Examples are the marked increase in the proportion of low birthweight babies and of overweight and obese children aged 4 years, as well as increases in both notified and substantiated cases of child abuse and neglect.



Along with the overall improvement in deaths rates, the relative difference in infant death rates and deaths at ages 15 to 24 years between the poorest and most well off areas has decreased substantially. The remaining differentials in death rates of 30% and above are, however, substantial.

Substantial differences (between the poorest and most well off areas) also exist for perinatal outcomes (as

indicated by the proportion of low birthweight babies), overweight and obese females aged 4 years and substantiated cases of child abuse and neglect. For each of these indicators, the gap has widened over the years for which data were analyzed. However, the gap has narrowed for overweight and obese four year old males in Adelaide; and for South Australia. As a whole it is static.

Access to services is also more difficult for children and young people in Adelaide's poorest areas. For example, children and young people in the most disadvantaged areas are over-represented on public hospital booking lists, even when their higher rate of use of those hospitals is taken into account.

While the differential in overall admission rates has been reduced for 0 to 14 year old children (in Adelaide and the non-metropolitan areas), it has increased for those aged 15 to 24 years (in Adelaide). Similarly, the disparity in rates of FAYS clients and of terminations of pregnancy, between the poorest areas and most well off areas in Adelaide, has increased.

The challenge for policy makers, researchers, health practitioners and governments is to find ways to address these health inequalities and the socioeconomic factors which underpin them.

GIS and Childhood Lead Exposure: From Research Design to Model Development to Community Translation, Marie Lynn Miranda, Dana Dolinoy, and M. Alicia Overstreet, Nicholas School of the Environment and Earth Sciences, Duke University. Although much progress has been made, childhood lead poisoning remains a critical children's environmental health concern. The 1999-2000 NHANES survey revealed blood lead levels elevated above the CDC threshold for health effects of 10 µg/dL in 2.2 percent of 1 to 5 year olds in the United States, with a geometric mean blood lead level of 2.23 µg/dL [1]. **These data indicate that approximately 434,000 children under age five continue to experience elevated blood lead levels [1]. In addition, emerging research suggests that significant adverse health effects, including learning and behavioral deficits, may occur at blood lead levels as low as 5 µg/dL [2-5]. Therefore, the actual number of children negatively affected by low level lead exposure is likely much higher.**

Exposure to lead-based paint and leaded

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household dust is the leading cause of childhood lead poisoning today. A recent study estimates that 38 million U.S. homes still contain lead-based paint [6]. Of these, 24 million units contain significant lead-based paint hazards [6]. Lead-based paint in older and lower-income housing represents the greatest concern due to expensive and technical rehabilitation methods. An estimated 35 percent of all low-income housing contains lead-based paint hazards, compared to 19 percent of households with incomes greater than \$30,000 per year [6]. Renter occupied housing also contains more lead-based paint hazards than owner occupied housing (30 versus 23 percent) [6].

Research Design. The Children's Environmental Health Initiative, a research and community outreach program within the Nicholas School of the Environment and Earth Sciences at Duke University oversees several environmental research projects emphasizing the special vulnerabilities of children. CEHI projects focus on incorporating innovative spatial analysis in combination with field-based sampling into children's environmental health research. All CEHI projects utilize GIS technology to explore exposure and health effects at high levels of geographic resolution and to link previously unrelated databases. In its commitment to shifting children's environmental health programs from mitigative to preventive strategies, CEHI pays particular attention to eventual community translation and policy development applications from the very earliest stages of research project conception and design.

With support from the CDC, CEHI has developed and validated a GIS-based risk prioritization map for lead exposure in six North Carolina counties. Mapping for Prevention models combine county tax assessor, North Carolina blood lead screening, and U.S. Census data to create household-level priority models for childhood lead exposure. Mapping for Prevention has successfully built a strong methodological basis for GIS mapping, developed environmental sampling protocols for validating predictive risk models, established working relationships with the State of North Carolina and local communities, gained household participation and cooperation, and provided the basis for research translation done in partnership with local community organizations. This project has proven to be valuable in determining at-risk populations for blood lead screening.

Model Development. Presented below are sample mappings from the GIS project developed for Durham County, North Carolina. The project uses spatial analysis of county tax assessor, U.S. Census, and North Carolina blood lead screening data to categorize lead risk levels at the individual tax parcel unit level. **Figure 1 depicts the priority categories for residences in Durham.** Dark blue areas represent Priority One (highest risk) parcels, predicted most likely to contain lead paint hazards. Priority Two and Three parcels are colored medium and light green, respectively, and are less likely to contain lead paint hazards. Priority Four (lowest risk) parcels are yellow and least likely to contain lead paint hazards. White areas represent commercial or industrial properties. Compared to South and North Durham, Central Durham has a heavier concentration of higher risk parcels.

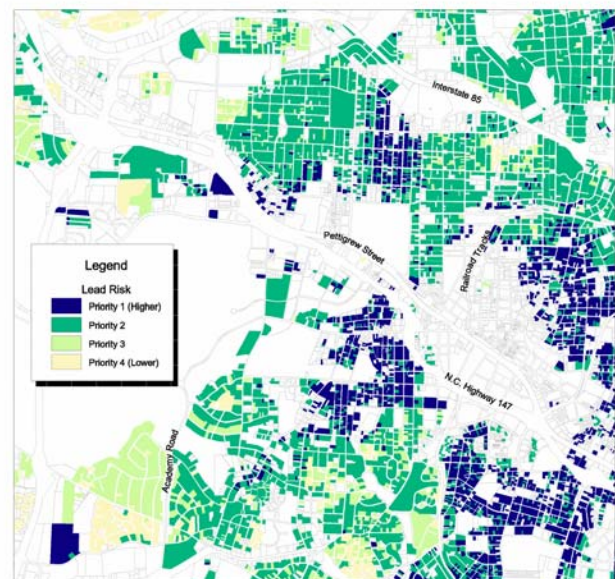


Fig 1. Lead Priority Model for Durham

Community Translation. Durham Congregations, Associations, and Neighborhoods (Durham CAN), the Durham Affordable Housing Coalition (DAHC), Durham Parents Against Lead (DPAL, a parent support group), and the Durham County Health Department (DCHD) have been using this model as the basis for targeting communities in an ongoing effort to increase blood lead screening among high risk children. DAHC, Durham CAN, DPAL, DCHD, and CEHI have joined together in

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presentations to PTAs, child care centers, churches, the Durham County Board of Health, and the Durham Department of Housing and Community Development. **Figure 2 zooms in on the neighborhood surrounding Burton and W.G. Pearson Elementary Schools in Central Durham.** Maps like this are printed in large-scale format for use in community presentations and are successful in engaging stakeholders. The population of children screened through this effort is exhibiting a 6 percent prevalence of elevated blood lead levels, well above the Durham County 2002 prevalence of 1.6 percent for 1- and 2-year-olds.



Fig 2. Lead Priority Model for Area Surrounding Burton and W.G. Pearson Elementary Schools in Central Durham

Table 1 provides a sense of how the risk model allows county health departments, housing agencies, and community organizations to utilize scarce resources more effectively. It shows the percent of the housing stock included in the Priority 1-4 risk categories for the study counties. This analysis indicates that by focusing on 30 percent of the housing stock in Durham County, for example, intervention programs could address 65 percent of the estimated elevated blood lead levels.

County		Priority 1	Priority 2	Priority 3	Priority 4
Buncombe	Percent of housing stock	5	25	30	40
	Percent of EBLs	30	25	20	25
Durham	Percent of housing stock	10	20	25	45
	Percent of EBLs	35	30	30	5
Edgecombe	Percent of housing stock	10	25	35	25
	Percent of EBLs	35	30	30	5
New Hanover	Percent of housing stock	5	15	35	45
	Percent of EBLs	35	20	35	10
Orange	Percent of housing stock	10	20	30	40
	Percent of EBLs	20	40	25	15
Wilson	Percent of housing stock	10	15	35	40
	Percent of EBLs	40	30	20	5

Table 1. Implication of Modeling Results for Housing Intervention Programs

The Durham Department of Housing and Community Development is using the model to prioritize low-income housing for HUD-funded lead abatement activities. CEHI serves as a collaborating partner on this grant. In addition, a recent proposal to the Cities United for Science Progress program submitted by the Department of Housing and Community Development and based on the Mapping for Prevention work was recently awarded a \$100,000 Award for Distinction (one of only seven nationwide) to implement CEHI's predictive risk exposure model for lead in a citywide housing intervention, public awareness, and education program. Again, CEHI is a collaborating partner on this grant. The childhood lead exposure project represents an illustrative example of how CEHI successfully combines field-and GIS-based analysis in ways that produce interesting and new research results with direct and immediate translational applications.

CEHI recently received funding from the CDC to expand the modeling to additional counties in North Carolina, as well as funding from NIEHS to expand the modeling to other areas of the United States. **At present, we are seeking partners who would be interested in building a similar model for areas outside North Carolina.** For more information, please send an email to cehi@env.duke.edu.

Mapping for Prevention has successfully laid the groundwork for university-community collaboration on issues of children's environmental health. Future collaborative endeavors will include use of GIS to explore interactions between social, environmental, and genetic factors. Community partners are especially interested in overlaying presence of green space and prevalence of obesity, diabetes, and heart disease. Throughout its projects, CEHI and its partners remain committed to issues of environmental justice and children's environmental health. All CEHI projects include Spanish/English bilingual community outreach and dissemination efforts. For more information on CEHI, see www.env.duke.edu/cehi. A more detailed description of the Mapping for Prevention Project can be found in the September 2002 issue of *Environmental Health Perspectives*. [Contact: **Marie Lynn Miranda**, Ph.D., Gabel Chair in Environmental Ethics and Sustainable Environmental Management, at

mmiranda@duke.edu]

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1. U. S. Centers for Disease Control and Prevention, Childhood Lead Poisoning Publications located on the Web at: <http://www.cdc.gov/nceh/lead/research/kidsBLL.htm>. Accessed 2003;
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5. Rogan, W.J. and J.H. Ware, Exposure to Lead in Children-How Low is Low Enough? *New England Journal of Medicine*, 2003. 348(16): p. 1515-1516;
6. Jacobs, D.E., The prevalence of lead-based paint hazards in U.S. housing. *Environmental Health Perspectives*, 2002. 110(10): p. A599-A606.

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

Bioterrorism: Information Technology Strategy Could Strengthen Federal Agencies' Abilities to Respond to Public Health Emergencies, GAO Report to Congressional Requestors, June 30, 2003. The October 2001 anthrax attacks, the recent outbreak of the virulent Severe Acute Respiratory Syndrome (SARS), and increased awareness that terrorist groups may be capable of releasing life-threatening biological agents have prompted efforts to improve our nation's preparedness for, and response to, public health emergencies--including bioterrorism. GAO was asked, among other things, to identify federal agencies information technology (IT) initiatives to support our nation's readiness to deal with bioterrorism. Specifically, we compiled an inventory of such activities, determined the range of these coordination activities with other agencies, and identified the use of health care standards in these efforts.

The six key federal agencies involved in bioterrorism preparedness and response identified about 70 planned and operational information systems in several IT categories associated with supporting a public health emergency. These encompass detection (systems that collect and identify potential biological agents from environmental samples), surveillance (systems that facilitate ongoing data collection, analysis, and

interpretation of disease-related data), communications (systems that facilitate the secure and timely delivery of information to the relevant responders and decision makers), and supporting technologies (tools or systems that provide information for the other categories of systems). For example, the **Centers for Disease Control and Prevention (CDC) is currently implementing its Health Alert Network, an early warning and response system intended to provide federal, state, and local agencies with better communications during public health emergencies**, and the Department of Defense is using its Electronic Surveillance System for the Early Notification of Community-based Epidemics to support early identification of infectious disease outbreaks in the military by comparing analyses of data collected daily with historical trends. The extent of coordination or interaction of these systems among agencies covered a wide range--from an absence of coordination, to awareness among the agencies with no formal coordination, to formal coordination, to joint development of initiatives.

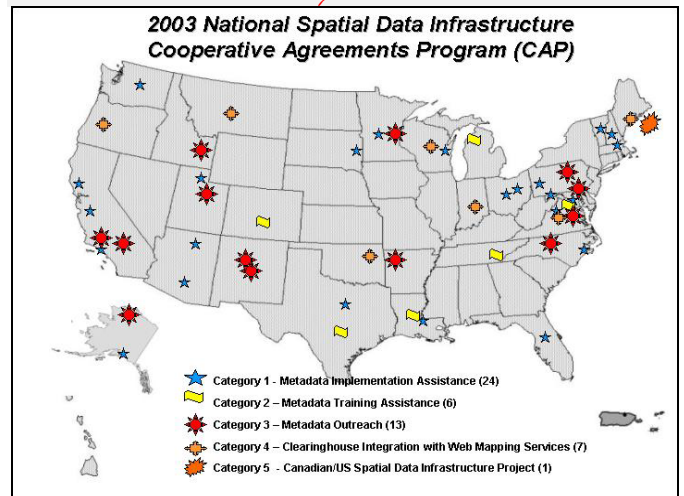
IT can more effectively facilitate emergency response if standards are developed and implemented that allow systems to be interoperable. The need for common, agreed-upon standards is widely acknowledged in the health community, and activities to strengthen and increase the use of applicable standards are ongoing. For example, CDC has defined a public health information architecture, which identifies data, communication, and security standards needed to ensure the interoperability of related systems. Despite these ongoing efforts to address IT standards, many issues remain to be worked out, including coordinating the various standards-setting initiatives and monitoring the implementation of standards for health care delivery and public health. An underlying challenge for establishing and implementing such standards is the lack of an overall strategy guiding IT development and initiatives. Without such a strategy to address the development and implementation of standards, agencies may not be well positioned to take advantage of IT that could facilitate better preparation for and response to public health emergencies--including bioterrorism. [See full report at <http://www.gao.gov/new.items/d03139.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>]

Building the NSDI

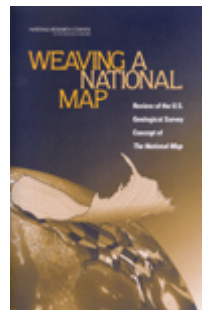


The 2003 Cooperative Agreements Program (CAP) will provide seed funds to engage organizations in building the NSDI through metadata implementation, training and outreach, and clearinghouse implementation of OpenGIS web services. In addition, the FGDC and Geoconnections Canada will jointly fund a collaborative cross-border spatial data infrastructure project. [Contact: **David Painter**, USGS, at dpainter@usgs.gov]

The National Map

Weaving a National Map: Review of the U.S. Geological Survey Concept of The National Map

Mapping Science Committee, Board on Earth Sciences and Resources, National Research Council, The National Academies Press, 2003. *Weaving a National Map* draws

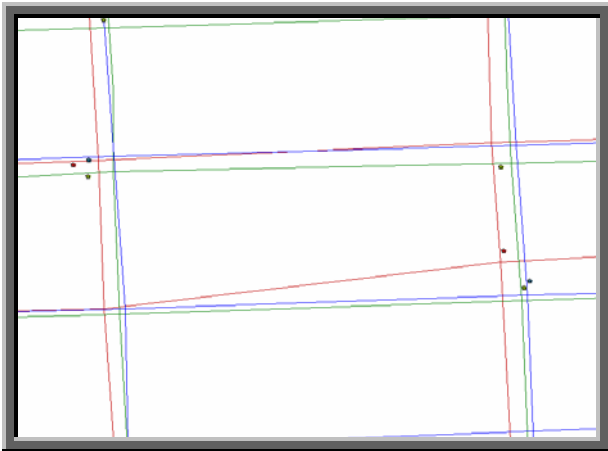


on contributions to a September 2002 workshop and the U.S. Geological Survey's (USGS) "vision" document for *The National Map*, envisioned by the USGS as a database providing "public domain core geographic data about the United States and its territories that other agencies can extend, enhance, and reference as they concentrate on

maintaining other data that are unique to their needs." The demand for up-to-date information in real time for public welfare and safety informs this need to update an aging paper map series that is, on average, 23 years old. The NRC report describes how *The National Map* initiative would gain from improved definition so that the unprecedented number of partners needed for success will become energized to participate. The challenges faced by USGS in implementing *The National Map* are more organizational than technical. To succeed, the USGS will need to continue to learn from challenges encountered in its ongoing pilot studies as well as from other federal-led programs that have partnered with multiple sectors. [Full report online at <http://www.nap.edu/catalog/10606.html>]

Special Submission

The following **"A Proposal for Leveraging Public/Private Geospatial Investments to Build and Maintain the National Spatial Data Infrastructure Road Network,"** was presented by Jonathan Sperling, GIS Scientist, Department of Housing and Urban Development (HUD) at a recent FGDC Coordination Group meeting. We are pleased to share Jon's thoughts with you.



Developing a uniform, consistent national road layer is the single most important component of the national spatial data infrastructure and for fulfilling the promises of the *President's Management Agenda* [See: http://www.whitehouse.gov/omb/budintegration/pma_index.html]. **Maintaining the status quo of multiple uncoordinated and separately updated and maintained street centerline files by the public and private sector is counterproductive.** Vested narrow

interests in both government agencies and private firms serve neither the national interest nor short or long-term advances in our rapidly expanding information economy.

Enhanced coordination at the national level among government agencies and between government and the private sector is urgently needed. Failure to do so will result in multiple unshareable or "difficult and costly to share" representations of the same physical road infrastructure that use similar models to achieve very similar purposes. Just as the nation's transportation infrastructure and development would have been stymied with the building of multiple private railroad gauges using separate standards, multiple duplicative public and private data collection efforts and representations of our road infrastructure are stymieing the development of a coordinated national information infrastructure. Would it have made sense for the federal government to build its own rail network with distinct standards to compete with private rail networks?

Vision and Goals: I propose the creation of a new national digital road network paradigm in public/private partnership in support of a National Spatial Data Infrastructure (NSDI) that will truly benefit the entire society. Negotiations between the FGDC, Office of Management and Budget (OMB), U.S. Census Bureau, U.S. Geological Survey (USGS), U.S. Department of Transportation (DOT), and other comparable appropriate players in industry **should begin now with the goal of creating a single national digital road network and maintenance regime.** Financial, legal, and operational logistics must be worked out so that the Nation counts one NSDI street centerline file that combines the best of all existing public and private files. Taxpayers should not have to spend billions of dollars to create what already exists in the private sector and, at the same time, have government agencies spend millions more (taxpayers money again) contracting with the above companies in an uncoordinated fashion because the public street centerline file is perceived not to have the needed quality.

Strategic Approach: This proposal provides a strategic approach to better optimize national geospatial investments. The U.S. Census Master Address File (MAF)/Topologically Integrated and Geographic Referencing System (TIGER) Modernization investment

offers incentives to move the vision forward and begin to change existing business practices. Duplicative data collection efforts must be replaced with a collaborative approach that will save the government billions of dollars in the long-term, promote market expansion and reduction of data development costs by providing a national framework for the private and public sector. Modernizing the MAF/TIGER database over the next several years will cost in the vicinity of a billion dollars (\$200 million have currently been allocated for only improving the positional accuracy of the street centerlines without even adding attribute data).

MAF/TIGER Modernization (along with the USGS National Map, Federal Management Emergency Agency Flood Plain Map Modernization and other federal geospatial investments) can be the catalyst to begin this national endeavor. The current effort by the Census Bureau will improve the existing TIGER/Line file but, without the broader vision of a NSDI-RN, create yet another, albeit highly accurate, national street centerline file. Based on developments thus far, it is apparent that much of this work is duplicative of what has already been done or is currently being done in the private sector. In fact, based on initial research, government (taxpayer) expenditure on this effort will result in a product no better or only marginally better than what already exists in the private sector.

Investment in the MAF/TIGER modernization effort should be used to leverage full collaboration in the development and maintenance of the shared national road network between the public and private sector. Current plans and budgets will create a highly accurate public centerline file (MAF/TIGER) that will bring benefit to government agencies and provide real values for the private sector as well (albeit much less value than a shared public/private NSDI-RN fully compatible with Geospatial One-Stop [See: <http://www.geo-one-stop.gov>] standards). In addition, the cost and license burdens required by private firms to maintain the networks independently, the competition, and the restriction on the data use and update may make them more amenable to a more collaborative public/private approach that meets the national interest as well as their business interests. **At the same time, efforts should envision a larger North American road network standard that links Mexico and Canada.**

Government-Industry Partnership. Between 2003 and 2008, the leading industry partners in this area and the Census Bureau will have reached an agreement and reconciled their geometric and attribute (minimum core set) redundancies and discrepancies to create the core NSDI-RN component of the Nation's digital infrastructure. The leading industry partner(s), in coordination with the FGDC, USGS, the Census Bureau and DOT, along with appropriate State agencies, will build the positional framework based on guidelines for consolidating existing data sets for the same areas. **This core NSDI layer will serve as the base for ongoing maintenance via public/private protocols and will align with the nation's imagery and other core infrastructure layers such as hydrography. Update and maintenance of the files will be shared between the public and private sector and financial incentives for private participation will be developed. Local government, in collaboration with the private sector, will play a critical role in updating and maintaining this national resource.** Value added opportunities for attributes and data services by private firms would remain and be multiplied by this investment in the NSDI-RN.

By 2008, all government and private agencies will use or link to the NSDI-RN or national street centerline file to support their agency missions and business operations. **Aligning and geocoding all information assets to a uniform and consistent national infrastructure layer will save billions of dollars, enhance data quality, leverage resources, and improve decision-making processes throughout society** (see previous proposal for NGSC). The NSDI-RN will serve as the digital counterpart to the national highway system and national road network.

Benefits:

1. Vast information repositories of the federal, state, and local government, the private sector, academia, and non-profit organizations will be linked and accessible via this common spatial framework.

*Homeland Security (See website materials at site: <http://www.whitehouse.gov/homeland/index.html>) will use this critical infrastructure to link data sources within and across jurisdictions as needed.

*This national resource will mitigate labor-intensive problems of integrating data from multiple agencies and

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data sources along with their corollary organizational obstacles, particularly when time is of the essence.

2. Each agency will link their vast stores of information and serve as data stewards to a common spatial infrastructure.

*The Census Bureau will use this file to support all its census and survey activities as well as link statistical and legal boundaries;

*The Environmental Protection Agency (EPA) will use this file to link all its facilities locations;

*The USGS will use this layer to support the National Map;

*FEMA will link its flood data, etc;

*Grants, loans, business data and other data assets by HUD, SBA, DOE, BLS, and others will be geocoded to the NSDI street centerline file (mandated) via a National Geocoding Service Center (see previous recommendation at

http://www.fgdc.gov/fgdc/coorwg/2002/gos_hud.html).

3. All FedStats (See: <http://www.fedstats.gov>) agencies will link their rich stores of statistical data to the NSDI street centerline file and its derivative geographies. All data will be shareable within and across agencies. State, local, and tribal entities will link seamlessly via appropriate coding systems with the NSDI-RN.

4. Private firms will no longer need to create and market separate sets of census boundary files and street centerline representations.

*Vehicle navigational systems will be based on the NSDI-RN geometry.

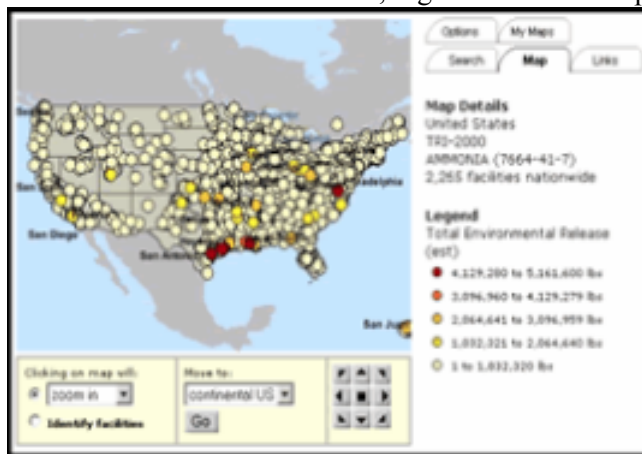
*Just as putting TIGER in the public domain revolutionized the GIS industry and created million of new economic opportunities, the development of a collaboratively maintained NSDI-RN will not only generate growth and opportunity in the private sector and national economy, but provide the basic framework for a new emergent location-based service industry and improved decision-making at all levels of government, academia, and business.

Summary: This proposal envisions a new paradigm in public/private partnership to build a national digital road network in support of a NSDI that will truly benefit the entire society. **Negotiations between the FGDC, OMB, U.S. Census Bureau, USGS, DOT, and other comparable appropriate players in industry should begin now with the goal of creating a single national digital road network and maintenance regime within**

three years. [Contact: Jon at jon_sperling@hud.gov]

*National Library of Medicine, National Institutes of Health
Special Request for GIS Users Assistance*

TOXMAP is a pilot web site from the **National Library of Medicine** (NLM) that uses maps of the United States to help users visually explore chemical data from the EPA's Toxics Release Inventory (TRI). TOXMAP enables users to create national, regional or local maps



showing where chemicals are released into the air, water, and ground. These maps show toxic releasing facilities, releases in a specified year, and release trends.

TOXMAP also provides links to in-depth toxicological information from the NLM's Hazardous Substances Data Bank (HSDB), accessible through NLM's TOXNET system (<http://toxnet.nlm.nih.gov>), and to other authoritative sources, such as ToxFAQs from the Agency for Toxic Substances and Disease Registry (ATSDR). The beta version of TOXMAP can be found at <http://toxmap.nlm.nih.gov>.

FEEDBACK SESSIONS START OCTOBER 6, 2003

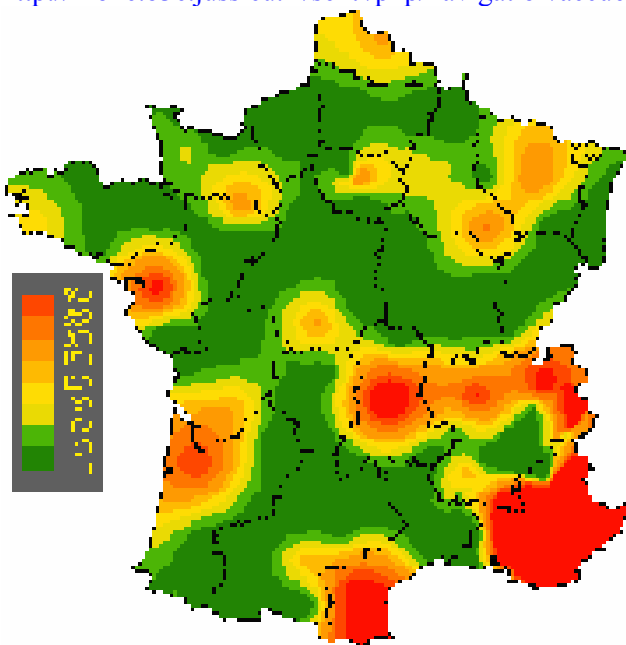
NLM is interested in identifying members of the environmental health community who would be willing to provide feedback on TOXMAP regarding whether the system could potentially be used in/for their professional activities. Ideally, these users would have some familiarity with TRI and/or TRI data, or with systems that use TRI data (<http://www.epa.gov/tri>), and with NLM's TOXNET system. Participants would review some brief, web-based exercises to familiarize themselves with TOXMAP features and respond to a few questions about the system via a one-hour teleconference.

Your and your colleagues' expertise/input would be invaluable to us. We hope you will consider

participating in this process with NLM staff on one of these dates: **Monday, October 6, 1pm ET; Tuesday, October 7, 3pm ET; or Thursday, October 9, 11am ET. Please let us know if you are interested in participating via email: toxmap@aquilent.com. NLM needs your expertise!** [Contact: Marti Szczur, MS, National Library of Medicine, NIH/DHHS, 6707 Democracy Boulevard, Suite 510, Bethesda, MD]

Web Site(s) of Interest for this Edition

<http://rhone.b3e.jussieu.fr/senti/php/navigation/accueil>

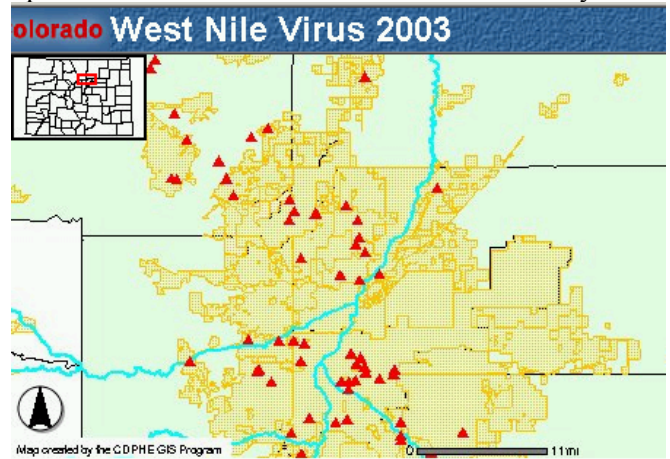


This French Epidemiologic surveillance system is online and covers a variety of timely nationally-reported diseases (map of diarrhea shown). The reporting period here is for week 37, from September 8-14, 2003.

<http://www.hazardmaps.gov/atlas.php> **Multihazard Mapping Initiative: Vision and Goals.** The vision of FEMA's Mutihazard Mapping Initiative is to maintain a living atlas of hazards data and map services for advisory purposes supplied from a network of hazard and base map providers. The initiative is an implementation of Section 203(k) of the Disaster Mitigation Act of 2000, which calls for the creation of Multihazard Advisory Maps, or maps "on which hazard data concerning each type of natural disaster is identified simultaneously for the purpose of showing areas of hazard overlap." The goals of the initiative are to foster the exchange and

collection of geospatial hazards data; increase hazard awareness by providing a multihazard mapping capability on the Internet for advisory purposes, and encourage data providers to establish standards based services that facilitate access and distribution of their data for the creating of these maps. The initiative is compatible with and shares the goals of FEMA's E-Government Initiative, Department of Interior's E-Government Initiative: Geospatial One-Stop, and the USGS National Map.

<http://emaps.dphe.state.co.us/wnv3/viewer.htm> **Colorado West Nile Virus 2003 Season Interactive Mapping Site.** These interactive maps show the results of animal testing for the West Nile Virus (WNV) during the 2003 season. This map is updated weekly. Positive tests are represented by type-either birds or horses. The counties having at least one positive WNV animal test are represented in light green. The **Layers** list to the right of the map can be used to turn layers on or off. When you turn layers on or off, be sure to use the **Refresh Map** button to update your map display. The toolbar to the left of the map can be used to control your map display, to query the data "behind" the map, and to print your final map. The query tools only perform operations on information found in the **Active** layer.



http://eire.census.gov/popest/estimates_dataset.php **Of interest to those weighting surveys.** The Census Bureau just released the 2000, 2001, and 2002 population estimates by age-sex-race. Current age-sex-race estimates can be made through assumptions about aging, births, deaths, and migration numbers that are also available now. These are probably invaluable for survey

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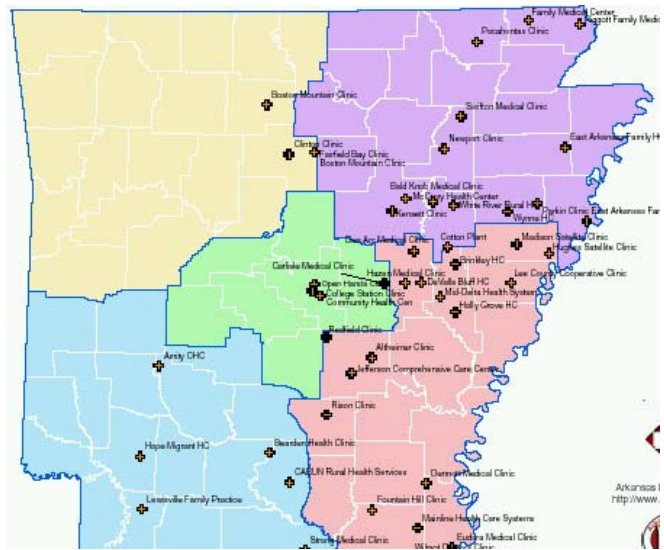
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researchers who would like to weight their polls or surveys.

<http://www.phrl.org/Special%20Training%20TBA.htm>
Public Health Research Laboratories (PHRL) presents the following spatial-epidemiology training course for health workers. This training course is designed to provide researchers with an applied and essential understanding of the following disciplines for the prevention and control of Disease including Medical Geography, Spatial Analysis, Spatial Statistics, Spatial Modeling and Spatial Epidemiology. The next training course will take place January 5-16, 2004, at California State University, Chico.

<http://www.gis.state.ar.us/defaultIE.htm#> **Arkansas Geographic Information Systems Site.** The Arkansas Geographic Information Office (AGIO) and Arkansas Department of Health (ADH) have been working this past year on geospatial technology transfer in support of the Arkansas Department of Health visualization component of CDC's National Electronic Disease Surveillance System (NEDSS). This MOU supports the mission of the AGIO to establish enterprise geographic information systems through collaborative efforts to enhance Arkansas' clearinghouse node. The site uses fully FGDC compliant metadata and is NSDI node

enabled. This MOU will serve and enhance both the needs of the ADH and the AGIO in providing accurate and current data to serve the needs of the geographic information system (GIS) community and the general public. Location coordinate data include Community Health Centers (see map), Health Units, Hospitals, Hospitals Heliports, and other types of statewide and community "critical health Infrastructure" data layers.



Community Health Centers, Arkansas Health Atlas

Final Thoughts

“Confidentiality and Geospatial Data Workshop” NASA Public Health Applications Program

Appreciation is extended to **Meredith Golden**, Senior Staff Associate, Center for International Earth Science Information Network (CIESIN), Columbia University, **Roberta Miller**, Director, CIESIN, and **Robert Venezia**, Program Manager for Public Health Applications, U.S. National Aeronautics and Space Administration (NASA), for their organization and leadership at the July 16, 2003 “Confidentiality and Geospatial Data Workshop,” held at the National Academy of Sciences. The primary goal of the meeting was to raise awareness among NASA researchers who utilize geospatial data for public health research and NASA administrators and legal staff who either manage or review confidentiality agreements between NASA and public health agencies.

There was an overview of key issues to begin the workshop followed by two panels. One consisted of government officials addressing the problems they have faced, and the protocols their agencies have implemented or would like to develop. The second included scientists from universities, government agencies, and research centers which explored the degree to which georeferenced data compromises confidentiality and what alternative methods can be employed to preserve confidentiality while reaping the benefits of integrating geospatial and other survey data. The plan is to have a final report and detailed bibliography, resulting from the workshop, posted to the Web in the future.

I found the workshop to be timely and informative. In this interim, I want to share some of my notes that may find a common interest among our readership. As you know, remote sensing is no longer a tool of the earth sciences but has become part of the social science toolkit for more than a decade. Higher spatial and spectral resolution of new

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satellite sensors makes remote sensing indispensable for many related public health applications, from the surveillance and detection of disease vectors and their transmission to a variety of emergency preparedness and response conditions, such as natural disasters, bioterrorism and homeland security. It was the National Research Council's 1998 "People and Pixels: Linking Remote Sensing and Social Science" that systematically demonstrated the relationship between remote sensing applications and social science research. The 2002 CIESIN report, "A CIESIN Thematic Guide to Social Science Applications of Remote Sensing," builds upon the case for this relationship.

As a public health geospatial tool, remotely sensed information faces similar challenges to the preservation of the confidentiality of georeferenced data where even at 30m² resolution the possibility exists to identify specific respondent locations. It may come as a surprise to many but NASA has no real guidance on confidentiality; as Bob Venezia stated in his opening remarks, "it is an issue whose time has come." **Deborah Balk**, CIESIN, pointed out that as the potential for greater use of remote sensing increases for use in demographic and health surveys, there is a similar potential for liability issues concerning privacy and confidentiality. Speaking for the National Science Foundation (NSF), **Tom Baerwald** remarked that "no one in NSF has a confidentiality specialty or is devoted to this issue." Although NSF funds the work of others, Tom believes NSF must become involved--it has a responsibility that NSF funded researchers be in compliance with confidentiality issues.

From a researcher's perspective, **Ronald Rindfuss**, UNC-Chapel Hill, addressed the issue of Institutional Review Board (IRB) involvement with confidentiality issues where human subjects are involved in the study. He stated that the insistence on confidentiality is relatively new, but that IRBs become involved in both data collection and data release activities. He mentioned that different solutions will arise given the difference in studies but can become complicated for research outside of the U.S. **Joanne Gabrynowicz**, University of Mississippi, provided an intriguing etiology of confidentiality in a legal context, from Common Law (tort) in the 4th, 5th and 14th Amendments to the recent HIPAA requirements to protect health information. She pointed out that the NASA 1974 Privacy Act doesn't cover individuals in geospatial data and that although NASA is not a "covered entity" by HIPAA definition, it could be considered a "business associate" which could bring NASA under the purview of this law. In view of the fact this is yet a well defined area, Joanne felt it important that NASA "err on the side of privacy, make a good faith effort to protect confidentiality, and develop in-house expertise for privacy protection."

Peter Madsen, Carnegie Mellon University, focused on the "ethical perspective" where although privacy and confidentiality go hand-in-hand (e.g., data providers or subjects want privacy, data users or researchers want data access while maintaining confidentiality protections of individuals), there is a "tension" between the two. Privacy is a social good but restrictive controls on data access tend to lessen the social good. There is also the problem of who owns the data once collected? **Jerry Garegnani**, ESRI, Inc., gave an industry perspective suggesting binding agreements to show everything was done to protect privacy, that organizations create a well documented data use and disclosure plan, that organizations decide on how geospatial data will be presented, and that GIS be used to validate organizational policies e.g., use GIS to purposely test the breach of privacy.

I could possibly fill another five pages on the afternoon panels and stimulating discussions. In the interest of time (and space) I want to recognize these participants and, in several cases, mention a highlight from their presentation. **Steven Guptill**, US Geological Survey, spoke to issues of infectious disease and confidentiality. In particular, problems with geospatial case data goes back to data originators but the rules for disclosure vary from state to state. And these barriers can result in potentially deleterious effects on communities with harmful elevated exposures. **C. Virginia Lee**, Agency for Toxic Substances and Disease Registry, spoke about issues of potential litigation and where even emergency response information from harmful exposures cannot be published because of too few human subjects (e.g., example of relationship between chlorine spills and respiratory conditions). **Mario Merlino**, New York City Department of Health, pointed out the inability to enforce data release agreements and that denying data requests can result in legal action. Even if one identifies a mosquito trap location on a map (i.e., near a park or zoo), it can result in problems in human interest in these areas. **Philip Steele**, US Census Bureau, showed that even though the Bureau has seven secure research data centers spanning the nation, access is limited, the use of GIS is restrictive and there is an economic cost to use and maintain them. **Alvan Zarate**, NCHS, CDC, also reviewed the NCHS secure Research Data Center and pointed out that

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although researchers have access to data sets, they cannot take away any data (summary only) and cannot take away any maps. Even cell or geographic area size of 100,000 population can carry disclosure risks and must be justified for use. **Rebecca Clark**, National Institute of Child Health and Development (NICHD), NIH, stated that NICHD funds extramural research and that HIPAA guidelines make it expensive to preserve confidentiality, especially for small grants. She cited the need for standards and thus confidentiality requirements can vary from review to review.

The final panel of the day included **Livia Montana**, AID funded Demographic and Health Survey Data (DHS); **Gregory Glass**, Johns Hopkins Bloomberg School of Public Health; **Myron Gutmann**, Inter-university Consortium for Political and Social Research (ICSPR), University of Michigan, and **Charles Taylor**, UCLA. Livia said the DHS has been releasing micro-level data (e.g., cluster level where 1 in every 8 households enumerated) in developing countries but blood testing for HIV changed confidentiality to become more protective. Greg showed that trying to relate 33 cases of Hantavirus to environmental data makes confidentiality a difficult barrier to gaining statistical power, where remotely sensed data needs to be aggregated. Myron discussed the issue that confidentiality is good but comes with a price e.g., less successful research. Charles pointed out that cultural differences in foreign countries can present a variety of barriers in the context of confidentiality and gave illustrations based on his field work in rural Mali.

[Editor: I take full responsibility and apologize for any errors in my notes. I hope these observations convey the timeliness and interest found in this workshop. I look forward to the workshop products that will be Web accessible in the future. Contact: **Meredith Golden** at mgolden@ciesin.columbia.edu]



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 54th 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>