PUBLIC HEALTH GIS NEWS AND INFORMATION

July 2001 (No. 41)

Dedicated to CDC/ATSDR scientific excellence and advancement in disease control and prevention using GIS

I. Public Health GIS (and related)Events

SPECIAL CDC/ATSDR GIS LECTURES

(1) **July 23, 2001**. **"LandScan USA: A High Resolution Population Distribution Modeling Project,"** presented by the Oak Ridge National Laboratory's Global Population Project Team led by Jerry Dobson, Senior Development staff member (see abstract this edition) and (2) **August 15, 2001**. **"The Newly Enhanced Cancer Mortality Maps and Graphs Web Site,"** presented by Dan Grauman, Computer Specialist, National Cancer Institute (see abstract this edition). These programs will be held from 2:00-3:30 P.M. at the NCHS Auditorium, RM1100, Hyattsville, MD; Envision is available to offsite CDC/ATSDR locations; Web viewing for both is available at http://video.cdc.gov/ramgen/envision/live.rm. Note: 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 guest 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 prior two bimonthly reports at NCHS GIS website*]

☛ 2001 Cancer Conference, "Using Science to Build Comprehensive Cancer Programs: A 2001 Odyssey," September 4-7, 2001, CDC, Atlanta GA [See: http://www.cdc.gov/cancer/conference2001]

☞ 2001 Georgia GIS Conference, "A Geospatial Odyssey", Georgia Urban and Regional Information Systems Association, September 5-7, 2001, Athens, GA [See: http://www.gaurisa.org]

☛ 1st European Conference on Geographic Information Sciences in Public Health, September 19-20, 2001, Sheffield, England [See: http://www.gis.sheffield.ac.uk/conference]

☞ United Nation's Economic Commission for Europe, Work session on methodological issues involving integration of statistics and geography, September 25-28, 2001, Tallinn, Estonia [See: http://www.unece.org/stats]

☛ Statistics Canada Symposium 2001, "Achieving Data Quality in a Statistical Agency: a Methodological Perspective," October 16-19, 2001, Hull, Quebec [See: http://www.statcan.ca/english/conferences/symposium2001]

☞ 129th Annual Meeting & Exposition of the American Public Health Association, "One World: Global Health," October 21-25, 2001, Atlanta, GA [See: http://www.apha.org]

☛ National GeoData Forum: The GeoData Alliance, November 1-3, 2001, Denver, CO [See: www.geoall.net]

☞ 50th Annual Meeting of the American Society of Tropical Medicine & Hygiene, November 11-15, 2001, Atlanta, GA [See: http://www.astmh.org/meetings/ 50th_call_for_papers.html]

☛ First annual ESRI International Health GIS conference, November 12-14, 2001, Washington, D.C. [See: http://www.esri.com/industries/health/call%20_papers_2001.pdf]

☞ Federal Committee on Statistical Methodology, Research Conference, Office of Management and Budget, November 14 –16, 2001 [See: www.fcsm.gov or contact Stephen Cohen, BLS, at fcsm@ccmail.census.gov]

II. GIS News

(Please communicate directly with colleagues referenced below on any items*; please 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 Editor: Summer 2001 Training in **Spatial Data Analysis using SpaceStat™ and ArcView®**. Introduction to Spatial Data Analysis. One-week short course at the University of California, Santa Barbara, CA, **July 16-20**, 2001. Offered for the second time in an introductory format this summer, this course reviews topics related to the analysis of spatial data: mapping and visualization, ESDA, point patterns, geostatistics, spatial autocorrelation and spatial regression. The format includes intensive hands-on experience with the linkage between ArcView and SpaceStat, using ArcView and SpaceStat for Exploratory Spatial Data Analysis (ESDA), spatial autocorrelation analysis and spatial regression analysis.

Spatial Regression Analysis. One-week short course at the University of Michigan ICPSR (InterUniversity Consortium on Political and Social Research) Summer Program on Quantitative Methods, Ann Arbor, MI, August 6-10, 2001. Offered for the seventh consecutive year in Ann Arbor, this summer the focus of the workshop will be exclusively on spatial regression analysis. Topics will include the specification of dependent stochastic processes (specifically, various types of spatial autoregressive models), maximum likelihood estimation of dependent processes, instrumental variables and general method of moments estimation, specification tests, and asymptotic and finite sample properties. While most of the material will be applied to the standard regression model, some attention will be paid to panel data contexts (space-time models) as well as to spatial probit models. [For detailed information on all workshops, see http://www.spacestat.com/index.htm]

2. From **Eric S. Jefferis**, National Institute of Justice: The National Institute of Justice (NIJ) Crime Mapping Research Center (CMRC) requests proposals to conduct research that utilizes and/or develops leading-edge spatial analytic methods. A wide variety of research topics are anticipated that explore the use of spatial data analysis for criminal justice research and practice. Established in 1997, the goal of the CMRC is the promotion, research, evaluation, development, and dissemination of GIS (geographic information systems) technology and the spatial analysis of crime. Toward that goal, approximately $300,000 is being made available for this solicitation to support between five and seven awards. Supported projects are to be conducted within one year. The Due Date for proposals is **September 17**, 2001 [See: http://www.ojp. usdoj.gov/nij/funding.htm]

This solicitation provides a unique opportunity for the support of studies of crime and justice issues that are theoretically derived and empirically tested using multivariate and inferential spatial analytic methods. NIJ is particularly interested, though not exclusively, in innovative proposals that address the following areas: Continued development of spatial crime- forecasting models; Spatial analysis techniques for discrete criminal events; Innovative uses of spatial analyses to assess criminal justice system policies and practices; Spatial analytic approaches to identifying problems and evaluating solutions in rural, American Indian, and Alaskan Native communities; and Comparative analyses of serial offender identification methods. [Contact: Eric at jefferis@ojp.usdoj.gov]

3. From **Ed Spar**, Council of Professional Associations of Federal Statistics (COPAFS): The Census Bureau has started to release the **Census 2000 Summary File 1 (SF1)** data on a flow basis. SF1 presents counts and basic cross-tabulations of information collected from all people and housing units. This information includes age, sex, race, Hispanic or Latino origin, household relationship, and

whether the residence is owned or rented. Data will be available down to the block level for many tabulations, but only to the census-tract level for others. Summaries will also be included for other geographic areas such as Zip Code Tabulation Areas and Congressional Districts. State data will be released on a flow basis. You will gain access to the data through links from http://www.census.gov/Press-Release/www/2001/sumfile1.html. This website will also provide the tentatively scheduled release dates for other states during the month of June. [Contact: Ed, Executive Director, at copafs@aol.com]

B. Department of Health and Human Services

Agency for Toxic Substances and Disease Registry

4. From **Steve Dearwent**: ATSDR's Health Consultation of the Libby Asbestos Site, Libby, Lincoln County, Montana, entitled **"Mortality from Asbestosis in Libby, Montana, 1979-1998,"** is an analysis of asbestos-associated mortality in Libby, MT. Multiple geographic areas of analysis were originally defined using aerial photography, air modeling, a digital elevation model, and concentric buffering. Imposing artificial areas of analysis enabled the gathering of baseline population data (total population, age and gender distributions) for calculating Standardized Mortality Ratios (SMRs). Decedents were georeferenced and assigned to the various areas of analysis. Current reanalysis of the data is in progress since some death certificates were missed the first time around. These omissions were due to historic data entry problems at the state's vital statistics division and were not uncovered until this report was released. Therefore, all reported SMRs are conservative estimates. The report is at http://www.atsdr.cdc.gov/HAC/PHA/libby/lib_toc.html. [Contact: Steve at sed7@cdc.gov]

Centers for Disease Control and Prevention

5. From **Ishmael Williams**, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP): On June 21, 2001 CDC released the report ***"Men and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality"*** which examines geographical patterns of heart disease for racial and ethnic groups of men at the US county level. This study, conducted in collaboration with West Virginia University, follows the release of the Women's Atlas of Heart Disease in February 2000. Hardcopy versions of both atlases may be ordered online or downloaded directly in pdf format at http://www.cdc.gov/nccdphp/cvd/.

CDC also invites readers interested in cardiovascular health, health disparities, and web-based GIS applications to visit the interactive atlases at the Cardiovascular Health web site where county data from both the Women's and Men's atlases are available interactively as part of CDC's GATHER application. http://www.cdc.gov/nccdphp/cvd/womensatlas/statemaps.htm GATHER (Geographic Analysis Tool for Health and Environmental Research) is a web-based tool with GIS functionality of identify, find, zoom, pan, hotlink, and print. This latest release includes new interactive national maps to complement the interactive state maps and additional functionality including two map comparisons and a tool to list county names in each of the map categories. CDC welcomes your comments and suggestions at our web site. [Contact: Ishmael, GIS Specialist, at ibw1@cdc.gov]

6. From **Kathleen Carey**, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP): CDC 2001 Cancer Conference-"Using Science to Build Comprehensive Cancer Programs: A 2001 Odyssey," September 4-7, 2001, Atlanta. On **September 4**, from 1:00-5:00PM, the short course **"An Introduction to Geographic Information Systems (GIS) and Spatial Analysis in Cancer Prevention and Control"** will be presented. The course materials and pace are designed for individuals who have used GIS software for at least three months, and who wish to begin to apply spatial statistics in mapping projects. This short course will introduce participants to a set of exercises and practice data sets on geographic information systems (GIS) technology and spatial analysis in cancer prevention and control. Examples of topics include basic GIS functions; geocoding cancer cases; coding the quality of the

address match; estimating population characteristics for geographic boundaries of interest; mapping rates and proportions; smoothed maps; spatial filters and kernel estimators; the Distance Mapping and Analysis Program (DMAP) software; tests for spatial randomness; Software for Calculating the Spatial, Temporal, and Space-Time Statistics (SaTScan); masking and protecting confidentiality of cancer cases; and prospective time-periodic geographical cancer surveillance. The conference Agenda At-A-Glance (including several GIS topics) and Short Course descriptions and registration form are now online at http://www.cdc.gov/cancer/conference2001/sessions.htm. Instructors are C. Virginia Lee, CDC, Martin Kulldorff, University of Connecticut, and Gerard Rushton, University of Iowa. [Contact: Kathleen at kcary@cdc.gov]

7. From the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), Division of Adult and Community Health: ***"Measuring Healthy Days- Population Assessment of Health-Related Quality of Life,"*** describes the origins, validity, and value of a set of survey measures developed by the Centers for Disease Control and Prevention (CDC) and its partners for use in tracking population health status and health-related quality of life (HRQOL) in states and communities. Several of these measures have been part of the full sample Behavioral Risk Factor Surveillance System (BRFSS) core since 1993 and were added, beginning in 2000, to the examination component of the National Health and Nutrition Examination Survey (NHANES). [The report is available at http://www.cdc.gov/nccdphp/hrqol/pdfs/mhd.pdf]

8. From **Bill Sappenfield**, NCCDPHP: **Fred Broome** (US Census Bureau), **Jon Sperling** (US Department of Housing and Urban Development) and **Charles Croner** (CDC), will instruct a GIS in Public Health workshop for the CDC sponsored CityMAtcH conference, "Urban Maternal and Child Health Leadership Conference 2001: Moving Women's Health Centerstage," on August 26, 2001, in Nashville. This is the third annual GIS conference workshop. The workshop will be held offsite at Tennessee State University. [Contact: Bill citymch@unmc.edu]

C. Historical Black Colleges and Universities (HBCUs) and Other Minority Program Activites

9. From **Pamela Bingham**, 2001 HBCU Summer Faculty GIS Workshop Coordinator, Howard University: The **18th annual HBCU Summer Faculty GIS Workshop**, "GIS for a Changing World," will be held **July 15-21**, 2001, at the National Capital Planning Commission, Washington, D.C. The conference is hosted by Howard University's Urban Environment Institute. Sponsoring agencies include the Department of Interior's Bureau of Land Management (BLM), Office of Surface Mining (OSM) and U.S. Geological Survey (USGS). Software and training materials are provided by the Environmental Science Research Institute (ESRI) and MapInfo. Many activities are planned including a field exercise with Global Positioning Systems (GPS) and presentations from HBCUs and federal agencies. Workshops will be held on the Census and demographics, criminal justice, environmental issues, school district planning, health care, landuse and redistricting. [For information and registration contact Gloria Thurman, Assistant Program Director, at voice 301.585.2295 or Pamela at bingham_engrsvs@hotmail.com]

10. The Extramural Services Activity, Public Health Practice Program Office (PHPPO), CDC, is pleased to announce the **Fiscal Year 2002** summer (spring, summer) internship programs through two CDC/ATSDR cooperative agreements with the Association of Schools of Public Health (**ASPH**) and the Association of Teachers of Preventive Medicine (**ATPM**). These programs provide outstanding training opportunities for newly trained public health professionals and provide an opportunity for CDC/ATSDR to mentor students who are interested in gaining experience in public health in the federal arena. To see if your institution participates, and then secure applications, please visit the ASPH website at http://www.asph.org and ATPM at http://www.atpm.org.

D. Other Related Agency or Business GIS News

11. From **Al Stevens**, Federal Geographic Data Committee: The **fifth annual Global Spatial Data Infrastructure (GSDI) Conference** took place in Cartagena, Columbia, May 21-25. The focus was "Sustainable Development: GSDI for Improved Decision Making". A total 290 delegates representing 49 nationalities agreed on 12 Conference Resolutions to help the GSDI become a more cohesive infrastructure. [Contact: Al is the new FGDC International Activities Coordinator and the GSDI point of contact. He can be reached at asteve1@usgs.gov]

12. From **Mylena Pinzón**, Pan American Health Organization (PAHO): Wwe have recently published **"Equity and Health: Views from the Pan American Sanitary Bureau."** We believe this publication will be of great interest to the readers of *Public Health GIS News and Information*: The concept of equity has emerged as a primary guiding for the work of the Pan American Sanitary Bureau. The Bureau has been gathering information on and examining issues related to disparities in health in the Americas, especially as they relate to socioeconomic factors. The articles gathered in this publication represent an important step toward a more equitable distribution of health conditions and health related services, insofar as they represent the status of the issues and dilemmas faced by that Bureau in making equity an operational concept for its work in the Region. The authors have attempted to show how equity and the insights it yields into the distribution of health-dependent as this is on differences in education, income, class, ethnicity and race, geographic location, gender, and other distinctions-can underpin the Bureau's work at the operational level and be incorporated into technical cooperation activities.

Many of the perspectives expressed in the collection come from conceptual work developed by other scholars and researchers or emerge from the Bureau's ongoing work with collaborating institutions, such as the Rockefeller Foundation, the World Bank, UNDP, and CARICOM, as well as several universities and professional and academic associations in the Region. The collection is organized into three sections: Conceptual and Contextual Aspects of Health Equity, Priorities for Incorporating Equity into Technical Cooperation in Health,and Making Health Equity Work at the Country Level. This publication may be obtained at the PAHO Online Bookstore at http://publications.paho.org/english/moreinfo.cfm?Product_ID=546. [Contact: Mylena at pinzonmi@paho.org]

13. From **Health Analytics**: Health Analytics has just released health services demand estimates for 2000 and projections for 2005. These data are available for **Major Diagnostic Categories (MDCs)** and **Diagnosis Related Groups (DRGs)** and can be purchased at the county and ZIP code levels. Compiled using the latest utilization rates available from the National Center for Health Statistics and high quality demographic estimates and projections, these data sets can be obtained on CD or through electronic transfer in the format you specify. Data sets are available for individual regions and for the nation as a whole. County-level data sets include state and U.S. data, and ZIP code-level data sets include county, state and U.S. data. [For more information, contact info@healthanalyticsonline.com]

14. From **Stephanie Hulina**, Harvard Design and Mapping Company, Inc. (HDM): HDM is pleased to announce that it has been awarded an **ImageWorld2 (IW2)** contract through prime contractor, SER Solutions. IW2 is a Government Wide Acquisition Contract (GWAC) administered through the **National Institutes of Health Information Technology and Assessment Center (NITAAC)**. One of three major functional areas of the IW2 contract is GIS products and services, HDM's area of expertise. For over thirteen years, HDM has provided outstanding GIS services to business and government including projects on risk management, spatial data analysis and client distribution analysis. HDM also has in-depth knowledge and experience in the statistical analysis of geocoded disease/infection data, including techniques for global and local cluster analyses and environmental epidemiology studies. From simple desktop applications to complete turnkey GIS and web-based

systems, HDM has the expertise to develop custom GIS applications and integrate them with an existing system at any stage of the system's life cycle. [Contact: Stephanie at shulina@hdm.com]

15. From **Mark E. Reichardt**, Open GIS Consortium, Inc. (**Geospatial Fusion Services Demonstrated**): The Open GIS Consortium, Inc. (OGC) announces the successful demonstration of an operational geospatial fusion implementation at In-Q-Tel by an international vendor team. Geospatial fusion refers to the ability of interoperable technologies to integrate text with geoprocessing and web based services. The demonstration showed three services working together: a geoparser (capturing geographic references in text), a gazetteer (using a dictionary of place names and their associated location) and a geocoder (putting the location on a dynamic digital map). Together these services would allow a researcher for example, to explore a dynamic, viewable map automatically filled with details based on text from a series of news articles and other documents. The application that builds the map might use a geoparser to search out geographic references in the text, consult a gazetteer to find the coordinates of each location, and then turn to a geocoder to post the location as a link on the map. [Contact: Mark at mreichardt@opengis.org]

III. GIS Outreach

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

☎ From **Johanna Nestor**, DHHS: Our office is proposing to use GIS and ArcView mapping software to conduct a descriptive study of Title X funded HIV services and service infrastructure as they relate to current trends in HIV infection and AIDS case rates. We plan to collect and geocode information from Title X grantees and correlate the information with rates of infection and other HIV/AIDs related care and treatment services in the surrounding community including substance abuse treatment centers. Ultimately, this study is intended to enable staff to display and conduct spatial and statistical analysis of gaps in Title X services and will hopefully aide in development of an action plan for requesting future funding and eliminating health disparities. Emphasis will be placed on areas identified as under-served. We request input from other federal, state and local agencies that have embarked on similar projects. We are also very interested in similar studies, pertinent sources of data and information, and any comments and suggestions. [Contact Johanna, Office of Public Health and Science, at voice 301.594.2131 or jnestor @osophs.dhhs.gov]

☎ From **Scott M. Cadigan**, Ocean County Dept. of Planning, New Jersey: Are there companies and universities integrating GIS spatial pattern recognition and analysis tools into bioinformatics, biotechnology, and similar research interest like genomics? Anyone with an interest in this question please write your thoughts to me. [Contact: Scott, GIS Director, at smcadigan@aol.com]

☎ From **Kathleen Askland**, Maine Bureau of Health: Is there a website or downloadable file that contains GPS coordinates of (1) home addresses in the U.S.; (2) U.S. highway entrance/exit ramps; and (3) town (or in the case of New England, Minor Civil Division) population centroids? Iif there is not a website, is there an agency or organization that has these data and will make them available? I know that the US Postal Service and the US DOT has some data, but I'm not sure exactly what that is or how to acquire it? I have inquired with a couple of individuals in the state DOT of interest (Maine), but they are not aware of the existence of such data here. [Contact: Kathleen, CDC EIS Officer, at voice 207.287.1967 or Kaskland @cdc.gov]

☎ From **Richard Carlson**, Filer, ID: Could you please direct me to any resources or people at CDC, or state or local health departments, who might know what the health risks are associated with contact with diluted dairy lagoon water with a fecal coliform count of 20,000 cfu/100ml and an ammonia/n count of 6.89mg/l. These numbers are lab results of a water sample test done on the overspray of "irrigation" water coming out of the endgun of a dairy lagoon irrigation pivot which was shooting across a public roadway

onto a woman's property where a day care center is located. [Contact: Richard at voice 208-326-3686 or carlsonr@filertel.com]

☎ From **John Phelps**, Graduate Center at CUNY: Jeffrey Osleeb, SUNY, and I are building a GIS county level data base of mortality, economic census data, environmental data and behavioral data in order to analyze patterns of chronic disease. If you have any suggestions for government agencies interested in supporting this work please let me know. This work is an extension of a study I did for the Health Care Financing Administration (HCFA) that helped explained state mortality by disease variation with SES variables and then with variables on risk behavior.

In our HCFA study on forecasting mortality, variables describing socioeconomic status were used to explain the variation in state age-adjusted mortality. Previous studies had used the poverty rate, median income and income inequality to explain about 40 percent of state mortality variation. We were able to double the explanatory power of the SES model by adding education, wealth, lack of health insurance and measures of race. The poverty rate was a weak measure due to the inability to adjust for geographic variation in the cost of living. Lack of health insurance was a better measure of lack of resources. The population share of blacks appeared to be even more significant at capturing poverty and limited resources. But measures of the lower end of the economic scale had only half of the explanatory power. Measures of the upper end, share of the population with a BA degree or more and income from assets were able to explain the other half of the variation in state mortality rates. Education was the single most important variable.

The good news was that so much of the variation morality could be explained, but concerns about what these SES variables represent also grew. While a straight-forward story for poverty and lack of resources can be told, wealth and education are more difficult to interpret. The role of income inequality, which has dominated the discussion on health inequalities, appears to be relatively indistinguishable from other measures of limited resources and access. The study tried to address these concerns by estimating a behavioral model with age-adjusted state level measures for obesity, lack of physical exercise, smoking, lack of health insurance and consumption of fruits and vegetables. This behavioral model performed almost as well as the SES model, explaining more than two thirds of the state variation in chronic disease mortality. We also are trying to extend these results to the county level and include explanatory environmental variables. Copies of the study may be obtained from the Office of the Actuary, HCFA, or from John. [Contacts: John, Sr. Research Fellow, at john.h.phelps@verizon.net or Jeff, Executive Officer of Earth and Environmental Sciences, at josleeb@gc.cuny.edu]

Technical News
New Spatial Analytic Software from BioMedware and Terraseer

Two new products are announced. "**BoundarySeer** identifies spatial patterns, then it assesses the probability that those patterns could occur by chance. While other software products offer data description methods, such as contouring, kernel functions, or buffer creation, no other software offers the advanced boundary detection and analysis features found in BoundarySeer, described at www.terraseer.com. You can find example applications analyzing health data at this site. **ClusterSeer** provides state-of-the-art statistics for evaluating disease clusters in space and time. ClusterSeer brings cluster detection software up to date. No other cluster evaluation software provides a multiple comparisons adjustment, as many cluster detection methods, nor any set of methods as current. ClusterSeer's cutting edge features are described at www.terraseer.com/csr/clusterseer_features.html. [Contact: Dunrie Greiling at dunrie@biomedware.com]

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FGDC Metadata Made Easy [the case of ArcView]

NOAA's Coastal Services Center has developed the **ArcView® Metadata Collector** which is an easy-to-use application that can be utilized by any ArcView

3.x user for creating Federal Geographic Data Committee (FGDC) compliant metadata. The tool can create metadata for any data type supported by ArcView, including ARC/INFO coverages, ArcView shapefiles, as well as any supported image formats. Tool functions include: Automatic extraction of information (metadata) such as bounding coordinates, map projections, and attribute information; Storage of information into .dbf files that can be edited, if needed, and reused for subsequent metadata records. Generation of output in both text and HTML formats. And also generation of an INFO file that will become part of that coverage if you are creating metadata for an ARC/INFO coverage [See: http://www.csc.noaa.gov/metadata/text/ download.html]

Left- Shoreline Data Layering Without Metadata
Right- Shoreline Data Layering With Metadata

As the example shows, metadata is necessary for using data properly. In this example, a land cover map was overlaid with a shoreline map without taking projection into account, thus causing substantial error. In order for data sets to be preserved and useful to others, standardized documentation is necessary. Don't duck metadata!

IV. Public Health and GIS Literature

Emerging Infectious Diseases

Emerging Infectious Diseases 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 online journal is located at http://www.cdc.gov/ncidod/EID/index.htm. The June 2001 supplement of CDC's journal, Emerging Infectious Diseases (EID), is now available at http://www.cdc.gov/ncidod/EID/upcoming.htm. This issue contains presentations and summaries from the **International Conference on Emerging Infectious Diseases 2000**. Over 2000 public health professionals in many areas of specialty met in mid-July for the International Conference on Emerging Infectious Diseases. The program included plenary sessions and symposia with invited speakers, presentations on emerging infections, and oral poster presentations. Major topics included current work on surveillance, epidemiology, research, communication and training, bioterrorism, and prevention and control of emerging infectious diseases, both in the United States and abroad. Online presentations include both audio and slides at http://www.cdc.gov/iceid/webcast/promo_webcast.htm.

Morbidity and Mortality Weekly Report

Selected articles from CDC's ***Morbidity and Mortality Weekly Report*** **(MMWR)**: [Readers may subscribe to MMWR and other CDC reports, without cost, at http://www.cdc.gov/subscribe.html and access MMWR online at http://www.cdc.gov/ mmwr]:Vol. **50**, No. **25**-

Influenza and Pneumococcal Vaccination Levels Among Persons Aged 65 Years or Older-United States, 1999; Routinely Recommended HIV Testing at an Urban Urgent-Care Clinic-Atlanta, Georgia, 2000; Vol. **50**, No. **RR-11** MMWR Recommendations and Reports for *Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis*; Vol. **50**, No. **RR-10** *Vaccinia (Smallpox) Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2001* Vol. **50**, No. **24**- Vitamin A Deficiency Among Children-Federated States of Micronesia, 2000; Measles Incidence Before and After Supplementary Vaccination Activities-Lusaka, Zambia, 1996-2000; Notice to Readers: National HIV Testing Day-June 27, 2001; Vol. **50**, No. **23**- Progress Toward Poliomyelitis Eradication-West and Central Africa, 1999-2000; Exposure to Patients With Meningococcal Disease on Aircrafts-United States, 1999-2001; Notice to Readers: Publication of Report on Tobacco Control Investment by States; Vol **50**, No. **22**- Fatal Pediatric Lead Poisoning-New Hampshire, 2000; Update: Influenza Activity-United States and Worldwide, 2000-01 Season, and Composition of the 2001-02 Influenza Vaccine; *MMWR Recommendations and Reports*, Vol. **50**, Number **RR-8** *Compendium of Animal Rabies Prevention and Control, 2001--National Association of State Public Health Veterinarians, Inc.*Vol. **50**, No. **20**- World No-Tobacco Day-May 31, 2001; Tobacco Use Among Adults-Arizona, 1996 and 1999; Protracted Outbreaks of Cryptosporidiosis Associated With Swimming Pool Use-Ohio and Nebraska, 2000; Prevalence of Parasites in Fecal Material from Chlorinated Swimming Pools-United States, 1999; Drowning-Louisiana, 1998; Notice to Readers: Deferral of Routine Booster Doses of Tetanus and Diphtheria Toxoids for Adolescents and Adults; Vol. **50**, No. **19**- Public Health and Injection Drug Use; Update: Syringe Exchange Programs-United States, 1998; Notice to Readers: National Hepatitis Awareness Month-May 2001; *MMWR Recommendations and Reports*, Vol. **50**, Number **RR-7** *Motor-Vehicle Occupant Injury: Strategies for Increasing Use of Child Safety Seats, Increasing Use of Safety Belts, and Reducing Alcohol-Impaired Driving-A Report on Recommendations of the Task Force on Community Preventive Services*; Vol. **50**, No. **18**- Outbreak of Legionnaires' Disease Among Automotive Plant Workers-Ohio, 2001; Public Health Dispatch: Update: Outbreak of Acute Febrile Respiratory Illness Among College Students-Acapulco, Mexico, March 2001; Pregnancy-Related Deaths Among Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native Women-United States, 1991-1997; Notice to Readers: National Melanoma/Skin Cancer Detection and Prevention Month-May 2001; Notice to Readers: Buckle Up America! Week-May 21-28, 2001; *MMWR Recommendations and Reports*, Vol. **50**, Number **RR-6** CDC *Report Regarding Selected Public Health Topics Affecting Women's Health*; Vol. **50**, No. **17**- Trends in Blood Lead Levels Among Children-Boston, Massachusetts, 1994-1999; National Estimates of Nonfatal Injuries Treated in Hospital Emergency Departments-United States, 2000.

Other Related Presentations
Washington Statistical Society

July 12, 2001. "Record Linkage and Privacy: Issues in Creating New Federal Research and Statistical Information," A new report from the General Accounting Office, by Judy Droitcour and Nancy Donovan, U.S. General Accounting Office. **This presentation will be held at NCHS**, RM1110, from 11:00AM-12:00 Noon. Abstract: The increasing ability to store, retrieve, cross-reference, and link electronic records brings information benefits as well as new responsibilities and concerns. Record linkage--a computer-based process that combines multiple sources of data to produce new research and statistical information-is a case in point. On one hand, federally sponsored linkage projects can inform policy debates, help government and business planning, and contribute knowledge that might benefit millions of people. But, on the other hand, new information about individuals is created as part of the linkage process: Linkages occur at the person level, and oftentimes "the whole is greater than the sum of the parts." Thus, personal

privacy is a potential concern-even though research and statistical projects do not involve government action towards any data subject.

This overview of issues concerning record linkage and privacy in the federal arena includes the following general findings: Federal projects generate new research and statistical information by tapping into-and linking--survey responses, existing records, and "contextual data"; Privacy issues raised by linkages like these include, among others: (1) whether consent to linkage was obtained, (2) whether data-sharing between organizations was required to "make the link," and (3) whether "de-identified" linked data are made available to the public-and might be vulnerable to reidentification risks; Various techniques to help address these privacy issues include signed consent forms, tools for masking personal data, and secure data centers where researchers analyze linked data under controlled conditions; Strategies for enhancing data stewardship could include, among others, developing agency systems for accountability and fostering an organizational culture that emphasizes the values of personal privacy, confidentiality, and security. Questions for further study include: How extensive is federal record linkage? How do legal and regulatory privacy protections vary across federal agencies? What new privacy "tools" and stewardship strategies can be developed? [The full report is available on the GAO website at www.gao.gov, referenced as Report Number: GAO-01-126SP; Contact: Ed Hunter at elh1@cdc.gov]

July 17, 2001. **"The Data Web Project: Confidentiality Issues,"** by Cavan Capps, U.S. Census Bureau, and Robert Chapman, Centers for Disease Control and Prevention (CDC). **This presentation will be held at the BLS Conference Center**, Rooms 7& 8, 2 Massachusetts Avenue, NE, Washington, DC at 1:45PM. Abstract: The Data Web is a project that is networking together databases from all over the World Wide Web into a single dispersed database, creating in effect the infrastructure for a virtual data library spanning multiple municipal, state, and federal agencies. This virtual data library includes data from many subject domains including but not limited to: economic data, demographic data, labor data, health data, crime data, transportation data, education data, and agricultural data. The online "reference librarian tool" called DataFERRETT, provides a means to search the multiple data sources over the web and to manipulate the data using standard spreadsheet-like tools, allowing analysts to preview the data before subsetting and downloading or to quickly create descriptive analysis for reports. Survey data, census data, administrative data from national and local sources, and data that are aggregated from these sources are included.

This Internet technology provides new opportunities to provide access to locally-maintained administrative data as it is being created by local government processes. For example, real time access to community crime statistics on muggings in a given neighborhood would be important to impacted citizens. Crop statistics that integrates real time weather data and at the same time presents a time series of crop production for a given area could be made available to analysts as local and national administrative data sources are posted on the World Wide Web. Advances in treating health epidemics might be made if real time access to health treatment administrative data were available. Internet technology has made each of these scenarios increasingly practical. To make such data available in any meaningful way, confidentiality is a fundamental issue that must be intentionally considered and effectively protected. We will attempt to describe some of the technologies available to implement confidentiality filters in such a distributed environment and outline some of the policy dilemmas that we expect to face as data on the Internet matures. The Data Web project is being jointly developed by the CDC and the U.S. Census Bureau. [Contact: Karen Jackson, BLS, at voice 202.691.7524]

NCHS Cartography and GIS Guest Lecture Series

July 23, 2001. "LandScan USA: A High Resolution Population Distribution Modeling Project." by the Oak Ridge National Laboratory's Global Population Project Team led by Dr. Jerry Dobson. **This lecture**

will be held at NCHS, RM1100, from 2:00-3:30PM. Abstract: The US Environmental Protection Agency's (EPA) is collaborating with the Department of Energy's Oak Ridge National Laboratory (ORNL) to develop LandScan USA, a high resolution population distribution database for the continental USA. ORNL has already developed a similar global database, LandScan1998 (updated in 2000), that is unique and innovative. LandScan, the best available global population distribution data, is the first of its kind to use satellite imagery in population distribution modeling and is 2400 times finer than previously available population distribution data. LandScan 1998 and 2000 have a grid cell size of 30 seconds (<1 kilometer) and use census data in combination with other geospatial data, such as land use/cover, slope, topography, roads and nighttime lights, in order to improve the estimation and prediction of the spatial distribution of residential populations. ORNL is developing LandScan USA using similar data layers as in LandScan 1998 and 2000 but with a grid cell size of 3 seconds (<100 meters). This smaller grid cell size is more appropriate for risk assessment work conducted at EPA. ORNL is conducting a pilot study in a 29 county area in southeast Texas (around Houston and Port Neches) in order to develop the necessary algorithms and identify and resolve issues surrounding development of LandScan USA. Based on the pilot, ORNL plans to complete LandScan USA, which should become a very valuable data resource for EPA and other agencies that need more detailed information on the spatial distribution of US populations. LandScan USA has great potential for applicability in various socio-environmental studies including exposure/health risk assessment, urban sprawl estimation, and estimating populations at risk from natural and anthropogenic disasters. The LandScan model has significant potential to be modified for other applications, and is currently being considered as a primary tool to estimate spatial distribution of pesticide usage in urban watersheds. [Contact: Sue Perlin, EPA, at Perlin.Susan@epamail.epa.gov]

AND

August 16, 2001. "The Newly Enhanced Cancer Mortality Maps and Graphs Web Site," by Dan J. Grauman, Computer Specialist, National Cancer Institute. **This lecture will be held at NCHS**, RM1100, from 2:00-3:30PM Abstract: The ***Atlas of Cancer Mortality in the United States, 1950-94*** was published by the National Cancer Institute (NCI) in December 1999. An associated Web site was released to the public at the same time. An enhanced version of the Web site (http://cancer.gov/atlasplus/) was released in April 2001. In addition to links to related U.S. and international Web sites, the site offers data download capabilities, information for first-time users, and links to related publications. The *Online Atlas*, *Interactive Charts and Graphs*, and *Customizable Maps* constitute the main links of this site.

The *Online Atlas* enables the user to view/download maps, text, tables, figures, and data in multiple formats. The text of the Atlas can be printed in its entirety or by section. *Interactive Charts and Graphs* generates 5-year rates over time at the national, state, and state economic area (SEA) levels, rates and confidence intervals for 40 cancers at the state, SEA, or county level, and rates or confidence intervals for cancers by state. All charts and graphs are accessible through text files to the visually-impaired and blind users. *Customizable Maps* allows the user to create individual or multiple maps based on specific parameters selected by the user, including geography (state, SEA, county), age (all ages + 4 age groups), race/sex, time period (12 choices), cancer (40), rate intervals for color shading, and map color. The user can also view the map and data for an individual county, state, or SEA. Zooming and panning options are also available. Multiple maps with individual or common scales can be generated. These maps can then be animated in a slide show. [Contact: Dan at dan_grauman@nih.gov]

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Annual Report to the Nation on the Status of Cancer (1973 Through 1998), Featuring Cancers With Recent Increasing Trends, by Holly L. Howe, Phyllis A. Wingo, Michael J. Thun, Lynn A. G. Ries, Harry M. Rosenberg, Ellen G. Feigal, Brenda K. Edwards, *Journal of the National Cancer Institute*, Vol. 93, No. 11, 824-842, June 6, 2001. Background: The American Cancer Society, the National Cancer

Institute (NCI), the North American Association of Central Cancer Registries, and the Centers for Disease Control and Prevention, including the National Center for Health Statistics (NCHS), collaborate to provide an annual update on cancer occurrence and trends in the United States. This year's report contains a special feature that focuses on cancers with recent increasing trends. Methods: From 1992 through 1998, age-adjusted rates and annual percent changes are calculated for cancer incidence and underlying cause of death with the use of NCI incidence and NCHS mortality data. Joinpoint analysis, a model of joined line segments, is used to examine long-term trends for the four most common cancers and for those cancers with recent increasing trends in incidence or mortality. Statistically significant findings are based on a *P* value of .05 by use of a two-sided test. State-specific incidence and death rates for 1994 through 1998 are reported for major cancers. *Results:* From 1992 through 1998, total cancer death rates declined in males and females, while cancer incidence rates declined only in males. Incidence rates in females increased slightly, largely because of breast cancer increases that occurred in some older age groups, possibly as a result of increased early detection. Female lung cancer mortality, a major cause of death in women, continued to increase but more slowly than in earlier years. In addition, the incidence or mortality rate increased in 10 other sites, accounting for about 13% of total cancer incidence and mortality in the United States. *Conclusions:* Overall cancer incidence and death rates continued to decline in the United States. Future progress will require sustained improvements in cancer prevention, screening, and treatment.

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Selection of control groups by using a commercial database and random digit dialing, by Olson SH, Mignone L, Harlap S, *Am J Epidemiology* 2000; 152: 585-92. Abstract: Identifying a control group when cases come from a specialized hospital is a challenge for epidemiologists. The authors compared controls recruited by using a commercial database with those recruited by random digit dialing in the context of a hospital-based case-control study of ovarian cancer. This part of the study was conducted in 1997-1998 among women aged 18 years or older who resided in the New York metropolitan area. A mailing list owner grouped cases into "lifestyle" clusters based on US zip+4 postal code microneighborhoods and generated a random sample of potential controls with the same distribution across the clusters. Controls recruited from the commercial database (n = 82) and from random digit dialing (n = 90) were similar in age and race. Women from the commercial database had somewhat more education and higher incomes and were more similar to the cases on these measures. The control groups resembled each other closely in terms of oral contraceptive use, nulliparity, and religion and differed from the cases on these measures. Response rates were similar for the two groups. Only 28% of the cases were included on the mailing list, indicating that it did not reflect the source population of the cases. Use of a commercial database provided a control group whose socioeconomic factors were similar to those of cases at a lower cost than when random digit dialing was used but did not result in a higher response rate.

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'GIS & Health Applications'
[CALL FOR SUBMISSIONS]

This is a call for chapters to be submitted to Omar Khan, Johns Hopkins University, and Ric Skinner, New Jersey Dept. of Health & Senior Services, editors of **'Geographic Information Systems and Health Applications.'** "It is our aim for the text to feature chapters describing a diverse array of GIS applications relevant to the field of health. We invite submissions from the public, private and academic sectors. We are interested in practice-oriented chapters as well as those addressing academic issues of GIS. Ideally, the chapters will appeal to a broad range of those working in the GIS and health-related fields. Conference presentations are acceptable if unpublished and if the author is able to transfer full copyright." Proposals, manuscripts and inquiries should be sent in MS Word format by email to: gis_health@usa.net. This book will be published by Idea Group Publishing in 2002. Details will be sent to accepted authors or upon request. Proposals should be sent in by June 30,

2001or if you choose to submit a full chapter instead, these are due July 31, 2001. Inquiries should be directed to either Omar at okhan@jhsph.edu, or Ric, at wskinner@fast.net.

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

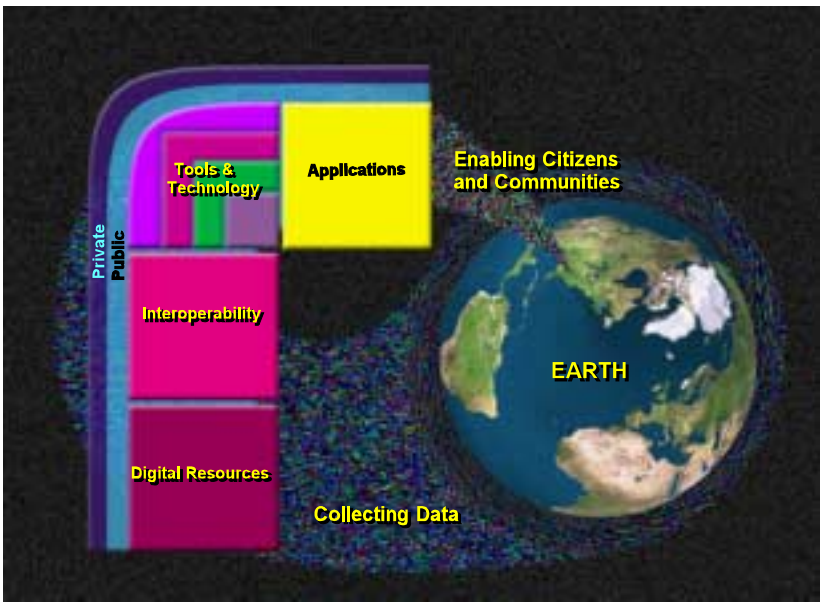
What is Digital Earth?

[New innovation and global data sharing is allowing everyone unprecedented access to information about our planet. Although some of this data is historical and political, most of it refers to a specific place on the Earth's surface. From building plans of a local town hall to population density, Digital Earth (DE) combines this information with satellite images to enable a 3-D environment that tells an ever-changing story about our Earth. The DE environment will enable access to this information, leading us towards better decision-making and a deeper discovery of our world. Through national partnerships, DE is working to make this geo-referenced data come alive for everyone. The digital earth community has captured a set of architectural views and identified both existing and required standards in the "Digital Earth Reference Model" at http://www.digitalearth.gov/derm]

"Digital Earth will be a virtual representation of our planet that enables a person to explore and interact with the vast amounts of natural and cultural information gathered about the Earth"

Society has gathered an enormous amount of digital information about the Earth and its inhabitants. This digital information consists of everything from satellite photographs that detail cities and farm fields to databases containing information on transportation, commerce, population, crime, food production, history, and much more. The scale ranges from global to local--from humanity to the individual. This information that is stored around the world is not easily accessible or easily utilized in conjunction with other types of data. Recognizing this challenge the ***National Digital Earth Initiative*** was created to enable and facilitate the evolution of Digital Earth, a digital representation of the planet that will allow people to explore and interact with vast amounts of natural and cultural information. Imagine a school child able to browse the planet, requesting information on land cover, distribution of planet and animal species, real-time weather, roads, political boundaries, and population. Imagine the quality of decisions that we could make as citizens, community leaders, business executives, and government leaders if we could seamlessly integrate information about our world from multiple sources.

Digital Earth is several things: a way to obtain information about the Earth; a framework in which to publish information; a new market for data, software and services; a set of standards; a local, national, and international collaboration; a near-term "alpha version"; technology challenges for the long-term vision. A primary goal of Digital Earth is to unlock the world's knowledge by simplifying access to georeferenced information, which is information that relates to a particular spot or area of the earth. The benefits will include reduced costs, a broadened range of users, enhanced merging of data from different sources, and improved decision-making by citizens, businesses and government. Digital Earth provides an environment for everyone to access and employ the vast amounts of cultural and physical electronic data that exists about the Earth. This data resides in many Digital Resources around the



world. An Interoperable environment is needed for Tools and Technologies to access and exploit these data archives. Tools and Technology range from generic items in the information technology marketplace to developments for specific Applications. Education, decision support, resource management, problem solving for citizens and communities are some of the many applications available through Digital Earth.

Digital Resources data, that constitute the raw materials of Digital Earth, are created and stored in many different ways. Large volumes of data are collected through various measurement methods at all geographic locations, e.g., direct measurements and remote sensing. Human activities and studies generate data with geographic components. Other data is the result of studies or activities that have an implied geographic relevance. This data includes natural and cultural themes, e.g., environmental, social, historical, government, economic, earth science, space science. All of this data is stored as a variety of Digital Resources.

Interoperability is the capacity to access multiple resources through common approaches to allow interaction of the wide variety of information technologies. Interoperability is defined in standards, through agreement on terminology; adoption of defined protocols, and through distributed services on the Internet. Interoperability allows simultaneous use of multiple geo-spatial data sets without needing to change the underlying digital resources. As users request data from multiple digital resources the interoperability is apparent as the responses from each of the various digital resources can be combined in a standard Web Browser. This allows a user to request land, water and political boundary data from different sources and overlay the data with geographic accuracy, producing a product specific to the user's application.

Tools & Technology are needed to allow users to enhance the data appropriately for their specific applications. Mature systems currently exist for management of the Digital Resources and to support the primary users of the data. The emphasis of Digital Earth is on the secondary users of the data, people who were not involved in the collection of the data, but can use the raw data for their particular purposes. Some of the tools and technologies to exploit the data exist today and others need to be developed. Standards and metadata for interoperability, Web Mapping, interactive 3-D visualization, storage and access of large multi-resolution datasets are some of the many tools and technologies.

Applications are where the value of Digital Earth is demonstrated. Imagine a social studies class learning about westward expansion across North America being able to access any relevant geo-spatial data and overlay that data to clearly visualize the topic. Another scenario might be a State Disaster Team response to an emergency in which they can access and utilize data showing the immediate area, the surrounding area, the weather and any other pertinent information. The public will determine the extent to which Digital Earth Applications develop.

Digital Earth is currently accessible to the end user, for general purposes, over the Web. In addition, high-performance access (for example, three-dimensional virtual reality displays) will be available at fixed installations in museums, libraries or educational institutions. Through Digital Earth, as with the World Wide Web, some information will be available with no charge and other data will have a fee. As a user of Digital Earth you will be able to rapidly find and retrieve relevant information through Catalogs, Portals and support services.

Once the desired information has been found, the user will be able to explore it by zooming in from global to local views, roaming through space and time, and asking for additional information on particular features. Furthermore, it will be possible to overlay information from different sources to obtain knowledge and make decisions. Currently, web-based map services exist, but each one contains only some fraction of the total information available and each has a different user interface. Digital Earth will enable a network of data servers that use common protocols; as a result, the user will choose the interface that suits his or her needs and be able to obtain information from any server. As an analogy, consider the World Wide Web (WWW), which lets users choose the brand of web browser they prefer and to access text and

multimedia content from any web site.

The Provider in a Digital Earth Environment enables you to publish information in an *open framework*. "Open" means that the standards for the framework are publicly available, defined and modified by consensus processes, and can be implemented without requiring a particular brand of software or hardware. Within that framework, you will be able to give away your information, or sell it, or restrict access as needed. By participating in this framework, you will maximize the audience for your information because it is compatible with that of others. By analogy, nearly all businesses today offer enterprise information and service using the WWW framework rather than customized applications. This has reduced costs for businesses providing text-based information in the same way that Digital Earth will reduce the costs of providing geospatial information.

Within the US, relationships are being established between federal, state, local and tribal governments, between government and the commercial and academic sectors, and within agencies of government. Affiliations are being established internationally as well. The National Aeronautics and Space Administration (NASA) has been identified as the lead agency. *NASA's Digital Earth Office* performs secretariat functions for the national Digital Earth Initiative and aligns NASA's data and resources with the national initiative. Many US government agencies work together within the Digital Earth Steering Committee and the Interagency Digital Earth Workshop to determine the government's needs and positions.

The Digital Earth Initiative is establishing relationships with NSGIC and NACo to coordinate with relevant activities. The United Nations Environmental Program has been considering a Global Digital Earth (GDE) collaboration, and several other countries have Digital Earth activities, e.g., China, Canada, European Commission, and Israel. In addressing the question what is Digital Earth we have touched on every aspect of the Digital Earth Program, including vision, environment, initiative, and involvement from many sources. The Digital Earth *Vision* is to provide Interoperability of geo-referenced digital resources. Digital Earth supports decision-making, geo-information management, increasing knowledge, and scientific discovery and dissemination to support a sustainable human world. Digital Earth is accomplished through a spirit of collaborations that enables involvement of the individual. Digital Earth *Environment* is the technical, managerial, and application guidelines to facilitate a Digital Earth. The Digital Earth *Initiative* is a multi-agency collaboration that enables and facilitates the evolution of a Digital Earth. The initiative demonstrates implementation through public and private partnerships. Together with community, public, and private partnerships Digital Earth will facilitate an environment for anyone, anywhere to access and use geo-spatial data to its full potential. [For a complete version of this document see the national web page at www.digitalearth.gov or contact George Percivall, Digital Earth Office, National Academy of Science study for Digital Earth, at percivall@gsfc.nasa.gov]

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Preliminary ICD-10 External Cause of Injury Mortality Matrix

ICD-10 for mortality was implemented in the United States beginning with data year 1999. Preliminary national data for 1999 will be released this month on the NCHS web site, http://www.cdc.gov/nchs/. Additional detail on the implementation of ICD-10 can be found on the Mortality data page, http://www.cdc.gov/nchs/about/major/dvs/mortdata.htm. **The ICD-10 injury mortality framework** was developed to be as consistent as possible with the recommended framework developed based on the ICD-9 external cause of injury codes as published in www.cdc.gov/mmwr/PDF/rr/rr4614.pdf . Colleagues in the ICE (International Collaborative Effort) on Injury Statistics as well as in the Injury Control and Emergency Health Services (ICEHS) section of APHA participated in its development. Several changes were made to the ICD-10 matrix that warrant attention: 1) Two rows have been added. The first is labeled “All transport” and it includes all transport related deaths that were classified as unintentional, suicide, homicide, intent undetermined and operations of war. In ICD-9, the codes for suicide and intent

undetermined by crashing of a motor vehicle were included with motor vehicle traffic injuries. There is no indication in the actual codes that these are traffic deaths. The second row, "Other land transport" was added to accommodate new codes in ICD-10. 2) A change was made to the transportation and drowning categories. The ICD-10 codes for water transportation-related drowning, V90 and V92, are included with the "other transport" codes rather than with the drowning codes. In the ICD-9 version of the matrix, the comparable codes, E830 and E832, were included with drowning. This change was made to be consistent with the categorization of other mechanisms of injury (i.e., falls, fires and machinery) involved with water transport-related injuries.

Further, because substantial changes were made in the classification of transport-related injuries in ICD-10, a more detailed categorization of transport codes is being offered for those users who want more detail than this framework offers. These detailed transport codes are compatible with categories of the transport codes in the NCHS ICD-10 Underlying Cause-of-Death List for 113 causes (the list that replaces the 72-Cause list based on ICD-9 codes). A link is provided http://www.stipda.org/icd-10-matrix.htm that contains the text document (SAS pgm 6-11-01.doc) with the SAS statements needed to run the ICD-10 matrix. In addition, an Excel workbook with 2 sheets can also be found there. The 2 sheets have 1) the ICD-10 matrix and 2) the more detailed transport code groupings. Each of these can be saved to your own computer. Finally, this matrix should not be considered to be the final ICD-10 matrix until NCHS completes the final comparability study of ICD-9 and ICD-10. The preliminary report, Comparability of Cause of Death Between ICD-9 and ICD-10: Preliminary Estimates has been released and it can be found on the NCHS web page, http://www.cdc.gov/nchs. [Source and contact: Lois A. Fingerhut, Chair, International Collaborative Effort (ICE) on Injury Statistics and Special Assistant for Injury Epidemiology, Office of Analysis, Epidemiology and Health Promotion, NCHS, at voice 301.458.4213 or email LFingerhut@cdc.gov]

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Federal Geographic Data Committee (FGDC)

[*The Federal Geographic Data Committee (FGDC) is an interagency committee, organized in 1990 under OMB Circular A-16, that promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis. The FGDC is composed of representatives from seventeen Cabinet level and independent federal agencies. The FGDC coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 17 federal agencies that make up the FGDC (pending DHHS membership) 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*]

Standards Out for Public Review

The FGDC develops geospatial data standards for implementing the NSDI, in consultation and cooperation with State, local, and tribal governments, the private sector and academic community, and, to the extent feasible, the international community. Anyone interested in participating in FGDC standards activities is invited to contact the Chair of the sponsoring FGDC Subcommittee or FGDC Working Group. The *FGDC Standards Reference Model* defines the expectations of FGDC standards, describes different types of geospatial standards, and documents the FGDC standards process. *Standards Directives* provide additional guidance to the FGDC Subcommittees and Working Groups developing standards and document the practices of the FGDC Standards Working Group. Many standards documents are in Portable Document Format. You may download a free PDF reader from Adobe [See: http://www.fgdc.gov/standards/standards.html].

Content Standard for Digital Geospatial Metadata: Extensions for Remote Sensing Metadata (close Friday, August 31, 2001). Background: NASA and NASA-support members prepared the initial draft, and the Project Development Team, which consisted of members from federal agencies, private industry, and the International Society of Photogrammetry and Remote Sensing (ISPRS), reviewed it. The standard was briefed at several symposiums and technical meetings to increase external awareness. The metadata content includes identification information, data quality information (Algorithm and Processing), spatial data organization information (raster data types, expanded dimension

description), spatial reference information (geo-referencing), and entity and attribute information (scaling). New content includes platform and mission, instrument, and location [(x,y,z) positions] information.

Objectives: The purpose of this standard is to provide extensions to the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (also referred to hereafter as the Metadata Content Standard) for metadata describing geospatial data obtained from remote sensing. Efforts are being made to make these extensions compatible with the framework and content of the ISO metadata standard now undergoing the approval process, in order that the FGDC standard can be converted to ISO form for use as remote sensing extensions to the ISO standard.

Scope: These extensions define content standards for additional metadata, not defined in the Metadata Content Standard, that are needed to describe data obtained from remote sensing. **They include metadata describing the sensor, the platform, the method and process of deriving geospatial information from the raw telemetry, and the information needed to determine the geographical location of the remotely sensed data.** In addition, metadata to support aggregation, both the components of an aggregate data set and the larger collection of which a data item may be a member, will be supported. Persons interested in reviewing the **Content Standard for Digital Geospatial Metadata: Extensions for Remote Sensing Metadata** may download the public review draft in Microsoft Word format or PDF format. All reviewers are strongly urged to use the Review Comment Template when preparing and submitting comments. Reviewers are to submit comments to gdc-remotesensing@www.fgdc.gov no later than Friday, August 31, 2001. [For information about the FGDC standards process (including public review), please visit FGDC Standards or contact Ms. Julie Binder Maitra, FGDC Standards Coordinator, at jmaitra@usgs.gov]

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The National Map

The National Map is a **proposed** database of continually updated spatial data for the U.S. and its territories. The vision is that by the year 2010, working with partners, USGS will provide the Nation with current, accurate, and nationally consistent basic spatial data, including digital data and derived topographic maps. Open standards would allow data from other sources to register to *The National Map's* reference scheme. This announcement invites partners, customers, and the public to review the report, and to improve it by providing comments on aspects (1) that are useful, (2) that need improvement, and (3) that should be reconsidered. Ideas about approaches to accomplish the goals of *The National Map* also are invited. The report can be found at: http://nationalmap.usgs.gov. [Contact: Mike Domaratz, USGS, at voice 703.648.4434 or email mdomarat@usgs.gov]

NSDI Communications Toolkit

FGDC worked with the National States Geographic Information Council (NSGIC) to create a **NSDI Communications Toolkit** containing a set of three interrelated briefing materials (an informational video, CD, and brochure) that describe the power of geospatial information and technology. to help deliver the message of the value and importance of GIS as an infrastructure to promote data sharing. These communication tools have been developed through a cooperative partnership between the NSGIC and the FGDC. These materials are intended to assist you in educating managers and policy officials about the widespread potential of spatial data and geospatial technology to assist their decision-making processes. The tools are designed to help you familiarize officials with a more effective way of addressing real world problem solving in the day-to-day business of government through the power of geographic information. Information on the Toolkit is available at http://www.fgdc.gov/nsdi/docs/communications/index.html.

Web Site(s) of Interest for this Edition

http://www.bts.gov/gis/ntatlas The geospatial data sets distributed by the Bureau of Transportation Statistics depict transportation facilities, networks, and services

of national significance. Databases are designed to be used with Geographic Information System (GIS) software packages to locate transportation features and provide a framework for transportation network analysis. You also may join the new Listserv for Geographic Information Systems in Transportation (GIS-T). Topics of interest to this community include, but are not limited to: research, training, linear referencing systems, base map development, state DOT concerns, resources, and conferences.

http://www.itdb.bts.gov The Intermodal Transportation Database (ITDB) is a central repository for transportation data gathered by both the Bureau of Transportation Statistics (BTS) and outside organizations. The data is stored in BTS databases, so to provide a central repository, offer easy access to a variety of transportation data, and extend the ability to run the data through a set of common applications. The ITDB, when fully developed, will describe the basic mobility provided by the transportation system, identify the denominator for safety rates and environmental emissions, illustrate the links between transportation activity and the economy, and provide a framework for integrating critical data on all aspects of transportation.

http://www.vbs.vt.edu/A1GISBIO/GISBIO.html Video proceedings from "Applications of GIS to Bioinformatics" Symposium, May 16-17, 2001, sponsored by Virginia Tech's Office of GIS and Remote Sensing (OGIS) and the Virginia Bioinformatics Institute (VBI). Selected topics include: GIS's Future in Bioinformatics: An Industry Perspective; GIS Spatial Analysis Techniques and Data Structures; Emerging Trends in Spatial Modeling and Analysis; Applications in Environmental Epidemiology and Ecology; Resources and Approaches for Untangling Health-environment Relationships; GIS in Bioinformatics-precision Agriculture; and the CIAT Stable of Climate Mapping Applications.

Final thought: Remote Sensing and Public Health

The special supplement for this edition on GIScience and Vector Borne (VB) Diseases will leave little doubt about the growing wave of public health research which incorporates remote sensing (RS) with other GIS and georeferencing tools. In public health, we are beginning to capitalize on remotely-sensed satellite detection that will help reveal pathogen-host-vector and environmental relationships that have remained elusive over time. It is a tip of a scientific expedition that will benefit from new satellite image sensors, with sophisticated capabilities to further us to spatially discern and associate vector-borne disease and environmental conditions, and help advance the health of nations. Much of the work submitted by others in this special supplement is "work in progress." I think you will come away with a new appreciation for the study of VB diseases and the important role of RS in this effort.

Charles M. Croner, Ph.D., Editor, ***PUBLIC HEALTH GIS NEWS AND INFORMATION***, Office of Research and Methodology, National Center for Health Statistics, e-mail cmc2@cdc.gov. While this report is in the public domain, the content should not be altered or changed. This is the 41st edition with continuous reporting since 1994.

Please join us at NCHS on July 23 and August 15 for two very timely NCHS Cartography and GIS Guest Lectures.
Our Web Page is located at http://www.cdc.gov/nchs/gis.htm

PUBLIC HEALTH GIS NEWS AND INFORMATION
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SPECIAL SUPPLEMENT

GIScience and Vector-Borne Diseases

It is a pleasure to introduce this special supplement on GIScience and vector-borne (VB) diseases. This initiative is the result of two University Consortium for Geographic Information Science (UCGIS) and U.S. Geological Survey (USGS) sponsored research colloquiums that have taken place this year [See: http://www.ucgis.org]. Appreciation is extended to **Suzy Jampoler**, UCGIS Executive Director and Chair, Planning Committee, and committee members **Stephen Guptill** and **Lee De Cola** (USGS), **Uriel Kitron** (U. of Illinois), **Art Getis** (San Diego State University) and **Gerard Rushton** (U. of Iowa). In the May 2001 edition, *Public Health GIS News and Information*, I introduced the topic of vector-borne diseases in the context of the first (January 3-5) colloquium. In this edition, you will find a review of the second (May 22-24) colloquium. However, the longer-range and more important goal of this supplement is to provide you with as much timely VB disease information as possible in an area that continues to provide a major challenge to all of us concerned with public health. We wanted to begin with the **basics** e.g., what exactly are VB diseases, what are some web-related resources for further investigation, and what is the emerging potential of new Remote Sensing (RS) technology, as part of the GIScience toolkit, to further VB disease modeling and prediction. "By vector-borne, we mean those diseases that are transmitted from one vertebrate host to another by an invertebrate, usually an insect, a tick, or a snail. A zoonosis (pl. zoonoses) is a disease that normally exists in a non-human host, or reservoir. For example, passerine birds are the natural hosts of several viruses that can infect humans. Many vector-borne diseases are also zoonoses (for example, yellow fever, Lyme disease, and plague)" [ref: see Moore and Guptill below]. This first supplement on VB diseases could not have been possible without the generous efforts of **Chet Moore** (CDC), **Ruth Allen** (EPA) and **Nancy Maynard**(NASA). *Editor*

Ixodes trianguliceps, rodent tick of Europe; Source: Sarah Randolph, Oxford Tick Research Group, 2001

I. Second Symposium on GIScience and Vector-Borne Disease

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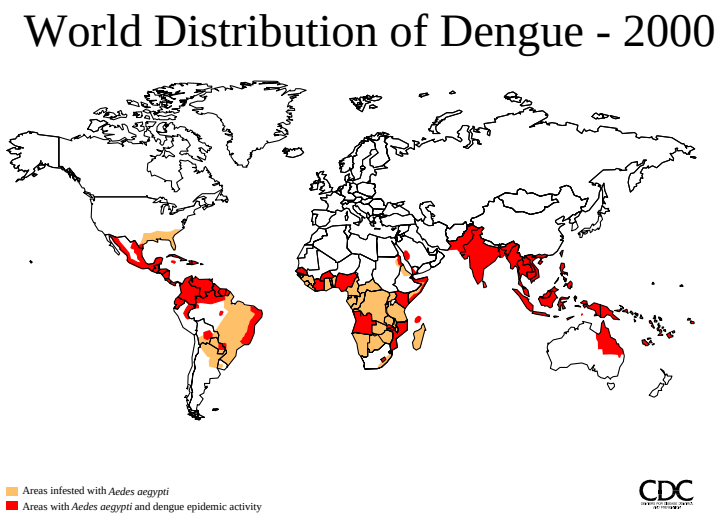
Centers for Disease Control and Prevention

The agenda for the May 22-24, 2001, Second Colloquium on GIScience and Vector-Borne Disease, was structured around a complimentary mix of interactive computer demonstrations, discussions, and formal presentations. It reflected a logical progression from the initial conference which sought to define VB disease research issues. This second of the series featured presentations of data and analytic tools for the scientific examination of disease patterns and related models. **Uriel Kitron** (U. of Illinois), "GIScience in Studies of Vector-Borne Diseases: Using Patterns to Elucidate Mechanisms," found that canine seropositivity was a good sentinel (in four Midwest states) for tick and Lyme-borne diseases, and that statistical modeling of vector transmission can be improved through the incorporation of environmental factors and dynamic biological models. Uriel also discussed the transmission characteristics of Eastern Equine Encephalitis, Schistosomiasis, and Chagas disease. **Sarah Randolph** and David Roger (U. of Oxford), "Vector-Borne Disease Epidemiology: From Pattern to Process and Back Again," emphasized the value of integrating quantitative analyses of biological processes with statistical analyses of spatial patterns to achieve explanations and predictions of spatial and temporal dynamics of VB disease. Most of Sarah's

work has been on tick-borne encephalitis in Europe where she has successfully incorporated the important contribution of the National Oceanic and Atmospheric Administrations' (NOAA) high temporal satellite imagery. The Advanced Very High Resolution Radiometer (AVHRR), carried by NOAA's Polar Orbiting Environmental Satellites, has unique characteristics of spectral response, image geometry, frequency of coverage, and accessibility that make it useful for applications in oceanography, terrestrial sciences, and meteorology, and therefore public health. She has shown that, while a vegetation index reflects ground moisture conditions and so determines the suitability of habitats for ticks, land surface temperature determines critical features of tick seasonality necessary for the transmission of tick-borne encephalitis virus.

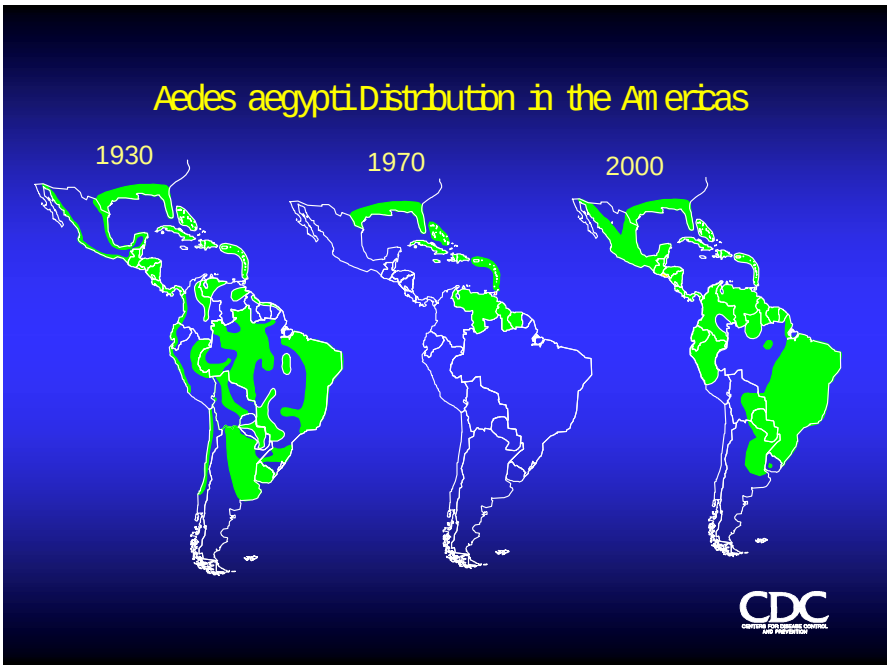
In the presentation "Dengue Modeling Efforts: Pupal Survey, Transmission Thresholds, Targeted Source Reduction, and Early Warning Systems," **Dana Focks** (Consultant) presented a pair of biologically-based and weather-driven simulation models of dengue. These models were used to develop transmission thresholds (the maximum number of pupae per person as a function of temperature and immunity in the environment) to preclude transmission. He outlined plans to develop a dengue risk assessment and mitigation program in concert with scientists in Vietnam that would incorporate GIS, El Niño Southern Oscillation (ENSO) forecasts, ground-based survey, and weather derived from satellite imagery. Dana pointed out that the infrastructure of public health is a big deterrent to dengue and malaria in the U.S. even though climatic conditions are favorable for the vector in populated areas. In the talk "Spatial Synchrony in Deer Tick Populations," In the talk "Spatial Synchrony in Deer Tick Populations," **Matthew Nicolson** (Southern Illinois University) used logistic regression to develop spatial models to predict human risk to tick-borne disease in Rhode Island. Based on data from 1993 to present including tick population estimates and the location of human disease cases, there is a strong association between human risk to tick-borne diseases and characteristics of the landscape around the home. In addition to the density of nymphal stage black-legged ticks, presence of forested habitat, the amount and distance to forest edge, and other habitat characteristics contributed to a risk map that accurately discriminated between the homes of Lyme disease patients and those of non-infected individuals nearly 80% of the time. He suggested that risk maps not only serve as a useful tool in public education, but can also lead to new insights into the ecology of vector-borne diseases. **Greg Glass** (Johns Hopkins University), "Reverse Engineering the Ecological Mechanisms of Hantavirus Pulmonary Syndrome," started with the human condition and worked back to weather altering ecosystem changes that characterized environmental correlates of risk through time. His use of logistic regression models to explore the association between TM bands and elevation resulted in good sensitivity and specificity of cases and controls in rodent densities.



Source: Duane J. Gubler, July 2000, CDC International Conference on Emerging Infectious Diseases

Several papers addressed spatial statistical techniques in the study of VB disease. **Art Getis** (San Diego State U.), "Dengue Risk Assessment in Iquitos, Peru," used a global *K* function to measure distances among all 590 households in the Maynas neighborhood of Iquitos. Art introduced a weighted *K* function taking into account household inhabitant size and pupae density. He found dengue transmission occurred at very short distances, both

inside and around the house, with pupae density a key predictor. In the paper "Resources and Approaches for Untangling Health-Environmental Relationships," **Geoff Jacquez** (BioMedware Inc. and TerraSeer Inc.) introduced company software that integrated spatial heterogeneity of Kitron's equine encephalitis data (southern Michigan) into a mathematical transmission model. His model included a landscape structure of equine encephalitis in space and time, and bedrock geology. Geoff demonstrated the software, particularly suited for clustering, "fuzzy" logic methods, and entropy, later in the program. He imported West Nile virus data provided by USGS and quantified patterns in the space-time locations of sero-positive birds. Using geographic boundary analysis, he demonstrated statistically significant overlap between the New Jersey road network and the places and times where sero-positive birds were found. Geoff noted "Not surprisingly, bird discovery is statistically associated with the geographic distribution of the New Jersey road network. This demonstrates the critical importance of collecting denominator as well as numerator data. Without these it is impossible to disentangle true epidemic spread from apparent pattern attributable to the road network." **Lee De Cola** (USGS) , "Spatial Forecasting of Lyme Disease Risk;" discussed both Lyme disease and West Nile Virus. Lee introduced autoregressive integrated moving average (ARIMA) techniques to forecast cases and their standard errors, and a kriged LOGRISK surface combining probability and risk in a national map.

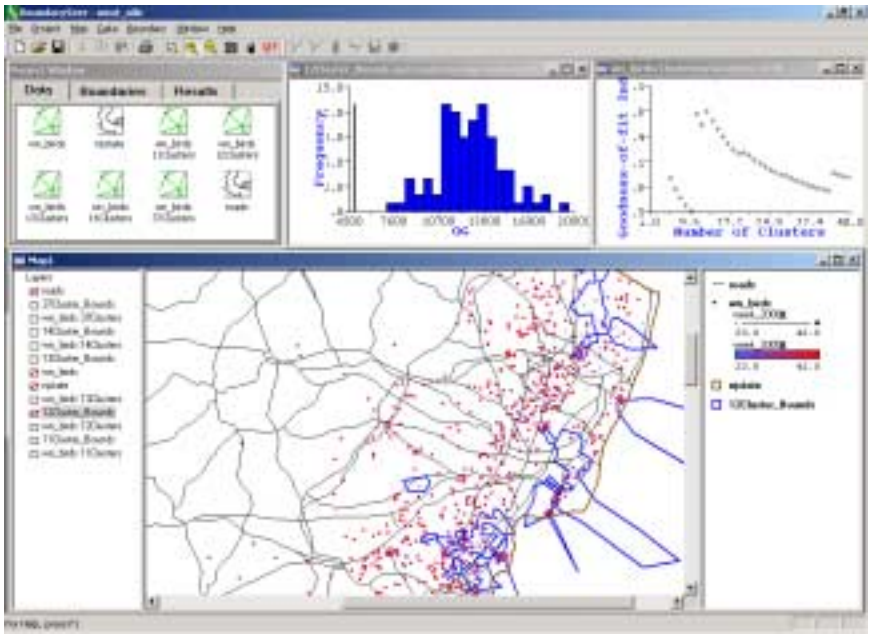


Source: Duane J. Gubler, July 2000, CDC International Conference on Emerging Infectious Diseases

Several presentations by National Aeronautics and Space Administration (NASA) staff pointed out the growing uses of, and timely opportunities for, remote sensing (RS) in the study of VB disease. **Nancy Maynard** (Goddard Space Flight Center) presented an overview of the many characteristics of RS today and how these can be brought into the study of VB disease and public health. Nancy stated NASA has a dedicated interest in the scientific study of VB disease. Her compilation of related papers and presentations by the NASA Goddard Environment & Health Group, 2000-2001, is included below. Colleague **Louisa Beck** (Center for Health Application of Aerospace Related Technologies, Ames Research Center) spoke on "Remote Sensing and Human Health: From High Resolution to Low (and Back Again)." Louisa, along with collaborators from both U.S. and Mexican institutions, generated a malaria transmission risk model for Chiapas, Mexico. Their approach was to correlate trapped adult mosquitoes with 13 Landsat Thematic Mapper landcover classes to determine which mixtures of landcovers explained the distribution and density of adult mosquitoes. Two landcovers, unmanaged pasture and transitional swamp, were found to be significant predictors; both landcovers provided opportunities for feeding (i.e., cattle/blood meal), as well as breeding habitats. Subsequently, this approach was successfully tested in a different area in Chiapas. She also pointed out that low resolution AVHRR data are available at little cost to no cost, with extensive scene coverages. These data have been used successfully in the study of such diseases as malaria, Rift Valley fever, trypanosomiasis, filariasis, and leishmaniasis. New satellite sensors are

providing new opportunities to study VB diseases with higher spectral sensitivity to soil and moisture, as well as higher spatial resolutions. A new project is the tracking birds using radiotelemetry and monitoring encephalitis in mosquito populations in order to understand temporal and spatial patterns of the infection in Sacramento, CA. The goal is to relate birds with mosquito populations and avian habitats to discern potential transmission risk.

Other presentations included **Andrew Thompson** (United Nations) "Vector-Borne Disease: Measuring Risk to United Nations Personnel. Andy assessed that a large proportion of deployed U.N. personnel worldwide will need to be prepared for the risks of VB diseases. **Lyle Peterson** and **Chet Moore** (CDC), "An Epidemiologist Looks at GIS and Remote Sensing," addressed the importance of standardizing an institutional approach to reported VB disease outbreaks. Steps outlined were: a) try to establish the diagnosis b) determine if a true outbreak c) establish a case definition d) locate cases e) use descriptive epidemiology f) apply interim prevention methods g) conduct surveillance for additional cases and h) consider other issues such as confidentiality, etc. Lyle noted that CDC has funded every state this year for West Nile Virus control.



Source: Geoff Jacquez,, Space-Time Seropositive Dead Birds in NJ. Second Colloquium on GIScience and Vector-Borne Disease, May 2001

Panel discussions proved useful in synthesizing and critically examining many of the issues associated with the conference presentations. Both Art Getis and **Gerry Rushton** (U. of Iowa) emphasized the need to include space e.g., spatial dependencies, autoregressive component, as an explicit part of VB disease data analysis. Gerry pointed out that most VB modeling is associative resulting in a somewhat static approach to prediction. He encouraged VB professionals to consider diffusion processes in the modeling equation which would make prediction more space-time dynamic. He referenced the early work of Peter Gould in the study of the spread or diffusion of AIDS through a hierarchy of city size and road networks. In terms of West Nile Fever, **Martin Kulldorff** (U. of Connecticut) suggested that public health officials need to be concerned about the spatial or georeferencing of all dead birds, not just those tested positive. This approach would provide needed information on vector-bird densities and estimated positivity rates, for effective epidemiological planning.

In summary all participants recognized that over time the role of technology has helped to advance the understanding and control of VB disease. There was unanimous agreement that GIScience has a significant role to play in this evolution. New developments in RS suggest breakthroughs in new risk factor identification in VB disease modeling and prediction. The importance of incorporating biological processes into analysis was emphasized such as the recent work by Sarah Randolph on tick-borne encephalitis and David Roger on the use of satellite imagery to predict tsetse fly vector densities and trypanosomiasis outcomes on cattle and humans. Strengthening the molecular part of disease transmission and diffusion processes was encouraged. As Dana Focks observed, the opportunities to bring all GIScience tools e.g., the range of integrative digital technology including RS, GIS, GPS (Global Positioning Systems) to bear on VB disease research will now define the future.

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II. Other Related Vector-Borne Disease and Public Health Resources

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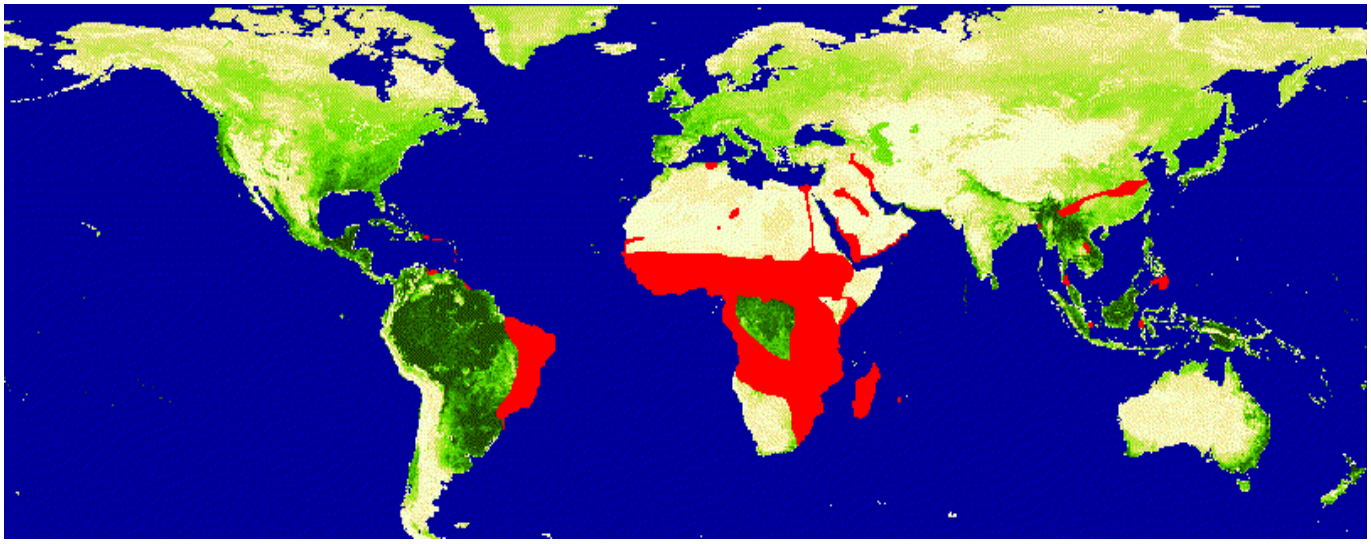
Vittor, A. and Patz. J: *Deforestation and Malaria in the Amazon*
Wood, B., Lobitz, B., Beck, L., Huq, A., Fuchs, G., Faruque, A, Colwell, R: *Climate And Infectious Disease: Use Of Remote Sensing For Detection Of Vibrio Cholerae By Indirect Measurement*

B. NASA's Center for Health Applications of Aerospace Related Technologies (CHAART)*...Editor*
The Center for Health Applications of Aerospace Related Technologies (CHAART) is part of the Ecosystem Science and Technology (ECOSAT) Branch of the Earth Science Division at the NASA Ames Research Center. The objectives of CHAART are to: expand the use of aerospace and information technologies by the human health community through training, education, application projects, and direct transfer of proven technologies and knowledge to research/control agencies and universities; assist health investigators in the utilization of CHAART capabilities to achieve the goals and objectives of their research; and, assess existing and planned aerospace-related technologies for use in health research, and encourage appropriate developments for their application.

http://geo.arc.nasa.gov/sge/health/sensor/bydisease.html The following is a subset of the world's major diseases that are thought to have environmental components that can be monitored using remotely sensed data: Chagas' disease; Cholera; Dengue fever, Dengue hemorrhagic fever; Filariasis (Bancroftian); Hantavirus pulmonary syndrome; Leishmaniasis; Lyme disease; Malaria; Onchocerciasis (river blindness); Plague; Rift Valley fever; Schistosomiasis; Trypanosomiasis (sleeping sickness); Yellow fever.



Schistosoma spp. (blood flukes) Human contact in water with *Schistosoma* larvae, which develop in snails

http://geo.arc.nasa.gov/sge/health/background.html The CHAART staff are available to consult with investigators on a variety of scientific issues affecting the successful application of remote sensing and geographic information systems (RS/GIS) for landscape epidemiology. Landscape epidemiology involves the identification of geographical areas where disease is transmitted. It is a holistic approach that involves the interactions and associations between elements of the physical and cultural environments. In addition to scientific support, CHAART offers investigators technical consultation on data acquisition, image processing and analysis, database

development, field support, and spatial statistics and modeling.

http://geo.arc.nasa.gov/sge/health/bydisease.html Current CHAART projects listed by disease, region and associated institution. For example, Cholera outbreak through Remote Sensing is being studied in Bangladesh (Bay of Bengal) by the University of Maryland Biotechnology Institute, College Park, Maryland, in conjunction with CHAART, NASA Ames Research Center. The tight linking of zooplankton and *V. cholerae* indicates remote sensing will be useful in tracking *V. cholerae* associated with plankton plumes emanating from major rivers where cholera is known to be endemic, i.e., the plume of the Ganges.

http://geo.arc.nasa.gov/sge/health/sensor/sensor.html The Committee on Earth Observation Satellites (CEOS) estimates that international space agencies are planning more than 80 missions over the next 15 years. These missions will carry over 200 different instruments, which will provide measurements of many environmental change parameters. These new capabilities will bring significant improvements in spectral, spatial, and temporal resolution, thereby making it possible to address health issues previously thought to be beyond the capabilities of remote sensing. In addition, advances in the understanding of the ecology of disease organisms, vectors, and their reservoirs and hosts have directed researchers to assess a greater range of environmental factors that promote disease prevalence, disease vector production, and the emergence and maintenance of disease foci. Advances in computer processing, geographic information system (GIS), and global positioning system technologies now make it easier to integrate ecological, environmental, and remotely sensed data for the purpose of developing predictive models that can be used in disease surveillance and control activities. A dynamic version of the basic characteristics of current and future planned remote sensing satellite systems may be viewed at http://geo.arc.nasa.gov/sge/health/sensor/cfsensor.html.

http://geo.arc.nasa.gov/sge/health/sensor/human.html Remote Sensing Citations in Human Health. Includes a listing of Disease, Vector, Location, Sensor, and Source. Remote Sensing Citations in General Health and Animal Diseases are located at http://geo.arc.nasa.gov/sge/health/sensor/general.html.

*C. Pesticide Web Resources for Vector Borne Disease Research at EPA**

by Ruth Allen, US Environmental Protection Agency

The US Environmental Protection Agency (EPA) has several web accessible resources that may be useful to the vector-borne research community:

http://www.epa.gov/pesticides/safety/healthcare/handbook/handbook.htm *The Recognition and Management of Pesticide Poisonings* is for anyone who may experience signs and symptoms, or for public health professionals providing care or treatment. It is written by medical professionals with toxicology expertise under contract and available on request in paper or electronically in English or Spanish. EPA's Worker Protection Standard (WPS) is a regulation aimed at reducing the risk of pesticide poisonings and injuries among agricultural workers and pesticide handlers. The WPS offers protections to over three and a half million people who work with pesticides at over 560,000 workplaces. The WPS contains requirements for pesticide safety training, notification of pesticide applications, use of personal protective equipment, restricted entry intervals following pesticide application, decontamination supplies, and emergency medical assistance.

http://ace.orst.edu/info/nptn This is a National Pesticide Telecommunication Network (NPTN) hotline for lay

public and medical professionals to ask questions about pesticides. It also serves as a West Nile Virus Resource Guide Homepage. The National Pesticide Telecommunications Network (NPTN) is a cooperative effort of the United States Environmental Protection Agency (EPA) and Oregon State University. NPTN is a service that provides objective, science-based information on pesticides. NPTN developed "NPTN's West Nile Virus Resource Guide" as a source of available information on the West Nile virus and pesticide related topics.
*Work in Progress

D. A Global Network on Schistosomiasis Information Systems and Control of Snail-Borne Diseases

Guest edited by N.R. Bergquist (WHO, Geneva) and J.B. Malone (LSU, Baton Rouge, LA), ***Acta Tropica***, Vol.79, No.1, April 27, 2001, pps 1-114. The contents are freely available and can easily be downloaded from the web at http://www.parasitology-online.com/parasitology/22/53/23/show/toc.htt. This unique collection of articles includes many interesting reviews on the use of satellite remote sensing and global information systems. [Appreciation is extended to **Adriaan Klinkenberg**, Amsterdam, The Netherlands, Senior Publishing Editor, *Parasitology*, for permission to quote from the below articles. Adriaan can be reached at email F.Klinkenberg@Elsevier.nl]

Foreward (excerpt), by **Carlos Morel**, Director, UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR), pps.1-2: "Geographic Information Systems (GIS), Global Positioning Systems (GPS) and Remote Sensing (RS) are particularly well suited to highlighting factors restricting the distribution of vector snails and insects. These technologies, now providing major support in the collection and handling of epidemiological data, have not only reached a high degree of sophistication but also the hardware has become surprisingly affordable. Computer-assisted data collection and instant provision of climatic information from earth-observing satellites enable detailed spatial and temporal parameters to be presented simultaneously."

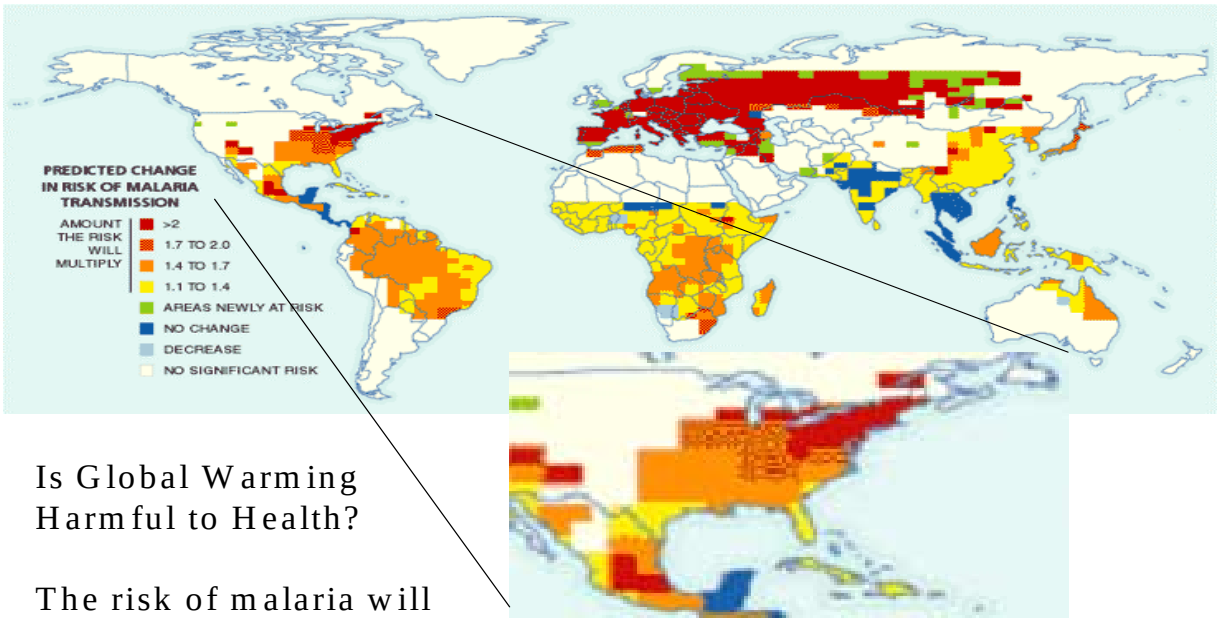
Editorial (excerpts), *A concept for the collection, consolidation and presentation of epidemiological data*, by **N.R. Bergquist**, UNDP/World Bank, Special Programme for Research and Training in Tropical Diseases (TDR), World Health Organization, pp. 3-5: "The sharp increase of the number of schistosomiasis victims in Africa following major dam projects in Egypt, Ghana, Senegal and elsewhere serves as a reminder of the strong environmental influence on the endemicity of snail-borne diseases. The completion in 2003 of the dam construction in the Yangtse river at the 'Three Gorges' in central China and the subsequent creation of a lake that will eventually dwarf all other lakes in the country will no doubt lead to a major shift in schistosomiasis epidemiology. There are all indications that environmental changes will increase in the future even without further human intervention. They should be taken as advance warnings that disaster is looming and that we need to act now to be able to come to grips with the increasingly rapid changes of disease transmission and distribution before it is too late.

Collection of baseline data would seem to be a suitable start but we must not forget that reported information is no better than the quality of the reporting system and reliable figures are hard to come by. Good estimates on almost all diseases in the third world are lacking and it has so far not been possible, the overriding importance of the burden of disease notwithstanding, to assess this with any degree of certainty. It is hardly surprising that the distribution of diseases, strongly influenced by a host of environmental factors, are difficult to assess and that the real number of people affected remains elusive. Before the advent of powerful computers and Geographic Information Systems (GIS) accurate information of the extent of various infections in the world was beyond reach. During the last decade, however, this field has undergone rapid transition and what was before unattainable can now easily be done, even with a personal computer, e.g. gauging variations and future prospects in near real time. Encouraged by these developments Kitron (2000) has suggested establishing world-wide 'risk maps', i.e. transmission models merging epidemiological and vector biology data with environmental information.

Facilitated by its close relation to the exploding information sector, satellites are rapidly finding extensive

use outside the field for which they were originally developed. Global Positioning Systems (GPS) and Remote Sensing (RS) from earth-observing satellites were not developed for the collection of data on endemic diseases but are so well suited to this task to appear almost tailor-made for this purpose. The important news is that the level of sophistication of the latest generation of satellites and data distribution via the Internet not only permits the collection of discretionary environmental data from the Earth's surface but also that pertinent information can be directly transmitted to GIS teams in the field. Appreciating the need to identify areas that could become endemic in addition to areas already endemic, RS adds an aspect to epidemiology which is generally missing from diagnostic surveys of spatial distribution of endemic infections. Although the usefulness of GIS for mapping the distributions of various diseases has long been recognized, the recent growth of satellite recognition technology and how this development can be utilized for the mapping of risk is less widely understood. The full value of the epidemiological potential of this approach can be appreciated by permitting satellite-generated data to govern surveys in the field. The papers presented at this workshop emphasize the feasibility in linking the output from these tools with available data sets which will no doubt lead to a quantum leap in providing evidence regarding risk for endemic diseases."

E. Editor's Selection: Visualizing Potential Relationship of Temperature Increase and Disease Risk



Source: John D. Corbett, Mud Springs Geographers, Inc., CDC presentation, June 13, 2001, "Almanac Characterization Tool (ACT 3.0)"

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VB Disease Appendix*

*by **Chet Moore**, Division of Vector-Borne Infectious Disease*
Centers for Disease Control and Prevention

Disease	Pathogen
African sleeping sickness	*Trypanosoma gambiense, T. rhodesiense, T. vivax, T. congolense*
Bancroftian filariasis	*Wuchereria bancrofti*
Carrion's disease (Oroya fever)	*Bartonella bacilliformis*
Chagas disease	*Trypanosoma cruzi*
Chikungunya fever	Chikungunya virus (*Alphavirus*, Togaviridae)
Colorado tick fever	CTF virus (Orbivirus)
Dengue	Dengue virus (4 serotypes)
Eastern equine encephalomyelitis	EEE virus
Flea-borne (endemic) typhus	*Rickettsia typhi* (=*mooseri*)
Japanese encephalitis	JE virus
La Crosse encephalitis	LAC virus (*Bunyavirus*, Bunyaviridae)
Leishmaniasis, dermal	*Leishmania tropica*, (several subspp (*tropica, braziliensis, mexicana*)
Leishmaniasis, visceral (kala azar)	*Leishmania donovani*
Loaiasis (Calabar swellings)	*Loa loa*
Louse-borne (epidemic) typhus	*Rickettsia prowazeki*
Louse-borne relapsing fever	*Borrelia recurrentis*
Malaria	*Plasmodium falciparum, P. vivax, P. ovale, P. malariae*
Malayan filariasis	*Brugia malayi*
Murray Valley encephalitis	MVE virus (*Flavivirus*, Flaviviridae)
Onchocercaisis	*Onchocerca volvulus*
Phlebotomus (sand fly) fever	SFN (Naples) and SFS (Sicilian) viruses (*Phlebovirus*, Bunyaviridae)
Plague	*Yersinia pestis*
Powassan encephalitis	POW virus
Rickettsial pox (Kew fever)	*Rickettsia akari*
Rift Valley fever	RVF virus
Rocky Mt. spotted fever	*Rickettsia rickettsii*
Scrub typhus	*Rickettsia tsutsugamushi*
St. Louis encephalitis	SLE virus (*Flavivirus*, Flaviviridae)
Tick-borne relapsing fever	*Borrelia* spp.
Tularemia	*Pasteurella tularensis*
Venezuelan equine encephalomyelitis	VEE virus (*Alphavirus*, Togaviridae)
West Nile encephalitis	WN virus (*Flavivirus*, Flaviviridae)
Western equine encephalomyelitis	WEE virus (*Alphavirus*, Togaviridae)
Yellow fever	YF virus, (*Flavivirus*, Flaviviridae)
Human granulocytic ehrlichiosis	*Ehrlichia chafeensis*
Human monocytic ehrlichiosis	*Ehrlichia*

Continued...

Disease	Vector(s)
African sleeping sickness	*Glossina palpalis, G. tachinoides, G. morsitans, G. swynnertoni, G. longipalpis*, etc.
Bancroftian filariasis	*Culex quinquefasciatus, Mansonia* spp.
Carrion's disease (Oroya fever)	Sand flies (primarily *Lutzomyia verrucarum*)
Chagas disease	Triatomine bugs (*Rhodnius, Panstrongylus*, etc.)
Chikungunya fever	*Aedes africanus, Ae. aegypti*
Colorado tick fever	*Dermacentor andersoni*
Dengue	*Ae. aegypti, Ae. albopictus*, other *Ae*. (*Stegomyia*) spp.
Eastern equine encephalomyelitis	*Culiseta melanura, Coquillettidia perturbans*, several *Aedes* spp.
Flea-borne (endemic) typhus	Several flea species
Japanese encephalitis	*Cx. tritaeniorhynchus*, other *Cx*. spp.
La Crosse encephalitis	*Ae. triseriatus, Ae. albopictus*
Leishmaniasis, dermal	*Phlebotomus* spp. (Old world), *Lutzomyia* spp. (New World)
Leishmaniasis, visceral (kala azar)	*Phlebotomus* spp. (Old world), *Lutzomyia* spp. (New World)
Loaiasis (Calabar swellings)	*Chrysops* spp.
Louse-borne (epidemic) typhus	*Pediculus humanus* (human body louse)
Louse-borne relapsing fever	*Pediculus humanus* (human body louse)
Malaria	*Anopheles* spp.
Malayan filariasis	*Mansonia* spp., *Anopheles* spp.
Murray Valley encephalitis	*Cx. annulirostris, Ae*. spp.
Onchocercaisis	Black flies (*Simulium* spp.)
Phlebotomus (sand fly) fever	*Phlebotomus* spp. mainly *P. papatasi*
Plague	Fleas (*Xenopsylla, Diamanus*, many other genera)
Powassan encephalitis	Ticks
Rickettsial pox (Kew fever)	Mites (*Allodermanyssus sanguineus*, others)
Rift Valley fever	Various *Aedes* and *Culex* spp.
Rocky Mt. spotted fever	*Dermacentor* spp., *Amblyomma americanum*, many other tick spp.
Scrub typhus	Trombiculid mites (*Leptotrombibium*,
St. Louis encephalitis	*Cx. tarsalis* (Western US), *Cx. nigripalpus* (Florida), *Cx. pipiens* complex (Central, Eastern US)
Tick-borne relapsing fever	Various soft ticks (Argasidae)
Tularemia	Ticks (*Ixodes, Dermacentor, Haemaphysalis*), tabanid flies (*Chrysops*), direct contact
Venezuelan equine encephalomyelitis	*Aedes taeniorhynchus, Ae. serratus, Mansonia titillans, Cx. quinquefasciatus*
West Nile encephalitis	*Cx. univittatus*, *Cx. pipiens* complex,
Western equine encephalomyelitis	*Culex tarsalis, Aedes melanimon*
Yellow fever	*Ae. aegypti, Ae. africanus, Ae. simpsoni, Ae. leucocelaenus*, *Haemagogus* spp., *Sabethes* spp.
Human granulocytic ehrlichiosis	*Amblyomma americanum*
Human monocytic ehrlichiosis	

Continued...

Disease	Normal (enzootic) vertebrate host(s)
African sleeping sickness	Wild ungulates, other mammals
Bancroftian filariasis	Humans
Carrion's disease (Oroya fever)	Unknown, presumed to be small rodents
Chagas disease	Opossum, armadillo, dog, cat, rodents
Chikungunya fever	Monkeys?
Colorado tick fever	Small rodents (ground squirrels, chipmunks)
Dengue	Humans, monkeys
Eastern equine encephalomyelitis	Various ciconiiform and passeriform birds
Flea-borne (endemic) typhus	Rodents (Rattus, Sigmodon, Peromyscus); Opossum
Japanese encephalitis	Waterfowl, passerine birds
La Crosse encephalitis	Tree squirrels, chipmunks
Leishmaniasis, dermal	Rodents (agouti and paca in S. America), dogs, humans
Leishmaniasis, visceral (kala azar)	Rodents, dogs, cats, humans
Loaiasis (Calabar swellings)	Primates
Louse-borne (epidemic) typhus	Humans
Louse-borne relapsing fever	Humans
Malaria	Humans
Malayan filariasis	Monkeys, cat, human
Murray Valley encephalitis	Water, shore, and land birds, fox, opossum
Onchocercaisis	Humans
Phlebotomus (sand fly) fever	?? (transovarial passage in sand flies?)
Plague	Rodents
Powassan encephalitis	
Rickettsial pox (Kew fever)	Rattus, Mus, Microtus spp.
Rift Valley fever	??
Rocky Mt. spotted fever	Various small mammal spp.; transstadial/transovarial transmission
Scrub typhus	Rats, shrews, voles, bandicoots
St. Louis encephalitis	Passerine birds
Tick-borne relapsing fever	Rodents
Tularemia	Rodents, lagomorphs, beaver
Venezuelan equine encephalomyelitis	Various bird species
West Nile encephalitis	Various bird species
Western equine encephalomyelitis	Migratory waterfowl, passerine birds
Yellow fever	Monkeys
Human granulocytic ehrlichiosis	
Human monocytic ehrlichiosis	

Continued...

Disease	Epizootic/epidemic vertebrate hosts
African sleeping sickness	Humans, domestic cattle
Bancroftian filariasis	Humans
Carrion's disease (Oroya fever)	Human, dog
Chagas disease	Humans, dogs, pits
Chikungunya fever	Humans
Colorado tick fever	Humans
Dengue	Humans
Eastern equine encephalomyelitis	Humans, horses, pheasants, whooping crane
Flea-borne (endemic) typhus	Humans
Japanese encephalitis	Humans, pigs
La Crosse encephalitis	Humans
Leishmaniasis, dermal	Humans
Leishmaniasis, visceral (kala azar)	Humans
Loaiasis (Calabar swellings)	Primates
Louse-borne (epidemic) typhus	Human
Louse-borne relapsing fever	Humans
Malaria	Humans
Malayan filariasis	Humans
Murray Valley encephalitis	Humans, dogs, horses
Onchocercaisis	Humans
Phlebotomus (sand fly) fever	Humans
Plague	Humans, cats, dogs
Powassan encephalitis	
Rickettsial pox (Kew fever)	Humans
Rift Valley fever	Sheep, cattle, goats, humans, other mammals
Rocky Mt. spotted fever	Humans
Scrub typhus	Humans
St. Louis encephalitis	Many bird species
Tick-borne relapsing fever	Humans
Tularemia	Humans
Venezuelan equine encephalomyelitis	Humans, horses
West Nile encephalitis	Humans, horses, other domestic and wild birds and mammals
Western equine encephalomyelitis	Humans, horses
Yellow fever	Humans
Human granulocytic ehrlichiosis	
Human monocytic ehrlichiosis	

Continued...

Disease	Distribution
African sleeping sickness	
Bancroftian filariasis	Pan-tropical, occasionally extends to 42° N, 30° S.
Carrion's disease (Oroya fever)	W. slope of Andes Mts., S. America
Chagas disease	
Chikungunya fever	
Colorado tick fever	Montane habitats in the Northwestern U.S.; Alberta and British Columbia, Canada
Dengue	
Eastern equine encephalomyelitis	
Flea-borne (endemic) typhus	Tropicopolitan, extending into warmer temperate regions
Japanese encephalitis	
La Crosse encephalitis	Eastern U.S.
Leishmaniasis, dermal	N. Africa, Middle East, Asia, Americas to SW United States
Leishmaniasis, visceral (kala azar)	Mediterranean Region eastward to China; S. America
Loaiasis (Calabar swellings)	Africa--Congo Basin to Sudan
Louse-borne (epidemic) typhus	Cosmopolitan, cooler climates
Louse-borne relapsing fever	4 major foci: Oriental, Eurasian, N. African, S. American Andes
Malaria	Global to 60° N, but mostly tropical to subtropical
Malayan filariasis	Eastern Asia and Pacific Islands
Murray Valley encephalitis	Australia
Onchocercaisis	Tropical Africa, Guatemala and S. Mexico
Phlebotomus (sand fly) fever	Middle East, Central Asia
Plague	Global
Powassan encephalitis	
Rickettsial pox (Kew fever)	Urban
Rift Valley fever	E. Africa and Middle East
Rocky Mt. spotted fever	S. Eastern US, mountainous areas of N., Central, and S. America
Scrub typhus	Tropical to subtropical Asia
St. Louis encephalitis	North America
Tick-borne relapsing fever	
Tularemia	
Venezuelan equine encephalomyelitis	Central & South America
West Nile encephalitis	S. Europe, Middle East, W. Asia, Africa; United States
Western equine encephalomyelitis	Western United States, Southern Canada
Yellow fever	Tropical regions of Africa, C. & S. America
Human granulocytic ehrlichiosis	
Human monocytic ehrlichiosis	

Continued...

Disease	Enzootic cycle habitat/ecotope
African sleeping sickness	Varies depending on the species of *Glossina*
Bancroftian filariasis	At least 4 habitat types, depending on vector and sub-form of parasite
Carrion's disease (Oroya fever)	Canyons with mild climate, lush vetetation, at 2-10,000' elev.
Chagas disease	Dwellings with harborage for triatome bugs e.g., mud, thatch, open
Chikungunya fever	
Colorado tick fever	
Dengue	Urban environments
Eastern equine encephalomyelitis	
Flea-borne (endemic) typhus	
Japanese encephalitis	
La Crosse encephalitis	Eastern hardwood forest
Leishmaniasis, dermal	Varies with location, vector species, etc.
Leishmaniasis, visceral (kala azar)	Varies with location, vector species, etc.
Loaiasis (Calabar swellings)	Forested areas, rubber plantations, forest-village interface
Louse-borne (epidemic) typhus	Crowded urban conditions, refugee camps, etc.
Louse-borne relapsing fever	??
Malaria	Varies greatly with vector-pathogen association
Malayan filariasis	Permanent water habitats, esp. with aquatic plants (e.g., Pistia)
Murray Valley encephalitis	
Onchocercaisis	Areas near fast-flowing streams (simuliid larval habitats)
Phlebotomus (sand fly) fever	Assoc. with rodent burrows, larval habitat of sand flies
Plague	Many habitat types
Powassan encephalitis	
Rickettsial pox (Kew fever)	High-density housing with rodent harborage
Rift Valley fever	Low-lying grassland areas (dambos) subject to periodic flooding
Rocky Mt. spotted fever	Determined by tick-vertebrate host ecology
Scrub typhus	Grass-scrub interface; varies with host-vector complex
St. Louis encephalitis	Varies with vector species (urban to rural/agricultural)
Tick-borne relapsing fever	
Tularemia	
Venezuelan equine encephalomyelitis	
West Nile encephalitis	
Western equine encephalomyelitis	Prairie pot-hole, flood plain, irrigated agriculture
Yellow fever	Tropical forest
Human granulocytic ehrlichiosis	
Human monocytic ehrlichiosis	

*Appendix is “work in progress”