

## PUBLIC HEALTH GIS NEWS AND INFORMATION

May 2003 (No. 52)

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

**Selected Contents:** Events Calendar (pp.1-2); (p.8); Public Health and GIS Literature (pp.8-24); Website(s) of Interest (pp. 23-24); Final



News from GIS Users (pp.2-8); GIS Outreach (pp.20-23); DHHS and Federal Update (pp.20-23); Thoughts (pp.24-28)

### I. Public Health GIS (and related) Events:

#### SPECIAL NCHS/CDC/ATSDR GIS LECTURES

**May 28, 2003. "Regional, Seasonal and Ethnic Differences in the NHANES III Pesticide Epidemiology (PEPI) Study"** Ruth H. Allen,<sup>1</sup> Mary Ward,<sup>2</sup> Gauthami Gondy,<sup>3</sup> David T. Mage,<sup>3</sup> and Michael C. Alavanja<sup>2</sup> (<sup>1</sup>US EPA, Office of Pesticide Programs, Washington, DC; <sup>2</sup>NCI, Division of Cancer Epidemiology and Genetics, Rockville, MD; and <sup>3</sup>Temple University, Institute for Survey Research, Washington, DC.). See abstract this edition. Please join us for this NCHS Cartography and GIS Guest Lecture Series to be held in our new NCHS facility and Auditorium (RM1405B), **10:00-11:30AM**, Hyattsville, MD; This NCHS GIS Guest Lecture Series has been presented continuously since 1988. Envision is available to offsite CDC/ATSDR locations; Web access will be available at the time at <http://video.cdc.gov/ramgen/envision/live.rm>. Cosponsors to the NCHS Cartography and GIS Guest Lecture Series include CDC's Behavioral and Social Science Working Group (BSSWG) and Statistical Advisory Group (SAG). [All NCHS Cartography and GIS presentations are open to the public. Contact: Editor, *Public Health GIS News and Information*]

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

\* 2003 Annual Meeting of the Population Association of America, May 1-3, 2003, Minneapolis MN [See: <http://www.popassoc.org>]

\* Southern California Public Health Association (SCPHA) Annual Conference, "Building Healthy Futures: Public Health Makes a Difference," May 9, 2003, Cerritos CA [See: <http://www.phfe.org/main.html?events>]

\*58th Annual American Association for Public Opinion Research (AAPOR) Conference, May 15-18, Nashville TN [See: <http://aapor.org>]

\* The National Conference on Digital Government Research May 18-21, 2003, Boston, MA [See: <http://www.dgrc.org>]

\* Conference on Federal Statistics and Counterterrorism, Committee on National Statistics at the National Academies, May 29-30, 2003, Washington, D.C. [Contact: David Banks at [banksd@cber.fda.gov](mailto:banksd@cber.fda.gov)]

\*National Environmental Health Association 2003 Chemical and Bioterrorism Preparedness Conference, June 8-11, 2003, Reno NV [See: [www.neha.org](http://www.neha.org)]

\* DVD 2003 International Conference, June 9-11, 2003, Gaithersburg MD [See: [www.nist.gov/dvd2003](http://www.nist.gov/dvd2003)]

\* 36th Annual Meeting of the Society for Epidemiological Research (SER), June 11-14, 2003, Atlanta, GA, [See: <http://www.epiresearch.org>]

\* 101<sup>st</sup> International Medical Symposium in Medical Geography, July 14-18, 2003, Manchester UK [See: <http://www.art.man.ac.uk/Geog/imgs>]

\* International Geoscience and Remote Sensing Symposium (IGARSS), July 21-25, 2003, Toulouse France [See: <http://www.colloquium.fr/igarss03>]

\* Sixteenth Annual Occupational Health & Safety Institute July 28-August 1, 2003 (sponsored by Center for Occupational & Environmental Health (COEH) Continuing Education Program at the University of California, Berkeley), Emeryville, CA [See: <http://socrates.berkeley.edu/~coehce>]

\* 2nd annual Public Participation GIS (PPGIS) Conference, Urban and Regional Information Systems Association (URISA), July 20-22, 2003, Portland OR [See:

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<http://www.urisa.org>]

\*ASTHO-NACCHO (Association of State and Territorial Health Officials/National Association of County and City Health Officials), 2003 Joint Conference, September 9-12, 2003, Phoenix, AZ [See: [www.astho.org](http://www.astho.org)]

\* 6th International Symposium on Environmental Geochemistry, September 7-11, 2003, Edinburgh, Scotland [See: <http://home.swipnet.se/medicalgeology>]

\* North American Cartographic Information Society XXIII, October 8-11, 2003, Jacksonville FL [See: <http://www.nacis.org>]

\*2003 Street Smart and Address Savvy Conference, Urban and Regional Information Systems Association (URISA), August 17-20, 2003, Providence RI [See: <http://www.urisa.org>]

URISA Annual Conference, October 11-15, 2003, Atlanta GA [See: Special request for CDC/ATSDR participation, Section D of this edition, and <http://www.urisa.org>]

\* 2003 International Conference on Health Policy Research: Methodological Issues in Health Services and Outcomes Research, October 17-19, Chicago IL [See: <http://www.amstat-online.org/sections/hpss/ichpr.htm>]

\* 26<sup>th</sup> Annual Applied Geography Conference, November 5-8, 2003, Colorado Springs CO [See: [www.appliedgeog.org](http://www.appliedgeog.org)]

\* APHA 131st Annual Meeting & Exposition, "Behavior, Lifestyle and Social Determinants of Health," November 15-19, 2003, San Francisco CA [See: <http://www.apha.org>]

### 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. From **Victoria Currie**, Census Bureau (ACS Operations Plan Now Available): The Census Bureau's **American Community Survey Operations Plan, Release 1: March 2003** has been released and is now available at

<http://www.census.gov/acs/www/Downloads/OpsPlanfinal.pdf>.

This plan identifies and documents the individual components of the ACS and describes projects associated with making the transition from a demonstration program to a production survey. The plan is intended to serve as a reference manual, and to assist communication and understanding about the ACS program.

2. From **Rachel Boba**, Police Foundation: I would like to announce the release of the next two issues of the **Crime Mapping News**: Volume 5 Issue 1, Winter 2003 and Issue 2, Spring 2003. Issue 2 includes articles submitted by crime mapping professionals on a variety of subjects. The articles in this issue cover topics including 1) an overview of the recently released CrimeStat II spatial statistics program, 2) a discussion of the use of maps to depict the scale and impact of the crimes of Dr. Harold Shipman, and 3) a technical discussion of a procedure for improving match rates when geocoding to Spanish-named streets and working with incomplete records [See developments at: <http://www.policefoundation.org>; contact: Rachel at [rboba@policefoundation.org](mailto:rboba@policefoundation.org)]

3. CDC and Emory University's Rollins School of Public Health will co-sponsor a course, "**Developing Public Health Software Applications Using Epi Info 2002**," May 13-16, 2003, at Emory University. The course is designed for practitioners of epidemiology and computing with intermediate to advanced skills in computing who wish to develop software applications by using Epi Info 2002 for Windows 95, 98, NT, 2000, and XP. The course covers hands-on experience with operating the new Windows version of Epi Info, programming Epi Info software at the intermediate to advanced level, and using computerized interactive exercises for developing public health information systems. [See course description and details at: <http://www.sph.emory.edu/EPICOURSES>]

4. CDC and Emory University's Rollins School of Public Health will co-sponsor a course, "**Introduction to Public Health Surveillance**" June 9-13, 2003, at Emory University. The course is designed for state and local public health professionals. The course will provide practicing public health professionals with the theoretical and practical tools necessary to design, implement, and evaluate effective surveillance programs. Topics include overview and history

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of surveillance systems; planning considerations; sources and collection of data; analysis, interpretation, and communication of data; surveillance systems technology; ethics and legalities; state and local concerns; and future considerations. [See website for description and enrollment: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5214a8.htm>]

5. From **Dunrie Greiling**, TerraSeer, Inc.: **Exploratory Spatial Data Analysis** will be held June 11-12, 2003, in Ann Arbor, MI. The course is aimed at those interested in extending the use of a GIS beyond mapping towards the identification, visualization and quantification of interesting patterns, outliers and hot spots. [See website for details at <http://www.terraseer.com> or contact Laura Jacquez at (734)-913-1098]

6. **DIMACS Tutorial on Statistical and Other Analytic Health Surveillance Methods**, June 17-20, 2003, Center for Discrete Mathematics & Theoretical Computer Science (National Science Foundation Science and Technology Center), Rutgers University. This tutorial at Rutgers will (<http://dimacs.rutgers.edu/Workshops/NewerStat>) provide an overview of the challenges and address an array of statistical surveillance tools and techniques. The tutorial will address such topics as: scan statistics, statistical process control, change-point methods, Bayesian approaches, rule-based surveillance, text data surveillance, false discovery rate and sequential testing. The tutorial is an outcome of an October 2002 recommendation from the DIMACS Working Group on Adverse Event/Disease Reporting, Surveillance, and Analysis. (Summary report now available at website <http://dimacs.rutgers.edu/Workshops/AdverseEvent/index.html>)

7. From *GeoReport* electronic newsletter: Due to the recent outbreak of SARS in the Toronto area, we regret to inform you that the **GeoInformatics 2003** conference scheduled for June 25-27, 2003, **has been cancelled**. [Please note site <http://www.geoplance.com/pressrelease/detail.asp?id=4698>]

8. From **Mark Reichardt**, Open GIS Consortium, Inc. (OGC): **OGC and IPE Announce Classes in Geospatial Interoperability**: OGC and the Institute for Professional Education (IPE) have collaborated to offer two courses (at various dates and locations) to introduce technical managers to the value and utility of open source standards in technology program development and acquisition, and

address the needs of software engineers in implementing OGC-based solutions. **“Geospatial Interoperability for Managers,”** an interactive 2-day course provides managers with a firm understanding of the elements required to enable geospatial interoperability within their organizations.

**“Geospatial Interoperability for Software Engineers,”** a 4-day course, is designed for software engineers seeking to integrate geospatial standards within their existing or planned applications. The course provides a working analysis of geospatial interoperability vocabulary, standards and technologies for rapid implementation of spatial components in applications. See website for details: <http://www.ipeseminars.org/GIS/interoperabilitySE.htm>]

9. From **Jennifer Carmichael**, George Mason University: George Mason University, the Office of Continuing Professional Education in Prince William VA offers a wide range of courses in the Geographic Information Sciences and a certification program. Current GIS certificate programs include concentrations in: Crime Mapping, Public Health, Defense & Intelligence, Crime Mapping & Analysis, and Public Health Administration & Analysis. [See: <http://gis.ocpe.gmu.edu>]

### **B. Department of Health and Human Services** (<http://www.hhs.gov>)



Health and Human Services Secretary Tommy G. Thompson shows off his rapid-response command center to Senator Edward M. Kennedy [Source: April 13-19 *HHS Weekly Report*]

### **Administration for Children and Families** <http://www.acf.dhhs.gov>

10. The Head Start 7<sup>th</sup> National Research Conference “Promoting Positive Development in Young Children: Developing Strategies That Work,” will be held June 28-

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July 1, 2003, Washington D.C. [See website for details: <http://www.acf.hhs.gov/programs/core/hsrc>]

### Agency for Healthcare Research and Quality

<http://www.ahrq.gov>

11. **AHRQ Research Alert: April 28, 2003.** African-American and Hispanic children in the United States 6 to 11 years of age are significantly more likely than non-Hispanic white children the same age to be overweight while Asian-American-Pacific Islander children are slightly less likely to be so, according to a new nationwide study sponsored by the federal Agency for Healthcare Research and Quality. But as adolescents, the relative positions reverse.

### Agency for Toxic Substances and Disease Registry

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

12. Public review and comment period on two health consultations in Anniston AL, **PCB Air Sampling Review and the Summary of Recent Work on Children's Blood Lead Levels**, is being extended through May 12, 2003.

### Centers for Disease Control and Prevention

<http://www.cdc.gov>

13. CDC's Statistical Advisory Group will sponsor a two-day course "**Introduction to Geographic Information Systems and Spatial Analysis for Environmental and Public Health Studies**," May 8-9, 2003, at CDC's Stanford Building, Atlanta. Course instructors are Lance Waller, Department of Biostatistics, Emory University and Carol Gotway Crawford, National Center for Environmental Health. The first day involves an in-depth overview of the components, features, sources and management of spatially-referenced data with particular attention given to the strengths and limitations of geographic information systems (GISs) in spatial analysis. During the second day, we continue the theme and review statistical methods for the analysis of spatial data including point process models, geostatistics, and the analysis of regionally referenced counts and rates. Both days include numerous examples drawn from environmental and public health applications. [Contact Carol at [ccrawford1@cdc.gov](mailto:ccrawford1@cdc.gov)]

14. The **National Center for Environmental Health** (NCEH) will host a presentation, viewable through Envision, by the **US Geological Survey** (USGS) on May 19, 2003, in Atlanta. The purpose of the visit is to explore

new opportunities for collaboration and for CDC employees to gain a better understanding of USGS expertise and resources. In addition to the Envision presentation a discussion group will be held to explore ideas for collaborative projects and plans for follow-up. [Contact: Mark Miller at [mdmiller@cdc.gov](mailto:mdmiller@cdc.gov); see also editorial this edition on this new USGS public health initiative]]

15. From **Edward Sondik**, Director NCHS: I am very pleased to announce the release of **Shaping a Health Statistics Vision for the 21st Century**, an important new publication that identifies principles, challenges, and opportunities in the future, and formulates a strategic vision for health statistics and the health statistics enterprise in the U.S. [see <http://www.ncvhs.hhs.gov/hsvision>]. This report, developed through a partnership of the National Committee of Vital and Health Statistics (NCVHS), NCHS, and the Department of Health and Human Services Data Council, draws on a national consultative process that involved numerous stakeholders in the health statistics enterprise. The report includes NCVHS recommendations for implementing this vision, and calls for stronger integration and coordination in order to improve health statistics and ultimately the nation's health. The report acknowledges NCHS' central role in the nation's health statistics enterprise, and the concomitant expectations for us to help move this enterprise forward. I am confident that this report will help us in our efforts to better communicate the importance of what we do, and help guide NCHS and our partners in the future.

16. From NCHS: The **National Health and Nutrition Examination Survey (NHANES)** hosted an open house in Washington, D.C., one of the fifteen examination sites in the 2003 national sample. NHANES is a unique national survey designed to assess the health and nutritional status of adults and children in the United States. The survey examines a nationally representative sample of approximately 5,000 people each year through a combination of health interviews, physical examinations, and laboratory tests. The health interviews are conducted in respondents' homes, and the physical examinations are performed in the NHANES Mobile Exam Center (MEC). Data that is collected and compiled across the country is used as the epidemiological basis for much public health and biomedical research. The information is used as a demographic snapshot and is used to track health trends



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Indian health network. The Strategic Plan is structured around 4 strategic goals: Build Healthy Communities, Achieve Parity in Access by 2010, Provide Compassionate, Quality Health Care, and Embrace Innovation.

### National Institutes of Health

<http://www.nih.gov>

21. Office of Preventive Oncology (Cancer Prevention and Control Lecture Series): **“Using GIS in Cancer Prevention to Address Screening Disparities,”** a timely presentation by Cynthia A. Warrick, Assistant Professor, Management and Policy Sciences and Investigator, Center for Health Promotion and Prevention Research, University of Houston School of Public Health. The topic is how GIS can be used to integrate social science methods with cancer prevention methods to study and analyze cancer screening in underserved populations.

22. National Institute for Environmental Health Sciences (NIEHS)- Announcing **RFA Environmental Justice: Partnerships For Communication (ES-03-007)**: The purpose of this program is to strengthen NIH NIEHS and CDC NIOSH support of joint research targeted at achieving environmental/occupational justice for socioeconomically disadvantaged and medically underserved populations in the United States. One goal of the participating institutions is to understand the influence of economic and social factors on the health status of individuals exposed to environmental or occupational toxicants. This component of the research program in environmental justice is designed to encourage community outreach, training, research and education efforts that will become the catalyst for reducing exposure to environmental pollutants in underserved populations. The main objective of this request for application is to establish methods for linking members of a community, who are directly affected by adverse environmental conditions or community based organizations serving affected communities, with researchers and health care providers and to create partnerships that can address environmental health problems. Community based organizations are especially encouraged to apply.

Some of the issues identified by research in the field of environmental and occupational health are: \*Inner-city poor often live in homes with high lead levels and may also be exposed to higher levels of air pollution; \*Toxic waste sites are more frequent in rural, low socioeconomic counties in the United States; \*Nuclear facilities and

chemical plants are often located in rural areas; \*Exposure to pesticides is another example where rural, socioeconomically disadvantaged populations are at a greater than average risk; \* Disadvantaged neighborhoods may rely on well water that may be polluted with toxic chemicals; \*Medical care is often inadequate or unavailable to a significant proportion of the socioeconomically disadvantaged and minority people; \*Lead poisoning and the cognitive and developmental damage associated with exposure to lead occur disproportionately among minorities; \*High blood pressure and prostate cancer are very common among African Americans; \*Low birth weight babies and other problems during pregnancy are common among groups of women who do not have access to good prenatal care; \*Minority and immigrant workers are employed disproportionately in industries with higher injury and illness rates, such as food processing, textile and garment manufacturing, services including health care services, construction and agriculture; \*Both African-American and Hispanic workers have been shown to be disproportionately impacted by workplace injuries and fatalities; \*Workers exposed to hazardous substances at workplaces with inadequate cleanup facilities can contaminate their homes with toxic substances. [Contact: Shobha Srinivasan at [ss688k@nih.gov](mailto:ss688k@nih.gov); The RFA and application can be found at: <http://grants1.nih.gov/grants/guide/rfa-files/RFA-ES-03-007.html>]

### Substance Abuse and Mental Health Services Administration

<http://www.samhsa.gov>

23. In 2000, **Hispanic females aged 12 to 17 were at higher risk for suicide than other youths.** Only 32 percent of Hispanic female youths at risk for suicide during the past year, however, received mental health treatment during this same time period. [April 23, 2003 release]

### 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>]

24. **Pamela R. Bingham**, National Medical Association, and Coordinator, **HBCU Summer Faculty GIS Program**: This nationally recognized program is tentatively scheduled for the week of July 27, 2003. Confirmation of dates and

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program details will be announced in the very near future.  
[Contact person: Pamela at [pbingham@NMAnet.org](mailto:pbingham@NMAnet.org)]

### **D. Other Related Agency or Business GIS News**

25. From **Nikki Snowwhite**, ESRI: ESRI will host the **2003 ESRI International Health GIS Conference** May 4-7, 2003, in Arlington, VA (see site at [www.esri.com/health](http://www.esri.com/health)). Participants will see and hear about the latest advances in GIS technology and future developments in topics such as geodatabase design, disease surveillance, health geography network, and enterprise GIS. Health and human services directors, GIS technical managers, and other GIS users will be able to attend more than 45 technical sessions, visit vendor exhibits, participate in the interactive Health Care Situation Room demonstration, and witness firsthand the SAS Bridge for ESRI.

Sessions at the conference will focus on GIS usage in the following areas: Improving community health; Changing the way health services are delivered; GIS-driven policy changes in health and human services; Changing the way health organizations work using GIS; Evidence-based decision making using GIS; GIS in disaster and bioterrorism preparedness planning; and, GIS in disease surveillance. [Contact: Nikki at [press@esri.com](mailto:press@esri.com)]

26. From **Marilyn Ruiz**, University of Illinois: A Special Invitation for Papers, Urban and Regional Information System Association-URISA-Annual Conference and Exposition, October 11-15, 2003, Atlanta, Georgia. The public health and social services track at the 41<sup>st</sup> Annual URISA conference (see <http://www.urisa.org/annual.htm>) **has set aside a special session for GIS-related CDC/ATSDR presentations**. This year's conference is in Atlanta and we invite GIS users, managers and developers to submit an abstract for inclusion in the program.

The emphasis in the track is on development of special applications, results from public health research, and lessons learned in the course of data sharing and cooperative, multi-agency activities. Although the official call for papers deadline has passed, this special invitation is open until 15 May 2003. The session is scheduled for Tuesday, 14 October 2003, from 10:30-Noon. [Contact: Marilyn, at [moruiz@uiuc.edu](mailto:moruiz@uiuc.edu) or voice (217)-265-5115]

27. From the **National Science foundation's TeraGrid**: Fiber optic links between Los Angeles and Chicago have

been "lit up" to form the cross-country network backbone for the National Science Foundation's \$88 million TeraGrid project. Technicians are sending the first test data packets racing across the network, which boasts an unprecedented bandwidth-roughly one million times the speed of a typical dial-up Internet connection and four times faster than existing research networks.

At 40 gigabits per second, the new "backplane," developed in partnership with Qwest Communications, will connect the resources of the TeraGrid, a multiyear effort to build and deploy the world's largest, fastest, distributed computing infrastructure for open scientific research. Scientists will use the TeraGrid to make fundamental discoveries in fields as varied as biomedicine, global climate, and astrophysics. The first applications will begin to use the TeraGrid capabilities from all sites this spring.

The TeraGrid partners are the National Center for Supercomputing Applications (NCSA); the San Diego Supercomputer Center (SDSC); Argonne National Laboratory (Argonne); the Caltech Center for Advanced Computing Research (CACR); and the Pittsburgh Supercomputing Center (PSC). When completed, the TeraGrid will include 20 teraflops of computing power, facilities capable of managing and storing nearly one petabyte of data, high-resolution visualization environments, and toolkits for grid computing. [See website and details at <http://www.teragrid.org>]

28. From **A M Productions Inc**, Vancouver B.C. Canada (Announcing the new release of **Introduction to GIS, A Workshop**, now on DVD!): As an introduction to our comprehensive GIS & Remote Sensing Library, comprised of **60 titles**, we are pleased to offer our 5-hour introductory workshop on GIS with Prof. Kevin Price, Department of Geography, University of Kansas. GIS-49, the original video version of Introduction to GIS, A Workshop, has continued to be our most popular video, and we are now introducing the new *digital* version of this workshop on 3 DVDs. [See website for details and ordering: <http://www.amproductions.com>]

### *Conversation on SAS and ArcGIS*

29. From **Jennifer Harar**, ESRI: There is a new partnership between SAS and ESRI that has led to the development of the SAS Bridge for ESRI that will allow organizations to exchange spatial and attribute data as well as metadata between ArcGIS and the SAS server [see

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<http://www.esri.com/news/arcnews/winter0203articles/sas-and-esri.html>]. The initial release of the SAS Bridge for ESRI will operate under SAS 8.2 and higher releases with Windows 2000, NT, and XP operating systems. It works with ArcGIS Desktop 8.x. The first version of this tool, V1.0, is a graphical user interface (GUI) that will allow the read-and-write exchange of data between SAS and ArcGIS. Example templates for running SAS programs in the ArcGIS environment are also included. The SAS Bridge will be sold by SAS. [Contact: Jennifer JHarar@esri.com]

### III. GIS Outreach

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

Maria Alexandra Duran Romero, who is doing epidemiology work in Colombia, SA, writes: I live in Villavicencio, capital of Meta department, located in the oriental plains. For this localization the climate is very conducive for all tropical diseases. I want to know if it is possible to publish an investigation I conducted for the health department about a case of yellow fever that occurred this year.

Editor: The submission of epidemiologic studies that incorporate use of GIS and spatial analytic techniques are invited. Submitted work is reviewed for content appeal, scientific methods, data accuracy and stylistic approach. [Contact: Maria at mariaalex777@hotmail.com]

### IV. Public Health GIS

#### Presentations and Literature

#### **NCHS Cartography and GIS Guest Lecture Series**

**May 28, 2003 at 10:00AM EDT**

**Regional, Seasonal, and Ethnic Differences in the NHANES III Pesticide Epidemiology (PEPI) Study**, by Ruth H. Allen<sup>1</sup> Mary Ward<sup>2</sup> Gauthami Gondy<sup>3</sup> David T. Mage<sup>3</sup> and Michael C. Alavanja<sup>2</sup> (<sup>1</sup>US EPA, Office of Pesticide Programs, Washington, DC; <sup>2</sup>NCI, Division of Cancer Epidemiology and Genetics, Rockville, MD; and <sup>3</sup>Temple University, Institute for Survey Research, Washington, DC). Abstract. The third National Health and Nutrition Examination Survey (NHANES III 1988-1994) collects health and nutrition data for a sample of the U.S. population. Exposure information and pesticide metabolites were analyzed for a sub-sample of 1338 NHANES III participants ages 20 to 59 from 24 locations in 13 states, and 978 people provided urine samples for analysis of pesticide metabolites (ug/L and ug/g creatinine corrected). We describe: the geometric mean, median, interquartile

range and 95th percentile for pesticide metabolites by region, season, ethnic differences, and seasonal differences by census region; a higher apparent pesticide burden for respondents in the South and Midwest; a comparison of high urban (>1 million) geographic areas to areas adjacent to urban area (>1 million); a deficit of rural counties or areas with active agriculture; seasonal variation by region, where 1-naphthol and 2,5-dichlorophenol had a higher concentration for the samples taken in the summer; and, provide crop specific pesticide use patterns at the time of the survey for the few predominantly rural counties. Because samples were mainly obtained from highly urban locations, exposures among the rural population living in agricultural areas may be different. Furthermore, sampling did not always occur in high pesticide use seasons in all areas surveyed, limiting our ability to make regional comparisons and possibly underestimating exposures in some areas. Due to the small sample size more data will be needed to confirm these findings, and targeted studies with community HANES on populations in agriculture over multiple seasons. [Contact: Allen.Ruth@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 May 2003 9(5) edition is available. [EID articles at <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 <http://www.cdc.gov/subscribe.html> and access the MMWR online at <http://www.cdc.gov/mmwr>]: Vol. **50**, No. **53**- *Summary of Notifiable Diseases-United States*, 2001; Vol. **52**, No. **17**- World Asthma Day, May 6, 2003; Self-Reported Asthma Prevalence and Control Among Adults-United States, 2001; Update: Severe Acute Respiratory Syndrome-United States, 2003MMWR Dispatch, Vol. **52/April 29, 2003**- *Updated Interim Surveillance Case*



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*Definition for Severe Acute Respiratory Syndrome (SARS)-United States, April 29, 2003*; Vol. **52**, Early Release-HIPAA Privacy Rule and Public Health Guidance from CDC and the U.S. Department of Health and Human Services; Appendix A: Selected Privacy Rule Concepts and Definitions; Appendix B: Sample Text That Can Be Used To Clarify Public Health Issues Under the Privacy Rule *MMWR Recommendations and Reports*, Vol. **52**, No. **RR-7**- *Recommendations for Using Smallpox Vaccine in a Pre-Event Vaccination Program*: [includes] *Supplemental Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Healthcare Infection Control Practices Advisory Committee (HICPAC)*; Vol. **52**, No. **16**- Update: Severe Acute Respiratory Syndrome-United States, 2003; Update: Adverse Events Following Civilian Smallpox Vaccination-United States, 2003; Nationwide Measles Vaccination Campaign for Children Aged 6 Months-12 Years-Afghanistan, 2002; Progress Toward Global Eradication of Poliomyelitis, 2002; Notice to Readers: Public Health Information Network Conference; Vol. **52**, No. **15**- Advancing HIV Prevention: New Strategies for a Changing Epidemic-United States, 2003; Update article: Severe Acute Respiratory Syndrome [SARS]-United States, 2003; Pneumoconiosis Prevalence Among Working Coal Miners Examined in Federal Chest Radiograph Surveillance Programs-United States, 1996-2002; Preliminary FoodNet Data on the Incidence of Foodborne Illnesses-Selected Sites, United States, 2002 Vol. **52**, No. **14**- Prevalence of Current Cigarette Smoking Among Adults and Changes in Prevalence of Current and Some Day Smoking-United States, 1996-2001; Point-of-Purchase Alcohol Marketing and Promotion by Store Type-United States, 2000-2001; Notice to Readers: Epi Info 2002: A Course for Developers of Public Health Information Systems; **52**, No. **12**- Update: Outbreak of Severe Acute Respiratory Syndrome-Worldwide, 2003; Cardiac Adverse Events Following Smallpox Vaccination-United States, 2003; Progress Toward Poliomyelitis Eradication-Egypt, 2002; Preliminary Clinical Description of Severe Acute Respiratory Syndrome; Vol. **52**, No. **RR-6**, *Key Clinical Activities for Quality Asthma Care: Recommendations of the National Asthma Education and Prevention Program*; Vol. **52**, No. **11**- Trends in Tuberculosis Morbidity-United States, 1992-2002; Update: Influenza Activity-United States, 2002-03 Season; Outbreak of Severe Acute Respiratory Syndrome-

Worldwide, 2003; Public Health Dispatch: Absence of Transmission of the d9 Measles Virus-Region of the Americas, November 2002-March 2003; Notice to Readers: Smallpox Vaccine Adverse Events Among Civilians-United States, 2003; Recommendations and Reports, Vol. **52**, No. **RR-5**, *Compendium of Animal Rabies Prevention and Control, 2003 National Association of State Public Health Veterinarians, Inc. (NASPHV)*; Recommendations and Reports, MMWR Dispatch, Vol. **52**- *Preliminary Clinical Description of Severe Acute Respiratory Syndrome*; Vol. **52**, No. **10**- Colorectal Cancer Test Use Among Persons Aged greater than or equal to 50 Years-United States, 2001; Smallpox Vaccine Adverse Events Among Civilians-United States, March 4-10, 2003; Notice to Readers: National Vaccine Advisory Committee Report on Strengthening the Vaccine Supply; Vol. **52**, No. **9**- Source of Firearms Used by Students in School-Associated Violent Deaths-United States, 1992-1999; Progress Toward Poliomyelitis Eradication-India, 2002; Vaccination Coverage Among Children Enrolled in Head Start Programs, Licensed Child Care Facilities, and Entering School-United States, 2000-01 School Year; Smallpox Vaccine Adverse Events Among Civilians-United States, February 25-March 3, 2003; Vol. **52**, No. **8**- Secondhand Smoke Exposure Among Middle and High School Students-Texas, 2001; Ambulance Crash-Related Injuries Among Emergency Medical Services Workers-United States, 1991-2002; Smallpox Vaccine Adverse Events Among Civilians-United States, February 18-24, 2003.

### *New Books*

*INTERNET GIS: Distributed Geographic Information Services for the Internet and Wireless Networks*, Zhong-Ren Pong and Ming-Hsiang Tsou, John Wiley & Sons, Inc: Hoboken NJ, 2003. This book is timely. It will dispel any questions in your organization about whether to join in the XML/GML (Extensible and Geography Markup Languages) trend for the delivery of geospatial and GIS web distributed services. It shows that XML/GML, unlike HTML (Hypertext), is far better designed for the encoding of geographic features and distributed web interoperability. It is the current solution for spatial information discovery and data exchange. The authors provide a thorough examination of the evolution of GIS technology on the web, the structure of the web, the ascendancy from HTML to the hierarchical structure of XML/GML (most suitable for geospatial applications), and a variety of other related topics

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including mobile GIS. It is an excellent resource in this dynamic field and very well organized and written. It will help agencies to understand the challenges associated with the delivery of web-based geospatial services and many of the needed solutions. Chuck Croner, Editor.

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*Geology and Health: Closing the Gap*. H.Catherine W. Skinner and A.R. Berger (ed.), Oxford University Press, 2003. [See Final Thoughts, this edition]

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*Introductory Biostatistics for the Health Sciences*, M Chernick, and R Friis, John Wiley & Sons, Hoboken, 2003. This book covers much of what one might expect in a basic statistics text with an orientation to biostatistics. It provides a very brief review of software packages for statistical analysis. It also is brief in the discussion of multiple comparisons in survey analysis and only discusses Tukey's honest significant difference (HSD) test but omits Bonferroni and others. The discussion of least squares and robust regression is made interesting using Florida's Palm Beach County data in the contested butterfly ballot controversy. It does not (by design) include GIS or issues of spatial analysis. Some minor contextual errors exist such as misspelling and incomplete reference to CDC (should be Centers for Disease Control *and Prevention*). Chuck Croner, Editor.

### New Reports

#### Institute of Medicine, National Academies Press

[See: <http://www.nas.edu/health>]

#### **The Future of the Public's Health in the 21st Century**

Committee on Assuring the Health of the Public in the 21st Century, 2003- Medical Science, "Public Health and Health Care" (selected studies listed). **Setting the Course: A Strategic Vision for Immunization-Part 3: Summary of the Los Angeles Workshop**, Committee on the Immunization Finance Dissemination Workshops, 2003; **Microbial Threats to Health: Emergence, Detection, and Response**, M Smolinski, M Hamburg, and J Lederberg, *Editors*, Committee on Emerging Microbial Threats to Health in the 21st Century, 2003; **Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care**, B Smedley, A Stith, and A Nelson, *Editors*, Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care,

2002; **Countering Bioterrorism: The Role of Science and Technology**, Panel on Biological Issues, Committee on Science and Technology for Countering Terrorism, National Research Council, 2002; **An Assessment of the CDC Anthrax Vaccine Safety and Efficacy Research Program**, Committee to Review the CDC Anthrax Vaccine Safety and Efficacy Research Program, 2002.

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**America's Children and the Environment: Measurements of Contaminants, Body Burdens, and Illnesses** (2<sup>nd</sup> edition), T Woodruff, D Axelrad, A Kyle, O Nweke and G Miller, US Environmental Protection Agency, Office of Policy, Economics and Innovation, and Office of Children's Health Protection, EPA Report 240-R-03-001, February 2003.

### Titles

- **Geographic information systems for transportation: Principles and applications**, Fotheringham AS, *Int J Geogr Inf Sci* 17 (3): 294-295 APR-MAY 2003;

- **Geographic information systems and environmental modeling**, Clarke KC, Parkes BO, Crane MP, Lees B, *Int J Geogr Inf Sci*, 17 (3): 296-298 APR-MAY 2003;

- **Using a GIS-based floating catchment method to assess areas with shortage of physicians**, by Wei Luo, *Health & Place*, In press, reference doi:10.1016/S1353-8292(02)00067-9.

- **Use of geographic information systems for assessing groundwater pollution potential by pesticides in Central Thailand**, Thapinta A, Hudak PF, *Envir Internl*, 29 (1): 87-93, APR 2003;

- **Fear of bioterrorism and implications for public health preparedness**, Dworkin MS, Ma X, Golash RG, *Emerg Infect Dis* 9 (4) APR 2003, [See online at <http://www.cdc.gov/ncidod/EID/vol9no4/02-0593.htm>]

**Characterization of urban air quality using GIS as a management system**, Puliafito E, Guevar M, Puliafito C, *Envir Pollution*, 122 (1): 105-117, MAR 2003;

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- **Geographic information systems in community-based gerontological research and practice**, Hirshorn BA, Stewart JE, *J of Appl Gerontol*, 22 (1): 134-151 MAR 2003;
- **Choosing area based socioeconomic measures to monitor social inequalities in low birth weight and childhood lead poisoning: The Public Health Disparities Geocoding Project (US)**. Krieger N, Chen JT, Waterman PD, Soobader MJ, Subramanian SV, Carson R, *J of Epidemiol & Comm Health*, 57(3):186-99, MAR 2003;
- **National Inventory of Hospital Trauma Centers**, MacKenzie EJ, Hoyt DB, Sacra JC, Jurkovich GJ; Carlini AR; Teitelbaum SD, Teter H, *JAMA*, 289 (12):1515-1522. MAR 2003;
- **Exposure to Ambient Fine Particulate Matter and Primary Cardiac Arrest among Persons With and Without Clinically Recognized Heart Disease**, Sullivan J, Ishikawa N, Sheppard L, Siscovick D, Checkoway H, Kaufman J, *Am. J. Epidemiol*, 2003 157: 501-509;
- **Effects of Climate on Variability in Lyme Disease Incidence in the Northeastern United States**, Subak S, *Am. J. Epidemiol*, 2003 157: 531-538;
- **Estimating long-term average particulate air pollution concentrations: Application of traffic indicators and geographic information systems**, Brauer M, Hoek G, van Vliet P, Meliefste K, Fischer P, Gehring U, Heinrich J, Cyrys J, Bellander T, Lewne M, Brunekreef B, *Epidemiol*, 14 (2): 228-239 MAR 2003
- **Use of retrospective data to assess ecotoxicological monitoring needs for terrestrial vertebrates residing in Atlantic coast estuaries**, Cohen JB, Rattner BA, Golden NH, *Ecotoxicology*, 12 (1-4): 365-375 FEB-AUG 2003
- **Multimodal geographic information systems: Adding haptic and auditory display**, Jeong W, Gluck M, *J Am Soc Inf Sci Tec*, 54 (3): 229-242 FEB 1 2003;
- **GRASP: generalized regression analysis and spatial prediction**, (vol 157, pg 189, 2002), Lehmann A, Overton JM, Leathwick JR, *Ecol Model*, 160 (1-2): 165-+ FEB 1 2003;
- **Local clustering in breast, lung and colorectal cancer in Long Island, New York**, Jacquez GM, Greiling DA, *Inter J Health Geog*, 2(3), FEB 2003;
- **Geographic boundaries in breast, lung and colorectal cancers in relation to exposure to air toxics in Long Island, New York**, Jacquez GM, Greiling DA, *Inter J Health Geog*, 2(4), FEB 2003;
- **Visualization of the spatial scan statistic using nested circles**, Boscoe FP, McLaughlin C, Schymura MJ, Kielb CL, *Health & Place*; 9 (1) 2003;
- **Breast Cancer Surveillance using Gridded Population Units, Connecticut, 1992 to 1995**, Gregorio DI, Samociuk H., *Ann of Epid*, 13 (1): 42-49 JAN 2003.
- **Late detection of breast and colorectal cancer in Minnesota counties: an application of spatial smoothing and clustering**, Thomas AJ, Carlin BP, *Stat in Med*, 2003; 22 (1): 113-127
- **Role of individual and contextual effects in injury mortality: new evidence from small area analysis**, Borrell C, Rodríguez M, Ferrando J, Brugal M T, Pasarín M I, Martínez V, Plaséncia A, *Inj Prev*, 2002;8:297-302.
- **Using hierarchical spatial models for cancer control planning in Minnesota (United States)**, Short M, Carlin BP, Bushhouse S, *Cancer Causes and Control* 2002; 13 (10): 903-916, December 2002;
- **The clearinghouse approach to enhancing informed public participation in watershed management utilizing GIS and Internet technology**, Smith WJ, *Water Int*, 27 (4): 558-567 DEC 2002
- **Determining the size of spatial clusters in focused tests: Comparing two methods by means of simulation in a GIS**, Sun Y, *J Geograph Syst* 4 (2002) 4, 359-370; DOI 10.1007/s101090300094;

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- **Geographic information system-based truck accident information and management system for New Jersey roadways**, Chien S, Li GC, Daniel J, *Transport Res Rec* (1818): 134-142 2002;

- **Use of spatial statistics and monitoring data to identify clustering of bovine tuberculosis in Argentina**, Perez AM, Ward MP, Torres P, Ritacco V, *Prev Vet Med*, 56 (1): 63-74, NOV 2002.

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### Other Submissions

**Community Environment And Women's Health Outcomes: Contextual Data.** Series Report 23, No. 23. 81 pp. (PHS) 2003-1999, by William Mosher, Lionel Deang, and Matthew Bramlett. A new report from the National Center for Health Statistics, Centers for Disease Control and Prevention, shows that several measures of the social and economic status and resources of a woman's community are closely associated with her health and health-related behaviors. The research team related measures of the characteristics of neighborhoods (counties, census tracts, and block groups) from the 1990 census to measures of behavior in 1995. The report used community characteristics such as median family income, unemployment rates, poverty rates, the percentage of adults who have college degrees, and the occupational composition of the area's work force. The report shows that these are often important factors in accounting for delayed childbearing, use of female sterilization for contraceptive purposes, breast-feeding, and cigarette smoking in 1995. [For details and methods of the report: <http://www.cdc.gov/nchs/releases/03facts/linkoutcome.htm>]

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### Health in the Americas, 2002 Edition

Health in the Americas is considered the most important and most consulted work of all the publications produced by the Pan American Health Organization (PAHO). This edition consists of two volumes and covers the period 1997-2000. Volume I describes the health situation from a regional perspective and contains a series of chapters that identify and analyze the most important general, demographic, and mortality trends of the period; major determinants of health as seen from a variety of political, social, economic, and financial standpoints; principal trends and characteristics of the ongoing health sector reform movement; the role of individuals and communities in promoting health; the association between the physical environment and human

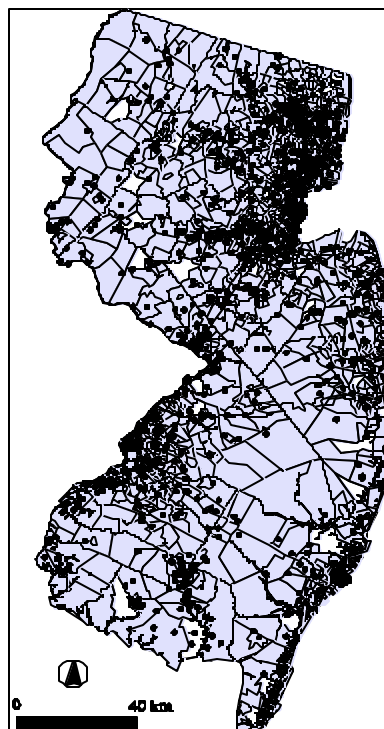
living conditions; principal diseases and health problems; the extent of human and technological resources available to address health issues today; and the status and achievements of international and bilateral cooperation within the context of the growing tendency toward trade globalization. Volume II consists of a breakdown of these same topics by country and covers the 45 nations and territories of the Americas. Other features new to this edition include a discussion of the search for health inequities and how we might reduce them, as well as a greater emphasis on the importance of disaggregating demographical information by sex and incorporating a gender perspective in its analysis. [See: PAHO Online Bookstore at <http://publications.paho.org>; Contact: Mylena Pinzón at [pinzonmi@paho.org](mailto:pinzonmi@paho.org)]

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### Special Report

#### Who Lives Near Hazardous Facilities? GIS and Environmental Risk and Justice

Jeremy Mennis, Department of Geography, University of Colorado, Boulder CO. **Introduction.** Environmental justice research investigates whether socioeconomically disadvantaged persons bear a disproportionate burden of environmental risk. The roots of the environmental justice



movement can be traced to the 1983 protest by residents of Warren County, North Carolina to the development of a polychlorinated biphenyl (PCB) disposal landfill facility in a predominantly minority community. These residents, with the support of civil rights groups, claimed that the siting of the facility was racially discriminatory. This protest spurred landmark studies by the United Church of Christ's Commission

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for Racial Justice and the U.S. General Accounting Office that found evidence for nationwide racial inequity in the distribution of hazardous facilities.

Consequently, in 1994 President Clinton issued Executive Order 12898, which instructs federal agencies to address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...” The U.S. Environmental Protection Agency (EPA) has responded by forming the Office of Environmental Justice and incorporating environmental justice concerns in U.S. environmental regulation and policy.

Environmental justice research has indicated that locations of hazardous facilities are related not only to factors of race, but also to factors of class, employment and land use. This study investigates how the distribution of socioeconomic indicators of race, age-related vulnerable populations, manufacturing employment, and industrial land use vary with regards to the locations of air polluting facilities in New Jersey. Geographic Information System (GIS) technology is used to develop an index of hazardous facility density as well as integrate hazardous facility data with socioeconomic and land use data for statistical analysis.

### Data and Methods

Air polluting facility location data were acquired from the U.S. EPA’s Aerometric Information Retrieval System (AIRS) through IDEA (Integrated Data for Enforcement Analysis system), a web portal to EPA environmental databases (figure 1-shows Air polluting facilities in New Jersey from the AIRS database ( $N = 1,216$ ) with Census 2000 tract boundaries. Note that for visual clarity tract boundaries are shown only for those tracts with an area greater than  $1 \text{ km}^2$ ). Socioeconomic data were acquired from the 2000 U.S. Census, and land use data were acquired from the U.S. Geological Survey National Land Cover Data (NLCD) program. These data were used to derive the following variables at the census tract level:

- \*POPDEN Population density (persons/ $\text{km}^2$ )
- \*MINORITY Percentage of the population who self-identify as non-white or Hispanic, or both
- \*POVERTY Percentage of the population living below the poverty line
- \*EDUCATION Percentage of the population over the age of 25 who have completed high school (or high

school equivalency)

\*CHILDREN Percentage of the population five years old and under

\*ELDERLY Percentage of the population 65 years old and over

MANUFAC Percentage of the population over the age of 16 who are employed in the manufacturing industry

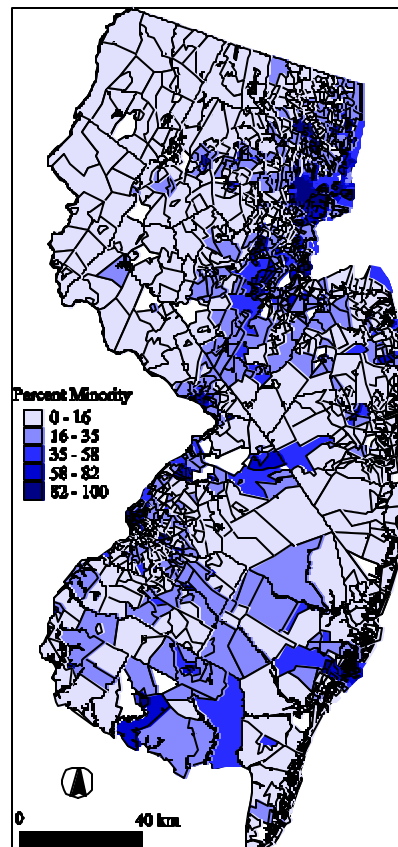
\*INDUSTRIAL Percentage of land area used for commercial, industrial, or transportation purposes

The density of facilities (DENSITY) for each tract was calculated to relate the distribution of hazardous facilities to the tract-level socioeconomic and land use data.

DENSITY was calculated by generating a 30 meter resolution grid of facility density using a simple density function with a search radius of five kilometers. Each grid cell value is thus defined as the density of facilities (facilities/ $\text{km}^2$ ) found within five kilometers of the center of the grid cell. Each tract was then assigned a DENSITY value based on the mean of the grid cell values contained within the tract.

Thematic maps of each of the variables were visually compared with a map of facility locations to support a visual exploration of socioeconomic inequity in the distribution of facilities.

Multivariate regression was then used to predict DENSITY based on the socioeconomic and land use variables. The POVERTY and EDUCATION variables were excluded from the regression because of their high correlation with MINORITY ( $|r| > 0.7$ ). Prior to the regression,



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POPDEN was transformed by taking the natural log, and DENSITY was transformed by taking the square root, in order to obtain a normal distribution of the residuals and improve the goodness of fit of the model.

**Results**

Figure 2 shows a map of percent minority by census tract (those tracts with an area greater than 1 km<sup>2</sup>) in New Jersey. By comparing figures 1 and 2, one can clearly see that both high percent minority and facilities are concentrated in urban areas such as New Jersey's portion of the New York City metropolitan area in the northeast region of the state. Similar patterns are evident for the POVERTY and EDUCATION variables (not shown); high rates of poverty and low educational attainment are associated with facility locations. There does not appear to be a strong spatial pattern associated with the percent of the population five years old and under (figure 3), although there does appear to be higher percentages of children in the suburban and exurban regions that ring the urban core areas in the northeast and southwest parts of the state.

Table 1 shows the results of the regression of DENSITY. All the independent variables are significant, Table 1. Standardized Coefficients ( $\beta$ ), and Zero-Order and Partial Correlations, for Regression of DENSITY (sqrt)

	Stand. $\beta$	Correlations	
		Zero-Order	Partial
POPDEN (ln)	0.441*	0.642	0.347
MINORITY	0.229*	0.598	0.163
CHILDREN	-0.076*	0.086	-0.100
ELDERLY	-0.006	-0.131	-0.008
MANUNFAC	0.168*	0.298	0.242
INDUSTRIAL	0.266*	0.455	0.357
R <sup>2</sup>	0.585		
N	1,935		

\*  $p < 0.0005$

with the exception of ELDERLY, and together explain 59% of the variation in DENSITY. These results indicate that factors of population density and industrial land use are the most important in predicting the density of facilities; facilities tend to locate in densely populated areas with industrial land use, i.e. urban areas. Interestingly, however, even when the influence of POPDEN and INDUSTRIAL is

accounted for, high percent minority is associated with high density of facilities.

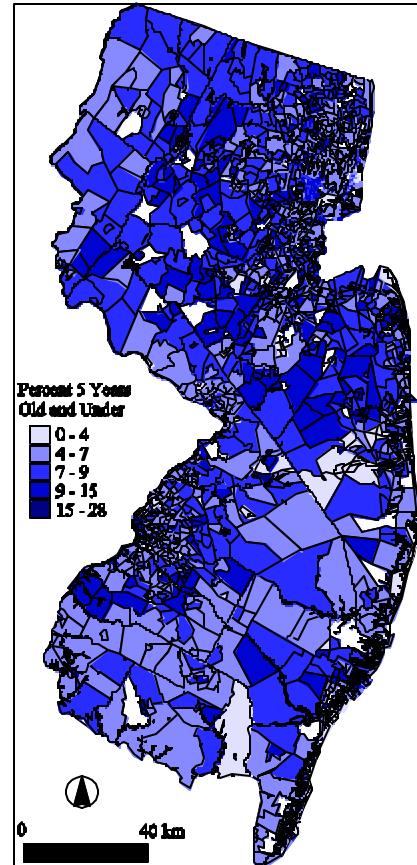
The regression also finds that CHILDREN tends to decrease with higher densities of facilities, although CHILDREN's

contribution to the slope of the regression line is slight. A look at the zero-order and partial correlations is revealing, however. The sign of CHILDREN flips from its zero-order to partial correlation, the only significant variable to do so. The zero-order correlation shows that apart from the influence of the other independent variables, CHILDREN actually increases with increasing values of DENSITY. When MINORITY and POPDEN are

removed from the regression, CHILDREN does not flip sign from zero-order to partial correlation and ceases to be significant. In addition, CHILDREN has the strongest correlation with MINORITY ( $r=0.301$ ) compared with all the other significant independent variables. One can conclude that the weak, positive relationship of CHILDREN with DENSITY that is observed in the zero-order correlation is explained in large part by MINORITY and POPDEN (which are themselves relatively highly correlated,  $r=0.585$ ). The residual variation in CHILDREN that is not explained by MINORITY and POPDEN has a negative (and significant) relationship with DENSITY.

**Conclusion**

This study demonstrates that there is socioeconomic inequity in the distribution of air polluting facilities in New Jersey. While the most important factors



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influencing facility location are associated with urban land cover, as indicated by population density and industrial land use variables, minorities bear a disproportionate burden of hazardous facility location even when the influence of population density and industrial land use is removed. Regarding age-related vulnerable populations, the results suggest a subtle, but notable, association between high density of hazardous facilities and concentrations of minority children living in densely populated areas. This association reflects the association of minorities and urban areas in general in New Jersey, but may also involve differences in the number and/or percentage of children associated with different socioeconomic groups. Further analysis using variables that disaggregate age-related vulnerable populations by race and other socioeconomic indicators is warranted.

Like the present study, the vast majority of environmental justice research has focused on socioeconomic inequity in hazardous facility location or environmental risk. For environmental justice research to advance, researchers must move beyond these relatively simple assessments of the presence of environmental inequity and address the causes and consequences of that inequity, if it is indeed observed. Analyzing the consequences of environmental inequity demands that environmental justice researchers reach out to the health statistics research community and make use of the vast health data resources that are available. Integrating health statistical research in environmental justice analysis can shed light on how factors of socioeconomic status, environment, and health interact. Understanding these interactions has far reaching implications for the formation of environmental and health policy. [Contact: Jeremy at [Jeremy@colorado.edu](mailto:Jeremy@colorado.edu)]

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

#### US EPA Green Book

#### Nonattainment Areas for Criteria Pollutants

EPA has set national air quality standards for six common pollutants (also referred to as "criteria" pollutants). These include ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, particulate matter and lead. Areas of the country where air pollution levels persistently exceed the national ambient air quality standards [see EPA standards at <http://www.epa.gov/oar/oaqps/greenbk/o3co.html>] may be designated "nonattainment." Clean Air Act, Section

excerpts: Sec. 107. (a) Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which national primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State. [These terms are defined as follows: **Nonattainment**- any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant. **Attainment**- any area that meets the national primary or secondary ambient air quality standard for the pollutant. **Unclassifiable**- any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant]

#### OZONE (O3)-Feb 2003



Ozone (O<sub>3</sub>) is a photochemical oxidant and the major component of smog. While O<sub>3</sub> in the upper atmosphere is beneficial to life by shielding the earth from harmful ultraviolet radiation from the sun, high concentrations of O<sub>3</sub> at ground level are a major health and environmental concern. O<sub>3</sub> is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>) in the presence of sunlight. These reactions are stimulated by sunlight and temperature so that peak O<sub>3</sub> levels occur typically during the warmer times of the year. Both VOCs and NO<sub>x</sub> are emitted by transportation and industrial sources. VOCs are emitted from sources as diverse as autos, chemical manufacturing, dry cleaners, paint shops and other sources using solvents.

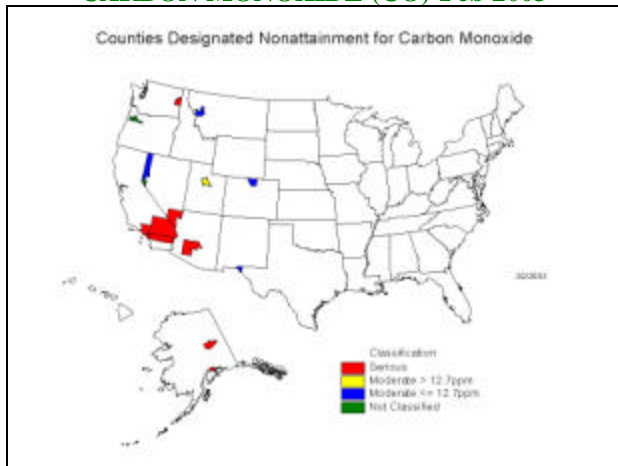
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The reactivity of O<sub>3</sub> causes health problems because it damages lung tissue, reduces lung function and sensitizes the lungs to other irritants. Scientific evidence indicates that ambient levels of O<sub>3</sub> not only affect people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to O<sub>3</sub> for several hours at relatively low concentrations has been found to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. This decrease in lung function generally is accompanied by symptoms including chest pain, coughing, sneezing and pulmonary congestion.

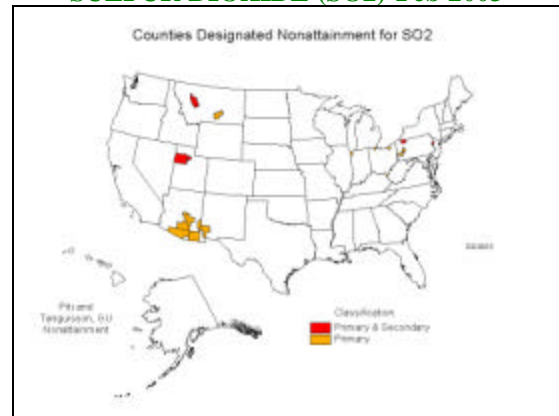
### CARBON MONOXIDE (CO)-Feb 2003



Carbon monoxide (CO) is a colorless, odorless and poisonous gas produced by incomplete burning of carbon in fuels. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health threats are most serious for those who suffer from cardiovascular disease, particularly those with angina or peripheral vascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability and performance of complex tasks.

Some 77% of the nationwide CO emissions are from transportation sources. The largest emissions contribution comes from highway motor vehicles. Thus, the focus of CO monitoring has been on traffic oriented sites in urban areas where the main source of CO is motor vehicle exhaust. Other major CO sources are wood-burning stoves, incinerators and industrial sources.

### SULFUR DIOXIDE (SO<sub>2</sub>)-Feb 2003



High concentrations of sulfur dioxide (SO<sub>2</sub>) affect breathing and may aggravate existing respiratory and cardiovascular disease. Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children and the elderly. SO<sub>2</sub> is also a primary contributor to acid deposition, or acid rain, which causes acidification of lakes and streams and can damage trees, crops, historic buildings and statues. In addition, sulfur compounds in the air contribute to visibility impairment in large parts of the country. This is especially noticeable in national parks.

Ambient SO<sub>2</sub> results largely from stationary sources such as coal and oil combustion, steel mills, refineries, pulp and paper mills and from nonferrous smelters. There are three National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub>: an annual arithmetic mean of 0.03 ppm (80 ug/m<sup>3</sup>); a 24-hour level of 0.14 ppm (365 ug/m<sup>3</sup>); and a 3-hour level of 0.50 ppm (1300 ug/m<sup>3</sup>). The first two standards are primary (health-related) standards, while the 3-hour NAAQS is a secondary (welfare-related) standard. The annual mean standard is not to be exceeded, while the short-term standards are not to be exceeded more than once per year.

### NITROGEN DIOXIDE (NO<sub>2</sub>)

[There are no nonattainment listings for nitrogen dioxide]  
Nitrogen dioxide (NO<sub>2</sub>) is a brownish, highly reactive gas that is present in all urban atmospheres. NO<sub>2</sub> can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Nitrogen oxides are an important precursor both to ozone (O<sub>3</sub>) and acid rain, and may affect both terrestrial and aquatic ecosystems. The major mechanism for the formation of NO<sub>2</sub> in the atmosphere is the oxidation of the primary air pollutant



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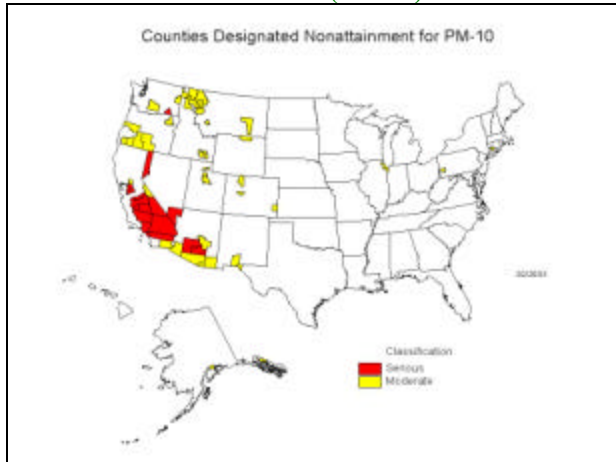
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nitric oxide (NO). NO<sub>x</sub> plays a major role, together with VOCs, in the atmospheric reactions that produce O<sub>3</sub>. NO<sub>x</sub> forms when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

Air pollutants called particulate matter include dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO<sub>2</sub> and VOCs are also considered particulate matter.

### PARTICULATE MATTER (PM-10)-Feb 2003



Based on studies of human populations exposed to high concentrations of particles (sometimes in the presence of SO<sub>2</sub>) and laboratory studies of animals and humans, there are major effects of concern for human health. These include effects on breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis and premature death. The major subgroups of the population that appear to be most sensitive to the effects of particulate matter include individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics, the elderly and children. Particulate matter also soils and damages materials, and is a major cause of visibility impairment in the United States.

Annual and 24-hour NAAQS for particulate matter were first set in 1971. Total suspended particulate

(TSP) was the first indicator used to represent suspended particles in the ambient air. Since July 1, 1987, however, EPA has used the indicator PM-10, which includes only those particles with aerodynamic diameter smaller than 10 micrometers. These smaller particles are likely responsible for most of the adverse health effects of particulate matter because of their ability to reach the thoracic or lower regions of the respiratory tract.

### LEAD (Pb)-Feb 2003



Exposure to lead (Pb) can occur through multiple pathways, including inhalation of air and ingestion of Pb in food, water, soil or dust. Excessive Pb exposure can cause seizures, mental retardation and/or behavioral disorders. A recent National Health and Nutrition Examination Survey reported a 78% decrease in blood lead levels from 12.8 to 2.8 ug/dL between 1976 and 1980 and from 1988 to 1991. This dramatic decline can be attributed to the reduction of leaded gasoline and to the removal of lead from soldered cans. Although this study shows great progress, infants and young children are especially susceptible to low doses of Pb, and this age group still shows the highest levels. Low doses of Pb can lead to central nervous system damage. Recent studies have also shown that Pb may be a factor in high blood pressure and in subsequent heart disease in middle-aged males.

Lead gasoline additives, non-ferrous smelters, and battery plants are the most significant contributors to atmospheric Pb emissions. In 1993 transportation sources contributed 33% of the annual emissions, down substantially from 81% in 1985. Total Pb emissions from all sources dropped from 20,100 tons in 1985 to 4,900 tons in

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1993. The decrease in Pb emissions from highway vehicles accounts for essentially all of this decline. The reasons for the decrease are noted below.

Two air pollution control programs implemented by EPA before promulgation of the Pb standard in October 1978 have resulted in lower ambient Pb levels. First, regulations issued in the early 1970's required gradual reduction of the Pb content of all gasoline over a period of many years. The Pb content of the leaded gasoline pool was reduced from an average of 12.0 gram/gallon, to 0.5 gram/gallon on July 1, 1985, and still further to 0.1 gram/gallon on January 1, 1986. Second, as part of the EPA's overall automotive emission control program, unleaded gasoline was introduced in 1975 for automobiles equipped with catalytic control devices. These devices reduce emissions of CO, VOCs and NOx. In 1993, unleaded gasoline sales accounted for 99% of the total gasoline market. In contrast, the unleaded share of the gasoline market in 1984 was approximately 60%. These programs have essentially eliminated violations of the Pb standard in urban areas except those areas with Pb point sources.

Programs are also in place to control Pb emissions from stationary point sources. Lead emissions from stationary sources have been substantially reduced by control programs oriented toward attainment of the PM-10 and Pb ambient standards. However, significant and ambient problems still remain around some Pb point sources, which are now the focus of new monitoring initiatives. Pb emissions in 1993 from industrial sources, e.g., primary and secondary Pb smelters, dropped by about 91% from levels reported in 1970.

Emissions of Pb from solid waste disposal are down about 76% since 1970. In 1993, emissions from solid waste disposal, industrial processes and transportation were: 500, 2,300 and 1,600 short tons, respectively. The overall effect of the control programs for these three categories has been a major reduction in the amount of Pb in the ambient air. Additional reduction in Pb are anticipated as a result of the Agency's Multimedia Lead Strategy issued in February 1991. The goal of the Lead Strategy is to reduce Pb exposures to the fullest extent practicable. [See EPA Green Book data and maps at <http://www.epa.gov/oar/oaqps/greenbk>, which includes a variety of related reports on population and criteria pollutants by county]

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### Special Report

#### SARS & Health Care Workers

Rhode Island Committee on Occupational Safety & Health [Excerpts 4/21/03]

Severe acute respiratory syndrome (SARS) has emerged as a serious international occupational health disease. Since the disease was first reported it has infected numerous health care workers, some fatally (So far the disease has not surfaced aggressively in the US, only a handful of health care workers have been infected). Most cases of transmission of SARS to health-care workers appears to have occurred before standard infection control precautions were put into place. However, it is unclear if cases may have occurred after hospitals had mounted controls, so there is a need to give the closest possible attention to recommended infection control plans and your facility infection control plan as they evolve regarding this outbreak.

The suspect disease agent (coronavirus) and the suspected mode of transmission (inhalation and contact) suggest that infection control procedures developed for TB could serve as a foundation for protocols directed at SARS, though a SARS protocol would also demand greater attention to the contact hazard associated with its transmission. CDC/NIOSH's TB Respiratory Protection Program for Health Care Facilities is a very good resource.

TB outbreaks that occurred in the late 80s and early 90s focused the health care industry and occupational health experts on occupational risks of infectious respiratory hazards. The subsequent overall decline in TB (and as a result the changes in the occupational risk of TB) has had much to do with development of effective respiratory protection programs that included early identification of contagious TB patients and monitored treatment. (As TB patients are treated they became less contagious.) The contrast with SARs is that the unambiguous early identification of cases is problematic, and there is no specific treatment as there is with TB. This is why infection control plans as they evolve during this outbreak need close and careful scrutiny. [Source: James M. Celenza, RI Committee on Occupational Safety & Health at [jobhealth@juno.com](mailto:jobhealth@juno.com)]

### Special Report

#### FOIA and GIS

A case currently proceeding in the state courts in Connecticut is pushing the limits of the state's Freedom of

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Information Act (FOIA) in the arena of GIS. Consultant Stephen Whitaker claims that under the law, he can ask for and use imagery and vector data from the town of Greenwich. The town thinks not, and the matter is under scrutiny. A reader requested that I have a look at the federal and state FOIA laws, which ideally make government information available, and how they pertain to GIS, especially in these times.

### *What is the Freedom of Information Act?*

Let's start with the laws in questions. There are basically four that are relevant: The Freedom of Information Act (FOIA) was passed in 1966 and basically says that federal government agencies must make their information available to the public. However, agencies may withhold information based on nine exemptions [see website for these at <http://archive.aclu.org/library/basics>] and three exclusions contained in the statute. The exemptions include: (1) national security, (2) internal agency rules, (3) material governed by other laws, (4) business information (trade secrets, for example), (5) internal government memos, (6) private matters (health records), (7) law enforcement investigations, (8) information on financial information subject to federal regulation, and (9) information on oil wells.

The exclusions [at [http://www.tncrimlaw.com/foia/VI\\_G.html](http://www.tncrimlaw.com/foia/VI_G.html)] are for material (1) being used in a criminal investigation, (2) specific informant records and (3) FBI records involving foreign intelligence, counterintelligence, or international terrorism. This discussion [see website at [https://www.spj.org/foia\\_opendoors\\_basics.asp](https://www.spj.org/foia_opendoors_basics.asp)] from the Society of Professional Journalists answers some questions.

To flesh out those exemptions, the third in the list above speaks to documents covered by other legislation. LANDSAT data falls into that category and was thus sold at far higher rates than FOIA would allow. (LANDSAT move from governmental control to the private sector and back again, making this situation very complicated.) According to Professor Harlan Onsrud writing in *GIS Law* [[http://www.spatial.maine.edu/~onsrud/pubs/In\\_Support\\_OA.htm](http://www.spatial.maine.edu/~onsrud/pubs/In_Support_OA.htm)], legislation to make such data available to non-profit and domestic government organizations was in the works in 1992. As I understand it, LANDSAT data is now available at rates more comparable to cost of duplication.

Onsrud's article also raises a question that underlies the Whittaker case mentioned above. Can an individual request an entire database? The courts generally say "yes,"

though the format of delivery (electronic vs. print) was still up in the air.

Another attempted use of FOIA was to push NIMA to release the high resolution VMAP-1 world dataset, the replacement for VMAP-0, an enhanced version of the Digital Chart of the World. VMAP-0 was made public, but NIMA argued that VMAP-1 included material from other governments, which would take it out of FOIA's reach.

The Free World Map Data Project group [<http://www.intramap.co.nz/atlas/freeworldmaps.html>] had hoped to bring together a group of FOIA activists to potentially mount a class action suit against NIMA. Based on e-mail discussions as recent as August 2002 (including input from Ian Thomas, remember him?) NIMA has not changed its tactics. Also interesting, the only [article](#) I found on the Free World Map Data Project was in *GeoEurope*, which has since ceased publication. One supporter of the Free World Map Data Project is [Manifold.net](#).

The second piece of legislation, the Federal Information Reform Act (FIRA), passed in 1986 and aimed to update FOIA in particular with regard to electronic information. It allowed differing fees for non-commercial and commercial users, required some information be provided for free, and stipulated that prices could not be assigned to the information itself.

The third part of FOIA is the Electronic Freedom of Information Act Amendments, signed by President Clinton in 1996. The goal was to use technology to speed the distribution of FOIA-requested data to its requesters. Writing in 2000, Caron Golden didn't see a lot of success on the EFOIA front. In 2001, the General Accounting Office reported roughly the same thing.

The fourth set of legislation includes individual state laws that essentially parallel the federal FOIA. These are sometimes called State Open Records Laws, state FOIAs, or "Sunshine Laws." These do vary from state to state. Pennsylvania's public-records law was recently updated to set a time frame for responses to queries, but has a limited definition of public records that some feel is too restrictive. Iowa's law seemed to be widely misunderstood by local law enforcement and was the subject an education campaign after journalists pointed out the situation. Journalists, it seems, are some of the most active users of FOIA at all levels.

I learned that pretty much every federal agency devotes a part of its website for dealing with FOIA. The USGS FOIA website (<http://www.usgs.gov/foia>) has

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material on the Act, and a discussion of how to request materials from the agency. This is pretty much standard across the agencies. That of course means that the first thing someone interested in records has to figure out is which agency holds the information of interest. Another key point on FOIA: the information has to exist for it to be requested. That is, if the agency has to create information to answer your question, it does not fall under FOIA.

### *Use of FOIA*

FOIA is widely used: The Justice Department reported federal agencies received about 2.24 million FOIA requests in fiscal 2001, up about 11,000 from the prior year. Agencies reported that they filled more than half of the requests made. Some agencies, notably the departments of justice, labor, treasury and state had lower reply rates.

Lately FOIA has had some of the wind knocked out of its sails by The Homeland Security Act which (<http://www.wired.com/news/business/0,1367,58039,00.html>) states information on public infrastructure should be "protected from unauthorized disclosure" and "used only for the performance of official duties."

### *FOIA and Geospatial Data*

I searched the Web for tales of FOIA and GIS and came up with some interesting tidbits:

\* A memo from the California Office of the Bureau of Land Management from 1998 explains that the Southwest Center for Biodiversity requested all of the GIS data from the California Agricultural Field Offices (AFOs). The Center sued BLM when a reply was not returned within the requisite 20 days. That set up a bit of a scramble to assemble the data.

\* In Michigan, two counties felt that setting up GIS to comply with the state's FOIA was impossible since cost recovery was not possible. Oakland and Wayne counties worked to have the state's access laws amended to allow for cost recovery. This is not an uncommon concern. There was a general feeling, according to Onsrud, that state open records laws could take away quite a bit of potential income for agencies responsible for creating and maintaining spatial data. In the same article he presents arguments in favor of keeping such laws as they are. A second part of the article presents the other side, but I was unable to find it on the Web.

\* FOIA has also made industry groups wary of GIS and where GIS data is held. At the 2002 Poultry Health Conference, discussions highlighted that GIS data held by the Virginia Department of Agriculture and Consumer

Services was subject to FOIA. The data in question, which related to poultry health, was ultimately shared with USDA, but only under a special memorandum of understanding that included rules of further dissemination. The report goes on to say, "Many poultry states have yet to develop GIS databases because of FOIA concerns, yet the power of GIS in managing diseases like AI is undeniable."

\* Each year The Alliance for the Wild Rockies submits FOIA requests to public land managers in the bioregion to determine incursions into roadless areas. These are incorporated into a roadless area database.

\* I found less use of FOIA with regard to imagery. Still, I did (<http://www.informatics.org/france/archivair.html>) find reference to Defense Intelligence Agency images acquired via FOIA from Burgundy, France, during World War II that are now in use for archeological research.

### *Back to Connecticut*

Stephen Whitaker has been trying to gain access to high-resolution imagery and vector data from Greenwich, CT for about two years. He argues that it's available to him under the state's open records law.

After losing in an appeal to the state Freedom of Information Commission last fall, Greenwich has offered an amendment to the state's law to exclude the images from public records on the grounds of security. Those on the other side argue that the exemption would weaken the law and prevent citizens from accessing the same data that decision makers use. The exemption is unlikely to pass, but a state GIS council has been suggested to firm up how such data is delivered.

Whitaker hopes to sell property and tax assessments to homeowners. This brief overview does not raise all the issues involved with federal or state FOIA legislation nor offer all the pros and cons for data availability, privacy concerns or stifling of GIS implementations. What I hope to have done is to bring the legislation to light and illustrate some of the ways its been used. [Reprinted, with permission, Adena Schutzberg, Editor, from the April 17, 2003 issue of *GIS Monitor* which is located at [www.gismonitor.com](http://www.gismonitor.com)]

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

### **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

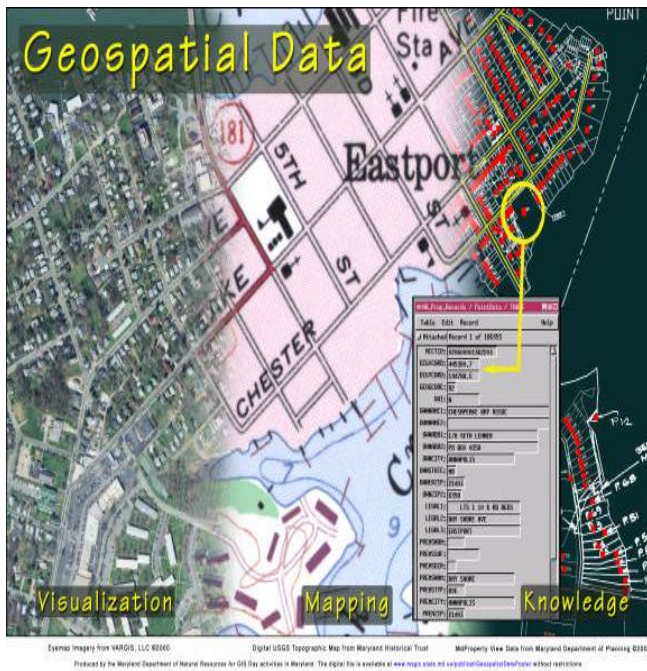
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data on a national basis. The FGDC is composed of representatives from seventeen Cabinet level and independent federal agencies. The FGDC coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, 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>]

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### Homeland Security and Geographic Information Systems

### How GIS and mapping technology can save lives and protect property in post-September 11th America

#### Introduction

Timely, accurate information, easily accessed and capable of being shared across federal, state, and local political jurisdictions is fundamental to the decision making capability of those tasked with the homeland security mission. But without the real-time ability to quickly visualize activity patterns, map locations, and understand the multi-layered geospatial context of emergency situations, homeland security will not be achieved.

The current state of geospatial information technology can provide decision-makers the data they need

to confidently confront a wide variety of threats including natural disasters, terrorist attacks, sabotage, and similar crises. However, the current *implementation* of that technology, across all the federal, state, and local agencies and jurisdictions necessary to fully coordinate an effective response, is seriously lacking in specific areas. As the concept of Homeland Security becomes infused into the work-a-day pattern of government and the everyday life of our citizens, decision makers will greatly profit from the crisis management "edge" that GIS provides. Homeland Security leaders should understand and implement the policy changes necessary to fully realize this technology's capability, and make the management decisions necessary to implement it on a national basis.

#### Background

As never before, in the aftermath of the terrorist attacks of September 11, it has become clear that in emergency situations of whatever origin our Nation is dependent on rapid access to and application of many types of current, accurate geospatial information. Critical information such as: **Facilities and operations susceptible to attack; Critical infrastructure, including telecommunications; electrical power systems; gas and oil production, storage and distribution; banking and finance; water supply systems; emergency services; Accurate employment data tied to specific locations; Detailed and current "framework" data, including orthophotography, transportation, elevation, political boundaries, property ownership, hydrography and geodetic control.**

Powerful geographic information systems are now available that quickly render one to several layers of digital geospatial data into map-like products. These systems can facilitate near-real time performance of a wide range of relevant geospatial analyses. These systems can be used to access and process digital geospatial data virtually anywhere because it, unlike analog data, can be instantly transmitted from wherever it's maintained and stored to any place where it's needed. These characteristics make geographic information technologies, combined with appropriate sets of geospatial information, an invaluable tool for the handling, display, and analysis of information involved in every aspect of Homeland Security. For example:

**Detection:** Geospatial information provides the spatial and temporal backdrop upon which effective and efficient threat

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analysis is accomplished. By linking and analyzing temporally and spatially associated information in real time, patterns may be detected that lead to timely identification of likely modalities and targets.

**Preparedness:** Emergency planners and responders must often depend on geospatial information to accomplish their mission. Current, accurate information that is readily available is crucial to ensuring the readiness of teams to respond. Geospatial information access and interoperability standards are essential elements as they support the means for the Nation's response units to react to terrorist attacks, natural disasters, and other emergencies.

**Prevention:** Geospatial information provides a means to detect and analyze patterns regarding terrorist threats and possible attacks. This information, coupled with information about borders, waters, and airspace, in turn may lead to the disruption of their plans or the prevention or interdiction of their attacks.

**Protection:** Geospatial information is a very important component in the analysis of critical infrastructure vulnerabilities and in the use of decision support technologies such as visualization and simulation to anticipate and protect against cascading effects of an attack on one system as it relates to other interdependent systems.

**Response and Recovery:** Geospatial information has been used by many organizations in response to and recovery from natural disasters. Similarly, this information is invaluable for emergency response services of all kinds, as well as for carrying out long-term recovery operations. The Federal Response Plan, developed by 26 federal agencies and the Red Cross, identifies overall responsibilities and the concept of operations for presidential declared disasters. A number of emergency support functions are identified, with the Federal Emergency Management Agency (FEMA) having the lead for coordinating response to natural disasters and the federal wildland agencies responsible for coordinating response to wildland fires.

### Current Status

Accurate and comprehensive data are the heart of information technology, **and geographic location is a key feature of 80-90% of all government data.** It is critical that as a Nation we take the steps necessary to assure that strategic information assets relative to Homeland Security--particularly geospatial information assets--are created, are maintained for currency and accuracy, are readily available to those who need them, and are interoperable. Although Homeland Security requires much of the same basic real-

time spatial information needed for other uses and applications, we know from recent events that it must be immediately and comprehensively available. In short, we need to assure: **Implementation of a comprehensive national spatial data infrastructure, Interoperability of the systems that process this information, and Commonality of the processes that collect, manage, and disseminate geospatial information.**

Fortunately the Nation already has a well-founded interagency effort under way to build such a National Spatial Data Infrastructure (NSDI) under the auspices of the Federal Geographic Data Committee (FGDC) which is chartered by the Office of Management and Budget. The NSDI provides crosscutting mechanisms for organizations of many types, affiliations, and responsibilities to be able to collaborate in assuring that geospatial data and systems are in-place, ready for use. The data, technology, and associated intergovernmental and government-private mechanisms forged in this effort will be invaluable to intelligence, law enforcement, and other national security-related elements, as well as to local communities, in dealing with terrorism and other major threats to public safety and welfare.

In collaboration with all levels of government, industry, and academia, the FGDC and its member federal agencies have in-place a wide variety of effective organizational relationships and processes that could readily be used and expanded upon as needed given appropriate sanction and backing--to produce a nationally consistent framework of Homeland Security-related base data characterized by common data content standards and supported by interoperable technologies. Several examples already exist of how this process works well: **\*The coordinated application and use of geospatial data in New York City in response and recovery to the World Trade Center attack; \*Development of geospatial data as a foundation for critical infrastructure protection and emergency preparedness/response in the greater Chicago area; \*The use of geospatial information in wildfire suppression through the coordinated work of the Geospatial Multi-Agency Coordinating Group**

However, at present there are gaps that should be filled to achieve assurance of data and technology accessibility and interoperability. Examples are: \*National data standards still need to be developed for a number of framework and other data themes to provide data that is

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immediately useful in Homeland Security events; \*NSDI Framework Themes are not yet complete; \*E911 capabilities are limited by the lack of consistent, standardized road data across the Nation, preventing true interoperability between all levels of government; \*Current and accurate information about the Nation's critical infrastructure is not consistently available or shareable among relevant agencies, leaving the Nation unable to effectively plan for modern terrorist activities.

The FGDC believes it is imperative that the Nation accelerate implementation of the NSDI. As we move forward to improve and support planning and management activities, the contribution of geospatial information and technologies in support of critical decision-making should be fully utilized. The NSDI has already established certain standards, processes, and relationships that serve to advance Homeland Security including: Well established relationships with Federal, State, Local and Tribal governments and ongoing coordination mechanisms such as I-Teams, an initiative to collect basic framework data collaboratively among all levels of government; A multi-node geospatial information Clearinghouse Network that can be extended to promote rapid discovery, sharing, and protection of critical geospatial information; and, Access to industry and international standards bodies and programs to advance standards that promote data consistency and interoperability of spatial technologies.

### Recommendations

It is our opinion that more needs to be done to fully realize the potential this technology brings to decision making. To that end, we recommend that the Office of Homeland Security consider the following recommendations:

#### **(1) Address the gaps outlined above by supporting:**

- a. National data standards
- b. Completion of all NSDI Framework Themes
- c. Nationwide geospatial data compatibility for E911 operations
- d. Compilation of comprehensive georeferenced information on Critical Infrastructure

#### **(2) Bring additional focus on these activities to selected officials at all levels of government across the Nation.**

- a. Promote, enhance, and provide sufficient resources for collaborative relationships between federal, state and local agencies and with the private sector.
- b. Develop uniform approaches to planning for Homeland Security events while relying on standardized data and

systems.

c. Develop sophisticated mobile GIS labs and trained staff that can be delivered to any site in the Nation within 12 hours of an event. [For more Information Contact: [www.fgdc.gov](http://www.fgdc.gov)]

### **Web Site(s) of Interest for this Edition**

<http://www.cdc.gov/mmwr/preview/mmwrhtml/m2e411a1.htm>

#### **HIPAA Privacy Rule and Public Health: Guidance from CDC and DHHS.**

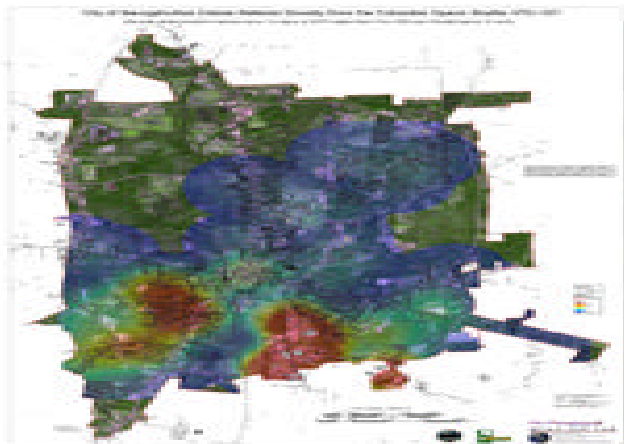
New national health information privacy standards have been issued by the U.S. Department of Health and Human Services (DHHS), pursuant to the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The new regulations provide protection for the privacy of certain individually identifiable health data, referred to as protected health information (PHI). Balancing the protection of individual health information with the need to protect public health, the Privacy Rule expressly permits disclosures without individual authorization to public health authorities authorized by law to collect or receive the information for the purpose of preventing or controlling disease, injury, or disability, including but not limited to public health surveillance, investigation, and intervention. [See also new CDC/ATSDR Privacy Rule Homepage <http://www.cdc.gov/privacyrule/default.htm>]

[http://www.pop.psu.edu/gia-core/gis\\_rd\\_listing.htm](http://www.pop.psu.edu/gia-core/gis_rd_listing.htm) **GIS**

**Resource Documents.** Designed to provide brief overviews of specific GIS issues, concepts and methods. Each document will include links to recommended websites as well as references to both classic citations and recently published materials. In addition, where appropriate these resource documents will include information on access to GIS resources at Pennsylvania State University.

<http://strand.sfasu.edu> The Humanities Undergraduate Environmental Sciences (HUES) GIS Lab is one of three GIS labs at Steven F. Austin State University. The HUES GIS Lab was used to help map the location and categorization of Colombia Space shuttle debris. Debris density plots and maps are available at this site. In the below map, density determinations are based on 14 days of GPS field work. Red color indicates areas of high concentrations of Space Shuttle Debris. Blue color indicates areas of low concentrations of Space shuttle debris. Density determinations are explained at this site.

### Debris Density Map of City of Nacogdoches.



<http://www.empowersd.com> County of San Diego Health and Human Services Agency. This is a website dedicated to helping San Diego County citizens find potential employment, child care assistance, public transportation routes, as well as, school, library, hospital, and Health & Human Services Agency facility information. Through the online services locator map, citizens can discover services in relation to street name and location.

<http://www.epa.gov/quality> **EPA's Quality System for Environmental Data and Technology.** EPA uses its Quality System to manage the quality of its environmental data collection, generation, and use. The primary goal of the EPA Quality System is to ensure that its environmental data are of sufficient quantity and quality to support the data's intended use. The following guidance has now been finalized: Guidance on Geospatial Data QA Project Plans.

<http://www.cdc.gov/epo/dphsi/asb/orcmacro.htm> The final products of a three-year evaluation of state Web-based systems for the dissemination of health-related data is now available. **A Guide for Public Health Agencies Developing, Adopting, or Purchasing Interactive Web-based Data Dissemination Systems** is a practical tool for public health agencies to use in developing, adopting, or purchasing new queryable Web-based data systems, or enhancing existing systems.

<http://www.hazardmaps.gov/atlas.php> This Web Map Service (WMS) provides access to **nationwide FEMA Q3 Flood Maps**. The Q3 Flood Data are derived from the Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA). The data is georeferenced to the earth surface using the EPSG:4326 (latitude/longitude coordinate system). WMS provides a standard for Internet-based retrieval of geospatial maps, and is a core component of the OGC Web Services suite. These data are for advisory purposes only.

<http://www.med.ic.ac.uk/divisions/60/euroheis/homepage.htm> The project is funded by the European Commission, Directorate-General Health and Consumer Protection, Luxembourg under the programme **Action on Pollution Related Diseases**. The EUROHEIS project aims to improve health information and analysis in order to assess relationships between environmental pollution and disease, and to respond rapidly to health threats, improving knowledge and understanding of health risk management.

## *Final Thoughts*

### **USGS and DHHS: Building Partnerships for an Expanded Research Agenda in the New Millennium**

The natural (geologic/biologic), and public health sciences are moving toward a robust and partnered research agenda in this new millennium. It is a direction other colleagues and I have supported for some time. The reality of it happening is due in large part to U.S. Geological Survey (USGS) Director Charles G. "Chip" Groat. Because of Director Groat's vision and leadership, we in the public health community will embrace new opportunities to partner research activities with the natural sciences. A number of events, some of which are documented below, portend a new era of sharable natural science and public health agendas. I believe Director Groat has truly energized this important theme. I also believe the ultimate beneficiary of this research initiative will be the public as new understandings in environmental exposures and human health relationships become better understood.

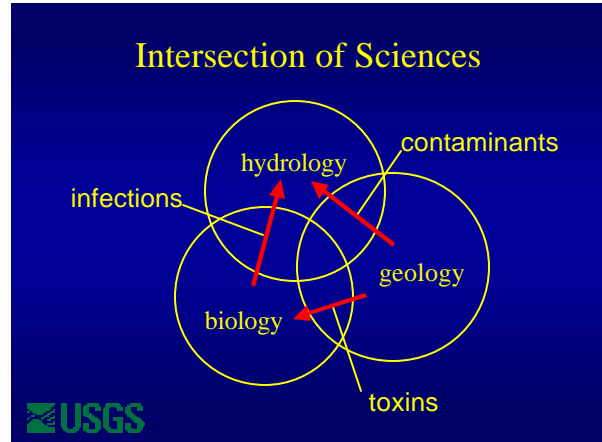


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The recent National Conference on USGS Health-Related Research, “Natural Science and Public Health: Prescription for a Better Environment,” was a USGS milestone in bridging the disciplines. Cosponsors to the conference included the U.S. Environmental Protection Agency, Armed Forces Institute of Pathology, and the George Washington University School of Public Health and Health Services. The USGS preliminary conference report (Open-File Report 03-097) contains abstracts and author contacts. In the report’s Forward, Director Groat states (excerpts) “Our core capabilities in water quality, environmental geochemistry, wildlife disease, geospatial technology and many other fields enable USGS to be a significant partner in the area of natural science and public health as we work together to write a ‘Prescription for a Better Environment.’”



Data from the Centers for Disease Control and Prevention indicate that nearly a million cases of illness each year occur in the

Courtesy adapted from De Cola. L Mav 2003

United States because of waterborne microbial infections. Incidence of asthma and other respiratory disease, certain cancers, and emerging new diseases are increasing. A wide variety of wildlife species have been identified as hosts or reservoirs for emerging infectious diseases that threaten both human and domestic animal health. According to the National Institute for Environmental Health Sciences [NIH], more than 80,000 chemicals are used in the United States and an estimated 2,000 new ones are introduced annually. The impacts of these on health are not clear. USGS studies have documented atmospheric dust that carries heavy metals, pesticides, and pathogens such as soil fungus from Africa to the United States. The harmful effects of toxicants such as lead, mercury, radionuclides, and arsenic on humans and animals are well known, but scientists do not yet fully understand their distribution and circulation in the environment. Increasing waste effluent has been related to outbreaks of *E. coli* and cholera, while *Pfiesteria* and other harmful algal blooms can affect people, fish, and wildlife.”

Director Groat points out that USGS views itself as partner in the exploration of the juncture of natural sciences and allied health sciences, that the conference is just the beginning. “We have the ability to bring together large, diverse datasets, conduct complex geospatial and statistical analyses, create interactive decision support models, and interpret data to produce unique and specialized derivative map products.”

*USGS Health Conference...*

### I. National Conference on USGS Health-Related Research

#### “Natural Science and Public Health: Prescription for a Better Environment”

The USGS Health Conference, held April 1-3, 2003, covered a variety of studies examining known and suspected associations between the natural science and public health. Titles of papers below illustrate this wide range of research interest. The full meeting agenda, more than 35 poster titles, and e-mail addresses of authors and presenters may be obtained from the conference URL (see <http://health.usgs.gov/program.html>).

The organization of conference themes and paper titles include: **Environmental Quality and Human Health:** Pliocene Coal, Water Quality, and the Etiology of Balkan Endemic Nephropathy; USGS Studies Related to Metal-rich Coal in Southwestern Guizhou Province, China; Effects of Enhanced Zinc in Drinking Water on Brain and Spatial Memory; Working Toward a Better Understanding of Health Hazards Caused by Volcanic Air Pollution on the Island of Hawaii; **Advances in Data Analysis and Information:** Rift Valley Fever: The Interplay Of Climate, Landscape Ecology and Epidemiology; Spatial Forecasting of Disease Risk and Uncertainty; Community Level Analysis of Vector-Borne Disease; Data-Driven Discovery of Temporal and Geospatial Patterns of Disease Transmission: West Nile Virus in Maryland; **Pathogen Distribution and Disease Vectors I:** Vaccination as a Potential Means of Controlling Sylvatic Plague; Environmental Predictors for Tick-borne Disease Risk in the Middle Atlantic Region, USA; Transmission Dynamics of Vector-Borne Zoonoses: Implications for

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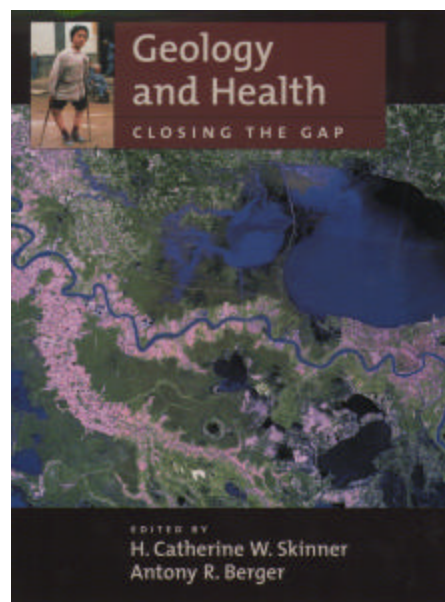
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Disease Management and Natural Resource Conservation; Out of Africa: Characterization of Microbial Communities Associated with Desert Dust and Their Implications for Human and Ecosystem Health; **Environmental Health Indicators:** Use of Fish Health as an Indicator of Exposure to Contaminants in the Aquatic Environment; Pathogenic Bacteria in Surface Waters: Occurrence and Association with Environmental Factors; Monitoring Contaminant Effects in Biota Through a Nationwide Program; Bioaccumulation and Mobility of Cadmium in Willow and Soils, Alaska -- Implications for the Health of Browsing Animals; **Risk Characterization I.** Role of Water-Quality Monitoring in Studies of Breast-Cancer Incidence in Suffolk County, New York; Ground-Water Quality and Childhood-Leukemia Cluster Near Fallon, Nevada; Naturally-occurring Arsenic in Ground Water in Southeastern Michigan: Practical Information from USGS Studies; USGS and NCI Data Together Show No Change in WM Bladder Cancer Mortality Risk in US for Drinking Water Arsenic Levels Between 3 and 59 ug/l (ppb); **Advances in Data Analysis and Information Delivery II.** Estimating Ground Water Arsenic Concentrations for Exposure Assessment in Cancer Epidemiology; Application of Health-Based Screening Levels to Ground-Water Quality Data in a State-Scale Pilot Effort; Deriving Crop Maps From Remotely Sensed Imagery to Support Agricultural Chemical Exposure Research; Improving Beach Management Through Water-Quality Modeling, Geographic Information Systems, and Economic Analysis; **Military Applications of Medical Geology and Environmental Monitoring and Surveys.** Medical Geology: An Emerging Discipline in Support of Environmental and Military Medicine; Telemedicine-Emerging Technology for Health-Related Research; Rapid Assessment of an Urban Hazard: Spectroscopy of the World Trade Center Dust; National and New Jersey Statewide Reconnaissance Surveys of the Occurrence of Radium-224 in Public Ground-water Supplies; Regional, Seasonal, and Ethnic Differences in the NHANES III Pesticide Epidemiology (PEPI) Study; **Risk Characterization II.** Dusts Deposited by the September 11, 2001, World Trade Center Collapse: Their Chemical Reactions with Simulated Rain Water and Body Fluids; Mineralogical, Geochemical, and Toxicological Variations of Asbestos Toxicological Standards and Amphibole Samples from Libby, MT; Health Risks from Long-term Mercury Exposure, Gorlovka, Ukraine; Mapping the Spread of West Nile Virus and Assessing the Risk of Human Illness; **Pathogen Distribution and Disease Vectors II.** Ambient Shoreline Sources of *E. coli* in a Coastal Beach and Stream of Southern Lake Michigan; Bank Filtration of Waterborne Pathogens, Platte River, Nebraska; Mycobacteriosis and Striped Bass; The Huntington Beach Investigation: Where are the Bacteria From?

*USGS Literature and Resources...*

### II. New Earth Science and Health Publications

**Geology and Health: Closing the Gap.** H.Catherine W. Skinner and A.R. Berger (ed.), Oxford University Press, 2003. *Geology and Health* is an integration of papers from geo-bio-chemical scientists on health issues of concern to humankind worldwide, demonstrating how the health and well-being of populations now and in the future can benefit through coordinated scientific efforts. International examples on dusts, coal, arsenic, fluorine, lead, mercury, and water borne chemicals, that lead to health effects are documented and explored. They were selected to illustrate how hazards and potential hazards may be from natural materials and processes and how anthropomorphic changes may have contributed to disease and debilitation instead of solutions. Contents: **Part I: Natural Geologic Hazards.** 1. Linking Health To Geology; **A. Physical--Obvious and Immediate.** 2. Natural Dust and Pneumoconiosis in High Asia; 3. Human Sickness and Mortality Rates in Relation to the Distant Eruption of Volcanic Gases: Rural England and the 1783 Eruption of the Laki Fissure, Iceland; **B. Chemical--"Silent" and Long Term.** 4. Human Geophagy: a Review of Its Distribution, Causes, and Implications; 5. Geogenic Arsenic and Associated Toxicity Problems in the Groundwater-Soil-Plant-Animal-Human Continuum; 6. Geological Epidemiology: Coal Combustion in China; 7. Mitigation of Endemic Arsenocosis



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with Selenium: an Example from China; 8. Biogeochemical Cycling of Iodine and Selenium and Potential Geomedical Relevance; 9. Environmental Iodine in Iodine Deficiency Disorders, with a Sri Lankan Example; 10. Mercury, a Toxic Metal, and Dental Amalgam Removal; 11. Nuclear Accumulation of Mercury in Neutrophil Granulocytes Associated with Exposure from Dental Amalgam; 12. Cadmium Accumulation in Browse Vegetation, Alaska--Implications for Animal Health; 13. Molybdenosis Leading to Type 2 Diabetes Mellitus in Swedish Moose; **Part II: Anthropogenic Changes to the Geologic Environment**. 14. Surface and Groundwater Quality and Health, with a Focus on the United Kingdom; 15. Breast and Prostate Cancer: Sources and Pathways of Endocrine-disrupting Chemicals; 16. A Legacy of Empires? An Exploration of the Environmental and Medical Consequences of Metal Production in Wadi Faynan, Jordan; 17. Life in a Copper Province; 18. Health Problems Related to Environmental Fibrous Minerals; 19. Anthropogenic Distribution of Lead; **Part III. Identifying the Hazards**. 20. Environmental Geochemistry on a Global Scale; 21. Biogeochemical Monitoring in Medical Geology; 22. Some Environmental Problems of Geomedical Relevance in East and Southern Africa; 23. Geochemistry and Vertebrate Bones; 24. Soil Nutrient Deficiencies in an Area of Endemic Osteoarthritis (Mseleni Joint Disease) and Dwarfism in Maputoland, South Africa; 25. Minerals in Human Blood Vessels and Their Dissolution in Vitro; 26. Organic Compounds Derived from Pliocene Lignite and the Etiology of Balkan Endemic Nephropathy; Summary; Glossary of Medical Terms; Index. [Editor: See website <http://www.oup.com> for contributing authors and book order information]

**Medical Geology**. The International Working Group on Medical Geology has taken an initiative in publishing a book on Medical Geology. The book will be written and edited by a very interdisciplinary team, geoscientists, medics, veterinarians, biologists, epidemiologists and pathologists. The book is to be published in 2003 by Academic Press. Overview: **Section 1 (Background)**. Geology, natural backgrounds, volcanic emissions, anthropogenic sources, Biology of the elements, Nutrition and diet, Biological responses; **Section 2 (Pathways, exposures)**. Animals and medical geology, Radon; **Section 3 (Epidemiology, pathology)**. Epidemiology, Environmental medicine, Environmental pathology, Environmental toxicology, Clinical assessment; **Section 4. Techniques and tools**; Summary; Appendix. [See: <http://home.swipnet.se/medicalgeology>]

**Assessing Ground-Water Vulnerability to Contamination: Providing Scientifically Defensible Information for Decision Makers**. MJ Focazio, TE Reilly, MG Ruper, DR Helsel, U.S. Geological Survey Circular 1224, U.S. Department of the Interior, Reston VA, 2002. Overview: Throughout the United States increasing demands for safe drinking water and requirements to maintain healthy ecosystems are leading policy makers to ask complex social and scientific questions about how to assess and manage our water resources. This challenge becomes particularly difficult as policy and management objectives require scientific assessments of the potential for ground-water resources to become contaminated from anthropogenic, as well as natural sources of contamination.

This report provides an overview of some of the common approaches used to scientifically determine the important factors controlling the vulnerability of ground-water resources to contamination. In addition, the report discusses the strengths and weaknesses of the various approaches as sources of scientifically defensible information for the water-resource management decision-making process. Descriptions of scientifically defensible methods are supported by example studies that have been conducted by the U.S. Geological Survey often in cooperation with local, state, and regional water-resources agencies.

**USGS Environment and Human Health web page (<http://health.usgs.gov>)**. Work by the USGS has contributed to understanding the effects of radon, asbestos, selenium, chromium, and uranium on human health. Ongoing research on bacterial and virus transport in ground water and bioaccumulation of metals such as arsenic, mercury, and lead also address public health issues. The USGS has considerable experience in conducting studies on the occurrence and distribution of natural and manmade organic chemicals that can affect human health. Human exposure to potentially toxic chemicals through plants and animals in the food chain is another area of concern in which the USGS can lend its expertise. Water Quality remains an important concern in health and medicine, and the USGS already has a significant role in helping others determine the best methods for monitoring drinking-water quality. This page is maintained by Janet Hren, USGS, and it contains an

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extensive listing of USGS health-related resources e.g., publications, projects and programs, databases, conferences, and other items with online linkage.

**Medical Geology web page and Epidemioecology newsletter** ([http://energy.er.usgs.gov/medical\\_geology.htm](http://energy.er.usgs.gov/medical_geology.htm)). As part of the Medical Geology project, the USGS Eastern Energy Resources Team (EERT) maintains this link to the new Epidemioecology newsletter. Edited by Joseph Bunnell, Public Health Research Biologist, at Reston VA, this quarterly online publication became operational in May 2002. It is useful and interesting reading. For example, the November 2002 edition addresses Balkan Endemic Nephropathy, a fatal kidney disease affecting rural populations in the Balkan Peninsula. At the time of the study, Jerry Feder, USGS Research Scientist, collaborated with others at NCHS/CDC to map mortality patterns of those affected by the disease and analyze spatial associations with exposed lignite deposits.

### Concluding Comments...

Keep in mind that the study of geological (natural science) events and human health precedes us by several thousand years. It is not a new development and it has been ongoing. For example, Mike McGeehin, Director, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC, made note at the USGS Health Conference that CDC and USGS collaboration in the study of acute lymphocytic leukemia in Fallon, Nevada, was at that time the most extensive study of cancer clustering in the world (arsenic and tungsten exposures). What is new is the current emphasis placed on this natural and public health science relationship by Director Groat. His commitment to bring USGS resources in partnered research activities with DHHS, US EPA, and other public health research agencies will advance us in a concerted and coherent way. CDC/ATSDR staff with an interest in knowing more about USGS research resources in support of public health can view through Envision the USGS May 19, 2003 presentation hosted by NCEH [See NCEH/CDC news item II. 14, page 4, this edition].



**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](mailto:cmc2@cdc.gov). Celebrating our 52<sup>nd</sup> edition with continuous reporting since 1994.**

**The NCHS GIS home page contains current GIS events, archived GIS reports and other GIS links**

<http://www.cdc.gov/nchs/gis.htm>

**Please join us **May 18, 2003**: “Regional, Seasonal and Ethnic Differences in the NHANES III Pesticide Epidemiology (PEPI) Study”**