Interactive Linked Micromap Plots with "nViZn" and on the Web

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- Micromaps for the West Nile Virus (2003-…)

Digital Government Initiative

- Research funded by NSF and Federal Agencies (EPA, USDA-NASS, NCI, Census, …)
- Started around 1999
- Multiple aspects of Federal data: Visualization, Access, Security, Disclosure, ...
- Digital Government Quality Graphics (DGQG)
- *http://www.diggov.org*

EPA's Cumulative Exposure Project (CEP)

- Conducted by EPA's Office of Policy
- Collection of analyses, addressing multiple pollutants from multiple sites (1998/1999)
- National analyses of
  - Air Toxics (Outdoor Concentrations)
  - Food Contaminants (Exposures)
  - Drinking Water Contaminants (Exposures)

Scope of Modeling

- 188 Hazardous Air Pollutants (HAPs) in Clean Air Act
- 148 HAPs modeled for 1990
- Modeled concentrations for each census tract in continental US (> 60,000)
- Includes stationary and mobile sources of air toxics emissions
- Uncertainty bounds derived from model-monitor comparisons

Web-based Access of HAP Data

- Goals:
  - Concise display
  - Easy access
  - Understandable to nonstatistical audience
- Solution:
  - WWW
  - GPL
  - Micromaps

Symanzik, Carr, Axelrad, Wang, Wong, Woodruff (1999): Interactive Tables and Maps - A Glance at EPA's Cumulative Exposure Project Web Page, Proceedings of the Section on Statistical Graphics, ASA, 94-99.

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Bookmarks Go To: http://www.epa.gov/CumulativeExposure

HOME
AIR
FOOD
DRINKING WATER
ABOUT THE PROJECT
WHAT'S NEW
RESOURCES
COMMUNITY-SPECIFIC STUDY
GREENPOINT/WILLIAMSBURG

EPA United States Environmental Protection Agency

CUMULATIVE EXPOSURE

P R O J E C T

EPA's Cumulative Exposure Project (CEP) is examining how much toxic contamination Americans are exposed to cumulatively through air, food,and drinking water. The study will estimate exposure levels for different communities and demographic groups nationwide, and identify which types of communities and demographic groups appear to have the highest exposures. The Cumulative Exposure Project is being conducted by EPA's Office of Policy.

About the Project

W H A T ' S N E W ?

Modeled 1990 air toxics concentrations are now available.

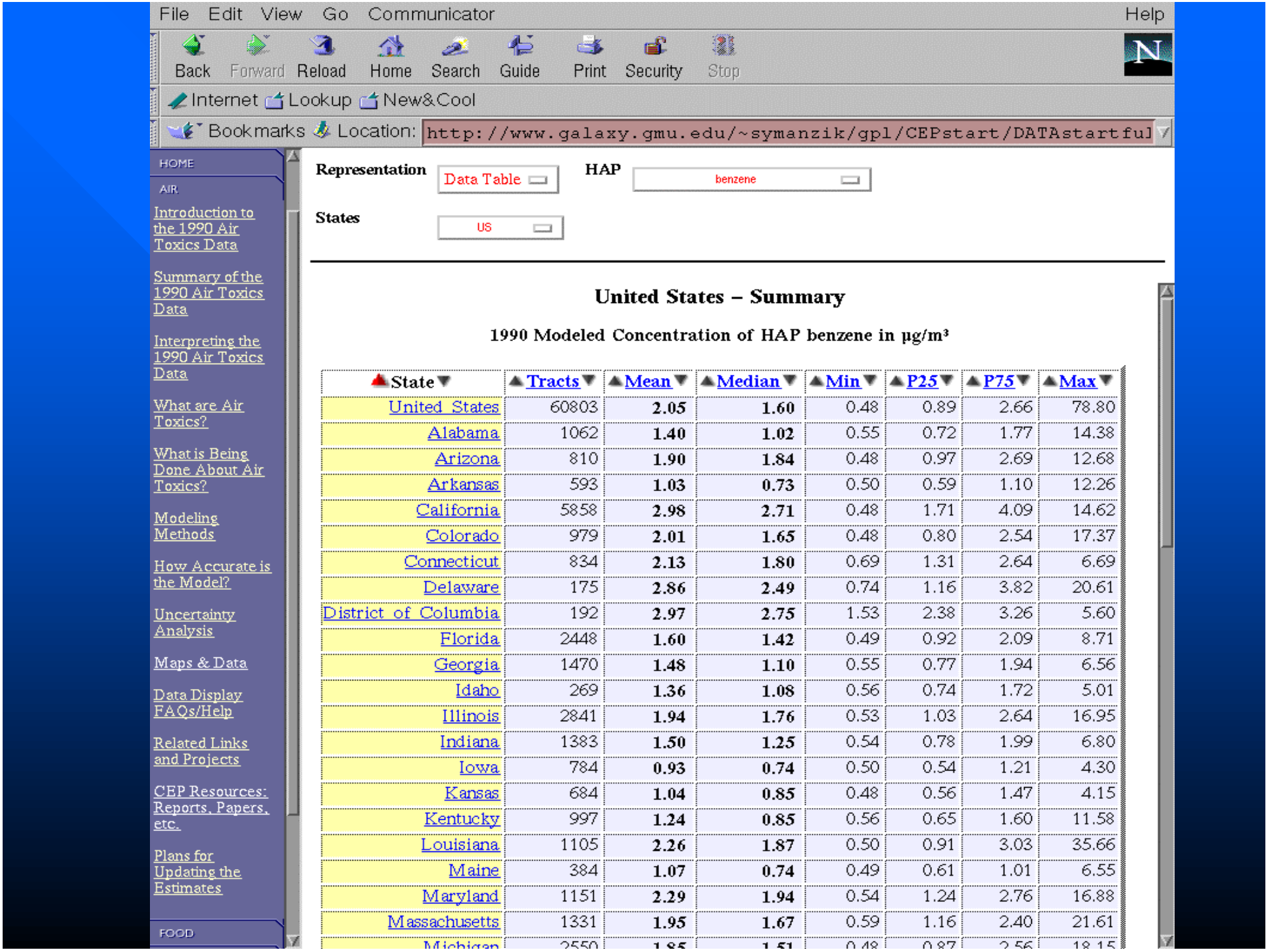
[Cumulative Exposure Project Home | EPA Home | Search | What's new]

http://www.epa.gov/CumulativeExposure/index.htm

last updated 12/3/98

Please send comments about this page to axelrad.daniel@epa.gov

http://www.epa.gov/CumulativeExposure (no longer active)



United States – Summary

1990 Modeled Concentration of HAP benzene in µg/m³

State	Tracts	Mean	Median	Min	P25	P75	Max
United States	60803	**2.05**	**1.60**	0.48	0.89	2.66	78.80
Alabama	1062	**1.40**	**1.02**	0.55	0.72	1.77	14.38
Arizona	810	**1.90**	**1.84**	0.48	0.97	2.69	12.68
Arkansas	593	**1.03**	**0.73**	0.50	0.59	1.10	12.26
California	5858	**2.98**	**2.71**	0.48	1.71	4.09	14.62
Colorado	979	**2.01**	**1.65**	0.48	0.80	2.54	17.37
Connecticut	834	**2.13**	**1.80**	0.69	1.31	2.64	6.69
Delaware	175	**2.86**	**2.49**	0.74	1.16	3.82	20.61
District of Columbia	192	**2.97**	**2.75**	1.53	2.38	3.26	5.60
Florida	2448	**1.60**	**1.42**	0.49	0.92	2.09	8.71
Georgia	1470	**1.48**	**1.10**	0.55	0.77	1.94	6.56
Idaho	269	**1.36**	**1.08**	0.56	0.74	1.72	5.01
Illinois	2841	**1.94**	**1.76**	0.53	1.03	2.64	16.95
Indiana	1383	**1.50**	**1.25**	0.54	0.78	1.99	6.80
Iowa	784	**0.93**	**0.74**	0.50	0.54	1.21	4.30
Kansas	684	**1.04**	**0.85**	0.48	0.56	1.47	4.15
Kentucky	997	**1.24**	**0.85**	0.56	0.65	1.60	11.58
Louisiana	1105	**2.26**	**1.87**	0.50	0.91	3.03	35.66
Maine	384	**1.07**	**0.74**	0.49	0.61	1.01	6.55
Maryland	1151	**2.29**	**1.94**	0.54	1.24	2.76	16.88
Massachusetts	1331	**1.95**	**1.67**	0.59	1.16	2.40	21.61
Michigan	2550	**1.85**	**1.51**	0.48	0.87	2.56	18.15

United States – Summary

1990 Modeled Concentration of HAP benzene in µg/m³

State	Tracts	Mean	Median	Min	P25	P75	Max
District of Columbia	192	**2.97**	**2.75**	1.53	2.38	3.26	5.60
Rhode Island	235	**1.92**	**1.77**	0.82	1.22	2.44	5.93
Delaware	175	**2.86**	**2.49**	0.74	1.16	3.82	20.61
New Jersey	1938	**3.30**	**2.82**	0.71	1.80	4.33	40.98
Connecticut	834	**2.13**	**1.80**	0.69	1.31	2.64	6.69
Massachusetts	1331	**1.95**	**1.67**	0.59	1.16	2.40	21.61
South Carolina	854	**1.37**	**1.09**	0.56	0.80	1.63	6.54
Idaho	269	**1.36**	**1.08**	0.56	0.74	1.72	5.01
Tennessee	1221	**1.62**	**1.15**	0.56	0.78	2.01	28.06
Kentucky	997	**1.24**	**0.85**	0.56	0.65	1.60	11.58
Georgia	1470	**1.48**	**1.10**	0.55	0.77	1.94	6.56
Alabama	1062	**1.40**	**1.02**	0.55	0.72	1.77	14.38
Ohio	2862	**1.85**	**1.66**	0.55	1.03	2.41	18.35
Mississippi	581	**1.25**	**0.89**	0.54	0.65	1.41	17.67
Maryland	1151	**2.29**	**1.94**	0.54	1.24	2.76	16.88
Indiana	1383	**1.50**	**1.25**	0.54	0.78	1.99	6.80
Virginia	1673	**1.60**	**1.26**	0.54	0.85	2.01	78.80
West Virginia	473	**1.53**	**0.93**	0.53	0.72	1.68	16.39
Pennsylvania	3167	**2.50**	**2.07**	0.53	1.21	3.08	18.91
Illinois	2841	**1.94**	**1.76**	0.53	1.03	2.64	16.95
Vermont	181	**1.07**	**0.66**	0.52	0.61	0.82	10.96
Missouri	1248	**1.58**	**1.18**	0.51	0.63	1.93	32.22

Rhode Island – Summary

1990 Modeled Concentration of HAP benzene in µg/m³

County	Tracts	Mean	Median	Min	P25	P75	Max
Bristol County	12	**1.61**	**1.24**	1.11	1.20	1.82	3.50
Kent County	36	**1.46**	**1.33**	0.94	1.17	1.79	2.56
Newport County	23	**1.93**	**1.37**	1.00	1.21	2.42	5.93
Providence County	138	**2.21**	**2.13**	0.85	1.66	2.66	4.83
Washington County	26	**1.19**	**1.00**	0.82	0.89	1.17	3.92

Tracts represents the number of census tracts in 1990 for each county.

Mean represents the arithmetic mean of all **1990 Modeled Concentrations** for each county and *Median* the median. *Min* represents the minimum **1990 Modeled Concentration** for each county, *P25* the 25th percentile, *P75* the 75th percentile, and *Max* the maximum. All concentrations are in *micrograms per cubic meter* [µg/m³].

There are 5 counties in this state.

Graphics Production Library (GPL)

- JAVA-based tool for creation and modification of statistical graphics on the Web
- Follows guidelines of modern statistical graphics
- Developers: Dan Rope, Dan Carr
- Reference: Carr, Valliant, Rope (1996): Plot Interpretation and Information Webs…, SCSG*, 7(2):19-26.

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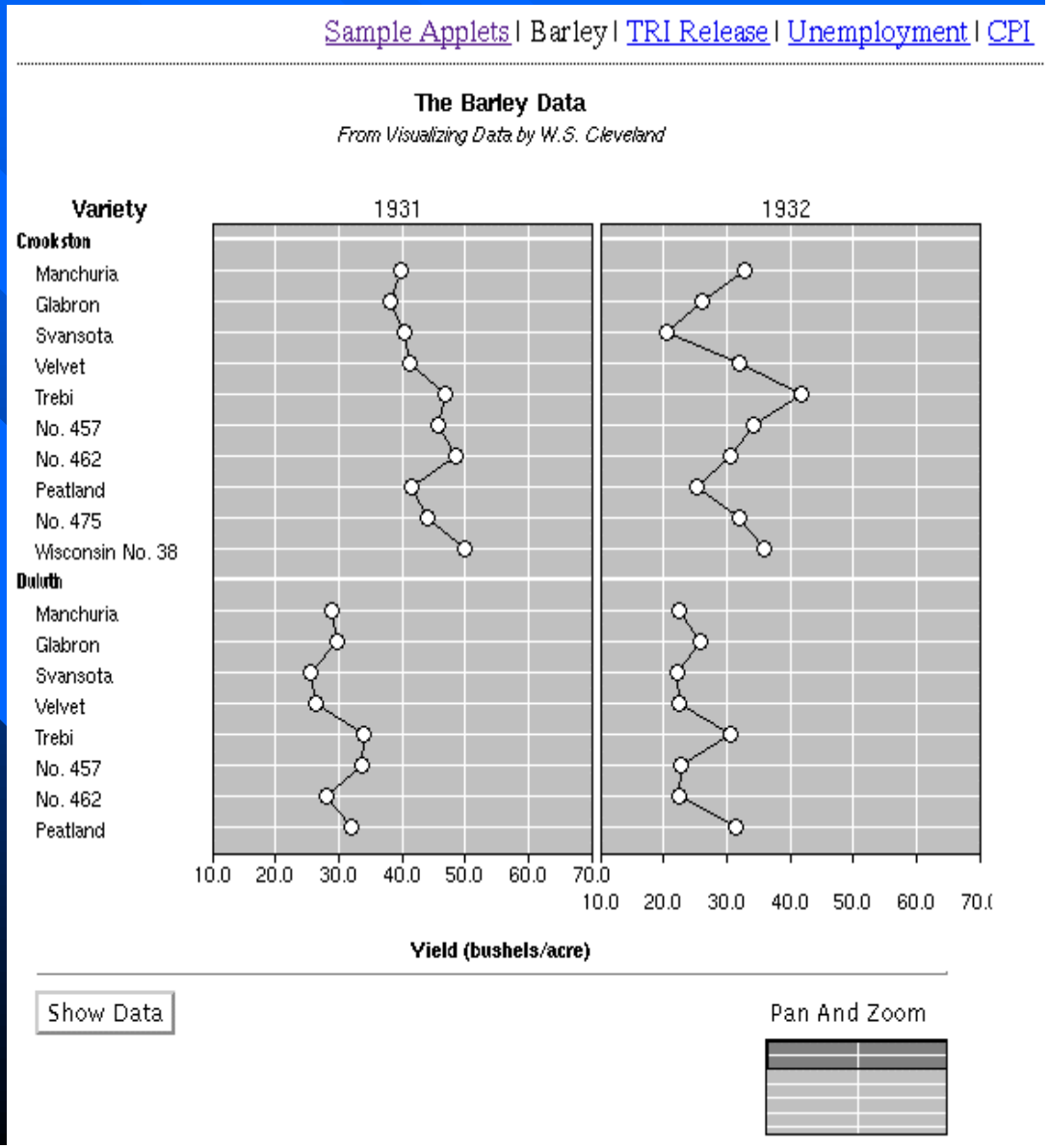
*SCGS: Statistical Computing & Statistical Graphics Newsletter: *http://www-stat.stanford.edu/~susan/scgn/*

GPL Examples

- *http://www.monumental.com/dan_rope/gpl/* (no longer active)
- WWW mirror site: *http://www.math.usu.edu/~symanzik/gpl/data/*



Micromaps

- Link of row-labeled univariate (or multivariate) statistical summaries to corresponding geographical region
- Focus on statistical display and not on maps

History of Micromaps

- First presented at 1996 American Statistical Association's (ASA) annual meeting (Olsen, Carr, Courbois, Pierson)
- References:
  - Carr, Pierson (1996): Emphasizing Statistical Summaries …with Micromaps, SCSG*, 7(3):16-23.
  - Carr, Olsen, Courbois, Pierson, Carr (1998): Linked Micromap Plots: ..., SCSG, 9(1):24-32.

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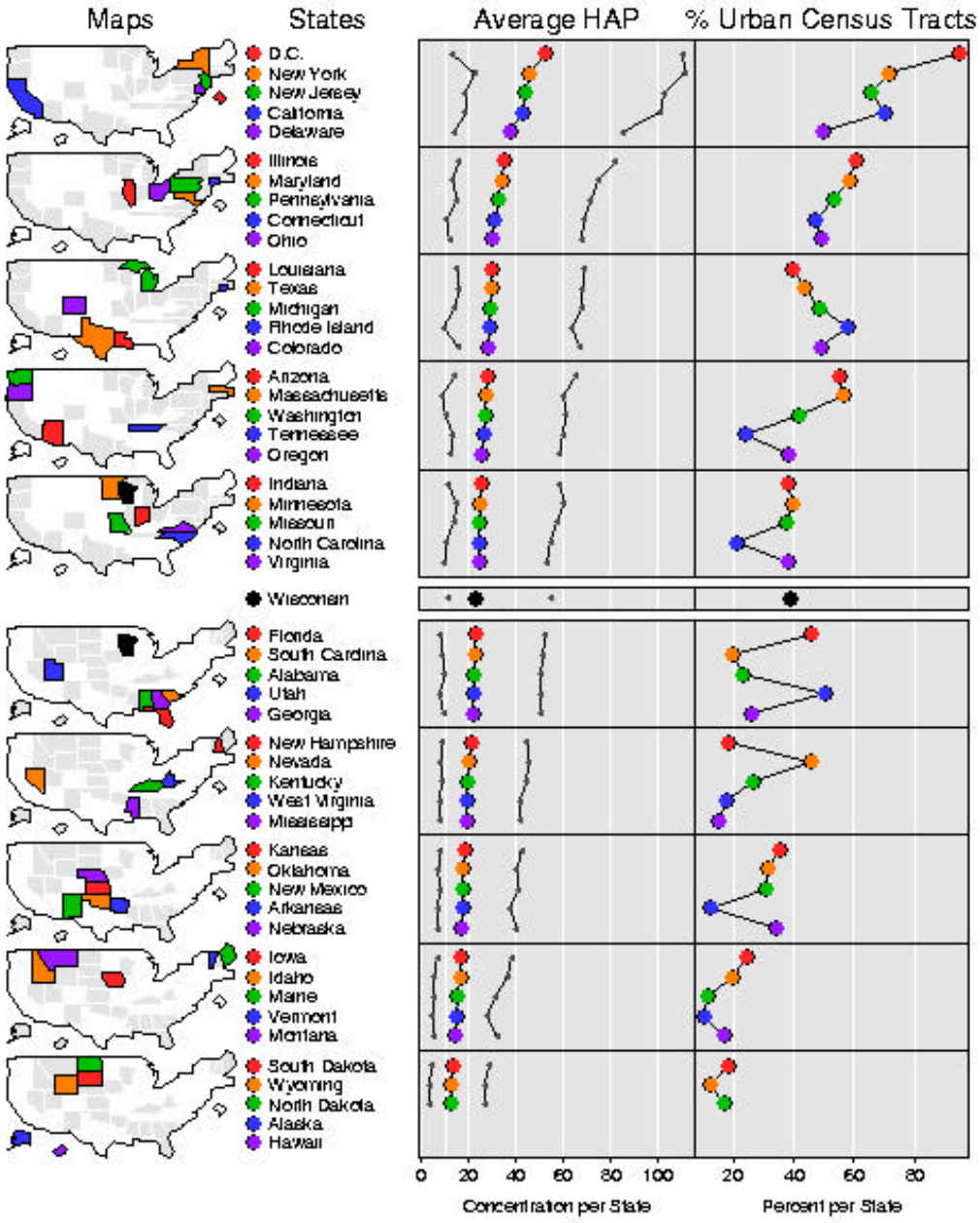
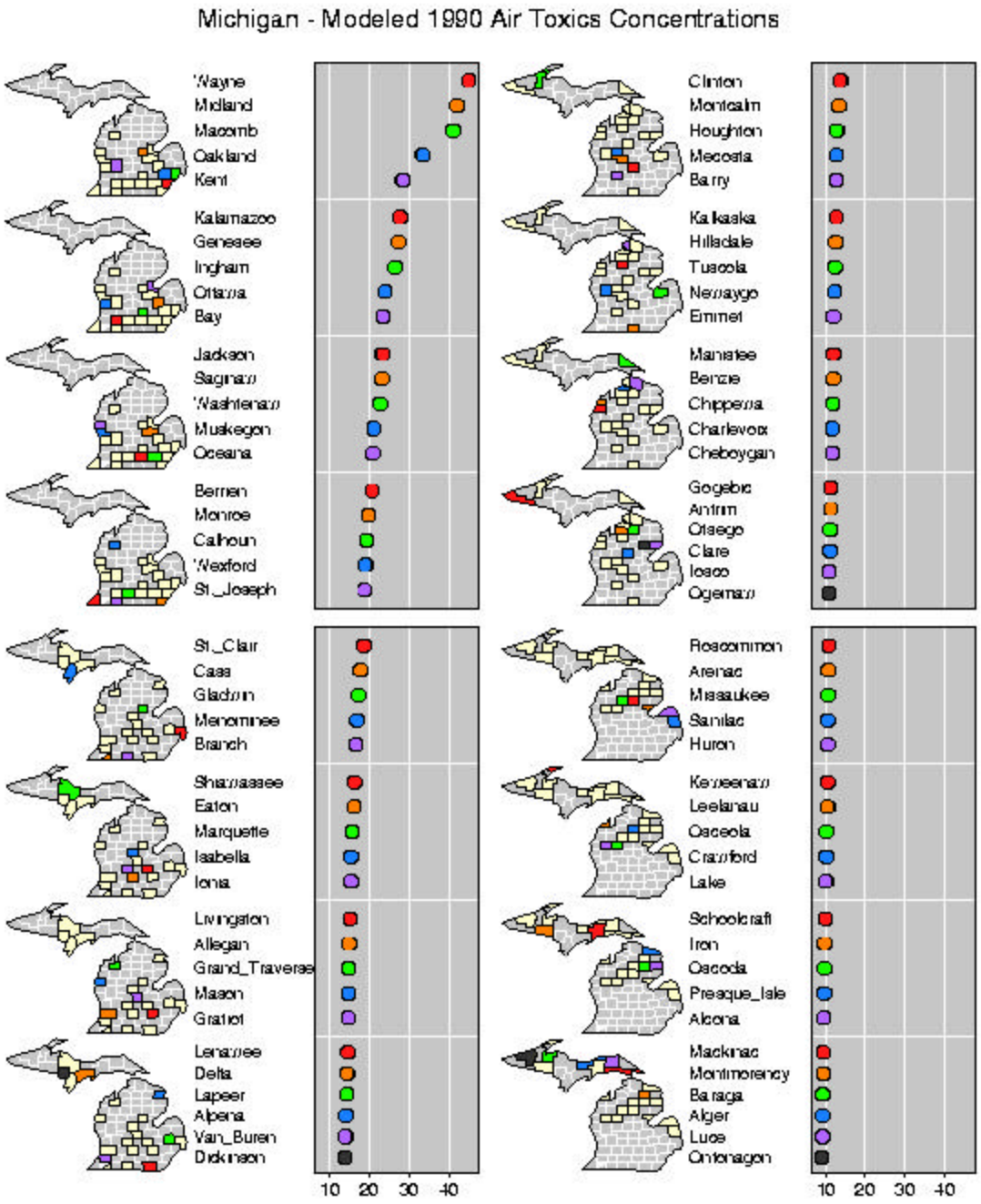
*SCSG: Statistical Computing & Statistical Graphics Newsletter:
http://www-stat.stanford.edu/~susan/scgn/

Hazardous Air Pollutants (HAPs)
1990 Annual Average Per State




Michigan - Modeled 1990 Air Toxics Concentrations
Wayne
Midland
Macomb
Oakland
Kent
Kalamazoo
Genesee
Ingham
Ottawa
Bay
Jackson
Saginaw
Washtenaw
Muskegon
Oceana
Berrien
Monroe
Calhoun
Wexford
St_Joseph
St_Clair
Cass
Gladwin
Menominee
Branch
Shiawassee
Eaton
Marquette
Isabella
Ionia
Livingston
Allegan
Grand_Traverse
Mason
Gratiot
Lenawee
Delta
Lapeer
Alpena
Van_Buren
Dickinson
Clinton
Montcalm
Houghton
Mecosta
Barry
Kalkaska
Hillsdale
Tuscola
Newaygo
Emmet
Manistee
Benzie
Chippewa
Charlevoix
Cheboygan
Gogebic
Antrim
Otsego
Clare
Iosco
Ogemaw
Roscommon
Arenac
Missaukee
Sanilac
Huron
Keweenaw
Leelanau
Osceola
Crawford
Lake
Schoolcraft
Iron
Oscoda
Presque_Isle
Alcona
Mackinac
Montmorency
Baraga
Alger
Luce
Ontonagon
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10
20
30
40

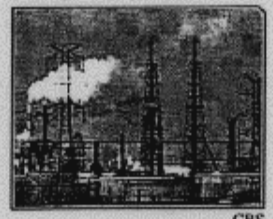
Death of the CEP

NATIONAL ‹ back to NEWS

Is House Paint Killing Us?

- *Industry May Not Be The Only Polluter*
- *Toxins Lurk In House Paint And Lawn Mowers*
- *But Some Question Validity Of Data*

UNION COUNTY, New Jersey
Saturday, February 20,1999 - 08:44 PM ET



CBS

(CBS) Breathing can be hazardous to your health. A groundbreaking study by the Environmental Protection Agency has found that virtually every American is inhaling unsafe levels of chemicals, reports **CBS News Correspondent Jeffrey Kofman.**

"It's almost: We found the problem, and it's us."
Robert Shinn, New Jersey environmental commissioner

VIDEO
CBS News Correspondent Jeffrey Kofman Reports

The study looked beyond high-profile pollution problems like lead and carbon monoxide, testing for 148 toxins that haven't been examined closely before. It found unsafe levels of at least eight cancer-causing chemicals virtually everywhere in America.

Living On Earth TOP STORY

EPA Air Pollution Study Put On Hold

Air Date: Week of January 22, 1999

CURWOOD: This is Living on Earth. I'm Steve Curwood. The results of a groundbreaking new Federal study of air pollution might have been available at the click of a button. But they're not, because of objections from the nation's mayors. The Environmental Protection Agency's Cumulative Exposure Project is looking at airborne toxic chemicals. So far it has found that at least 8 of these chemicals are present at dangerous levels in every neighborhood in the continental US. The EPA was ready to post the city-by-city results on their Web site last month, but it decided not to, after the Conference of Mayors questioned the findings, saying they were based on untested models and old data. Scott Allen covers the environment for the Boston Globe. He says the report's conclusions are disturbing.

ALLEN: If you are living anywhere in the United States and taking a breath as we speak, you're getting at least an 8 in a million lifetime cancer risk of exposure from what you're breathing. That may not sound like a whole lot, but when you multiply it over a city's population, a couple million people living in a city or 5 million people in a state, it adds up to hundreds and thousands of cancers spread across a lot of people. And you have to also consider that there are some places, in fact about 10% of the United States, has got a significantly higher risk of cancer from the toxic chemicals in the air. Their risk is at least one in 10,000. And that means in any small town in America, practically, 1 or 2 people are getting cancer from breathing the air. Not any special pollution, but just the regular everyday air.

CBS, 2/20/1999

NPR, 1/22/99

nViZn

- Follow-up to the GPL
- JAVA-based software development kit (SDK) for the creation and modification of interactive statistical graphics applications (tables, charts, micromaps, ...)
- *http://www.spss.com/nvizn*
- Related book “The Grammar of Graphics” by Leland Wilkinson

nViZn Features

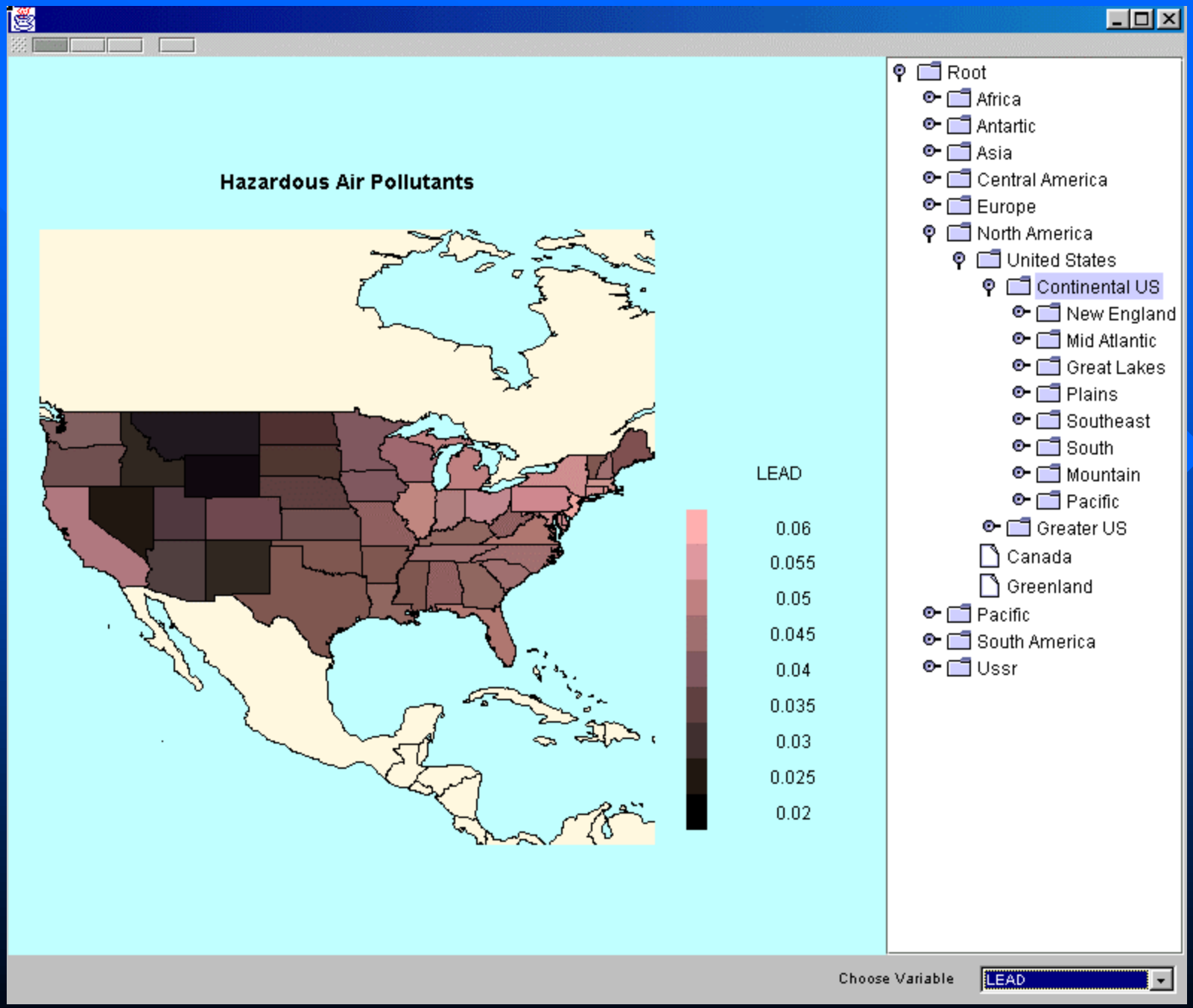
- Follows guidelines of modern statistical graphics with analytics completed within the SDK
- Interactive abilities include dynamic data filtering, brushing/linking, mouse roll-overs, pan-and-zoom, drill-down, 3-D rotation, and animation

Micromaps with nViZn

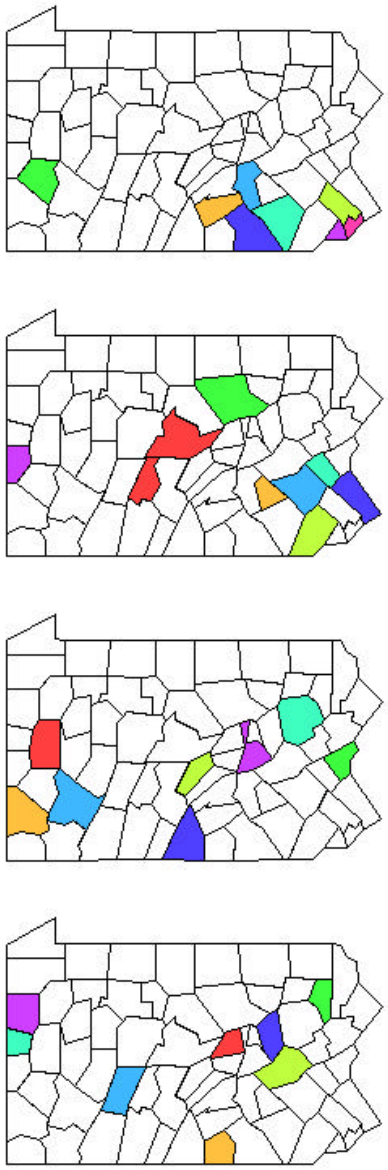
- Hierarchical clickable micromaps and tables for the display of Federal statistical data
  - Micromaps and tables under nViZn
  - Clickable maps and tables
  - Hierarchy of maps and tables
  - Selection of variables
  - Use of EPA HAP data for demo purposes

Pennsylvania: 1990 Modeled Benzene Concentrations
Upper Half

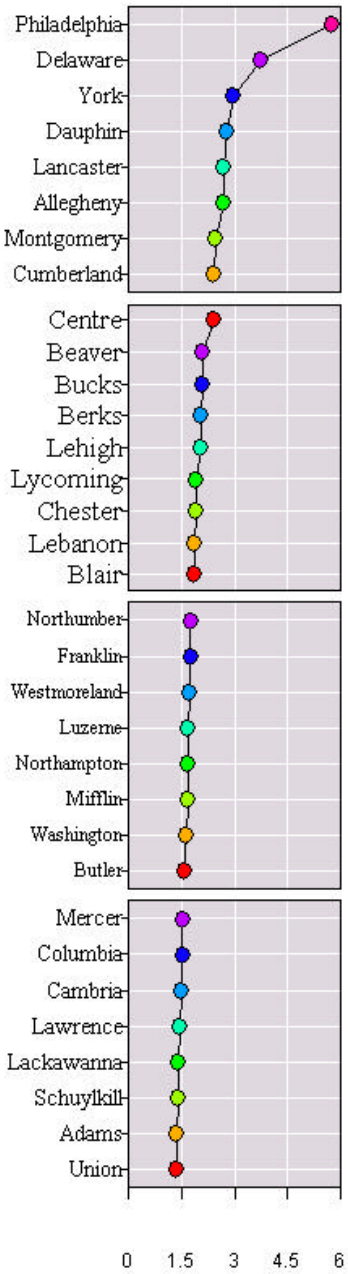
	Minimum	Mean	Maximum	Quartile1	Median	Quartile3
Philadelphia	2.79	5.75	15.9	4.19	5.16	6.44
Delaware	1.98	3.76	18.91	2.69	3.21	4.13
York	0.94	2.96	12.07	1.23	1.72	3.9
Dauphin	0.92	2.79	6.17	1.54	2.63	3.61
Lancaster	0.91	2.68	10.38	1.26	1.92	3.39
Allegheny	1.18	2.68	8.74	2.01	2.58	3.07
Montgomery	1.24	2.45	4.24	2.0	2.43	2.86
Cumberland	0.87	2.42	7.4	1.12	2.33	2.74
Centre	0.64	2.4	9.82	0.72	1.31	3.56
Beaver	1.0	2.09	4.63	1.19	1.81	2.79
Bucks	1.14	2.08	14.34	1.74	2.01	2.22
Berks	0.88	2.07	5.71	1.22	1.96	2.73
Lehigh	0.82	2.03	4.4	1.42	1.94	2.51
Lycoming	0.6	1.93	5.92	0.75	1.03	2.91
Chester	0.96	1.91	5.66	1.34	1.77	2.11
Lebanon	1.01	1.86	3.4	1.21	1.44	2.46
Blair	0.72	1.86	4.39	0.97	1.81	2.45
Northumber	0.79	1.75	3.02	0.88	1.82	2.79
Franklin	0.76	1.75	3.71	0.93	1.06	3.12
Westmoreland	0.72	1.73	4.87	1.08	1.49	2.21
Luzerne	0.7	1.69	4.06	0.98	1.59	2.31
Northampton	0.94	1.68	2.9	1.3	1.65	1.98
Mifflin	0.75	1.67	3.96	0.81	0.9	2.78
Washington	0.74	1.63	4.47	1.01	1.2	2.29
Butler	0.71	1.57	4.8	0.96	1.09	1.83
Mercer	0.68	1.52	2.55	0.87	1.35	2.17
Columbia	0.7	1.52	3.64	0.8	0.96	2.12
Cambria	0.69	1.51	4.07	0.79	1.14	2.13
Lawrence	0.83	1.46	2.71	0.96	1.3	1.86
Lackawanna	0.77	1.42	2.08	1.14	1.44	1.68
Schuylkill	0.76	1.4	3.36	0.87	1.04	1.79
Adams	0.8	1.36	3.95	0.95	1.01	1.43
Union	0.7	1.35	3.94	0.8	0.84	1.26
Venango	0.61	1.31	3.86	0.69	0.86	1.57


Hazardous Air Pollutants
LEAD
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
Root
Africa
Antartic
Asia
Central America
Europe
North America
United States
Continental US
New England
Mid Atlantic
Great Lakes
Plains
Southeast
South
Mountain
Pacific
Greater US
Canada
Greenland
Pacific
South America
Ussr
Choose Variable
LEAD

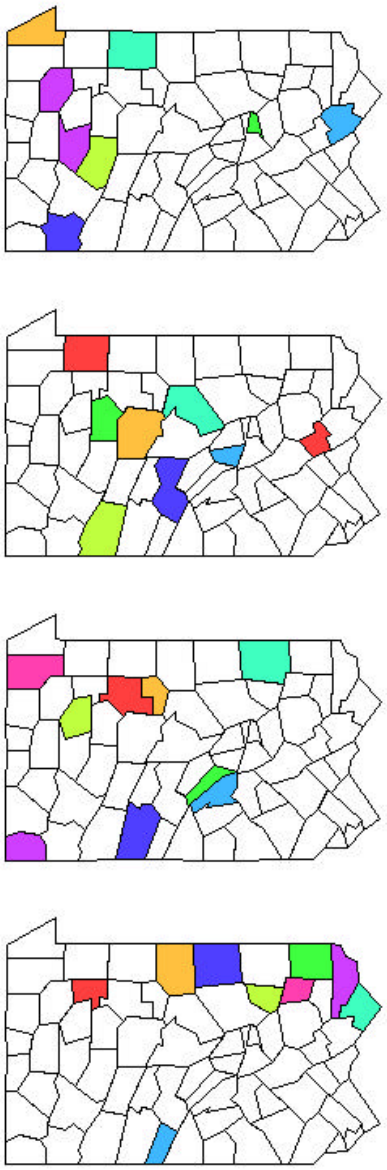
Pennsylvania: Upper Half



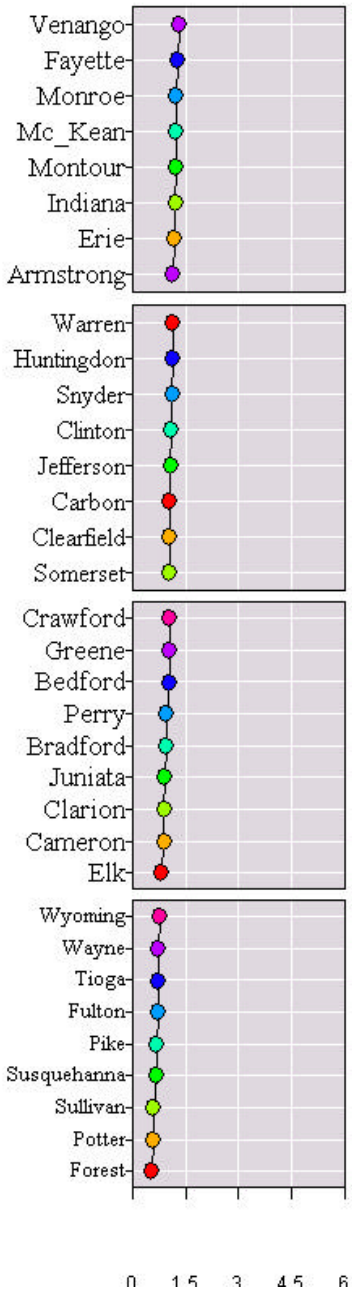
1990 Modeled Benzene Concentrations



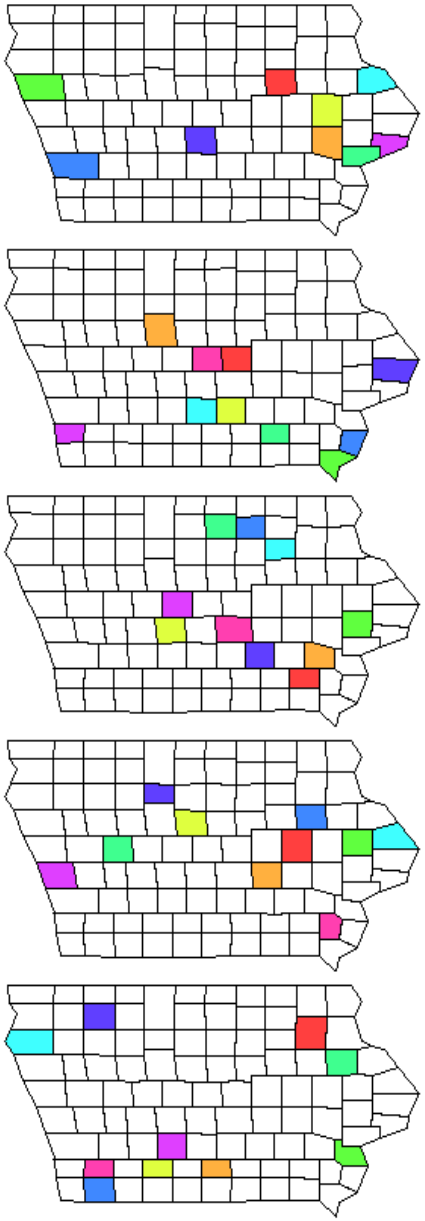
Pennsylvania: Lower Half



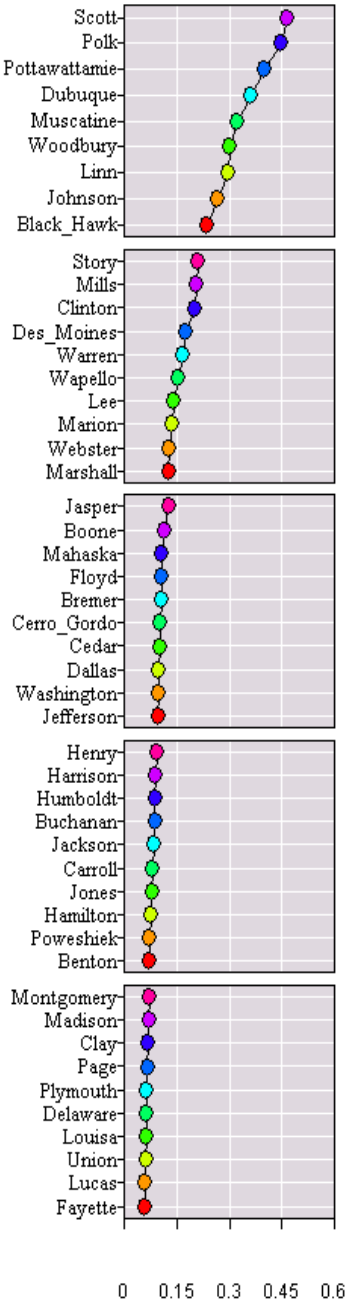
1990 Modeled Benzene Concentrations



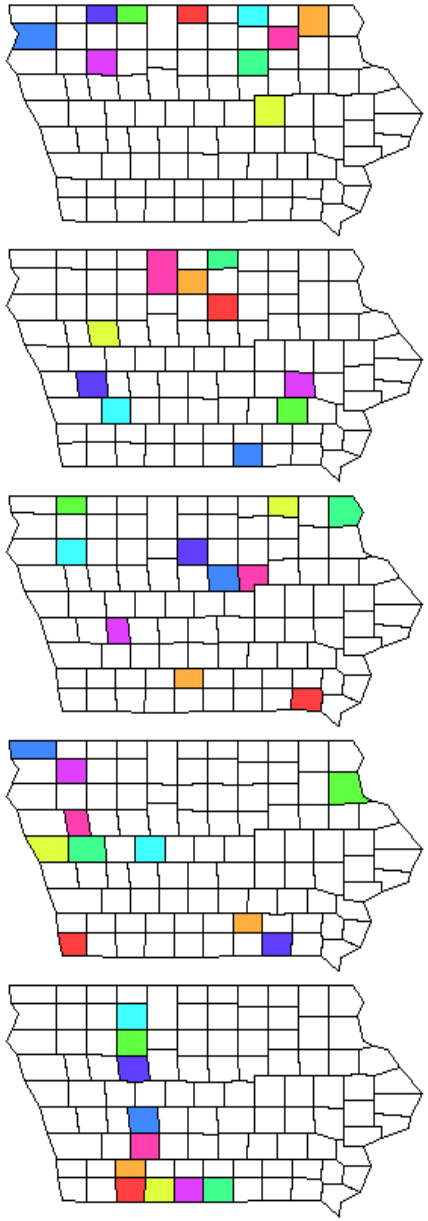
Iowa: Upper Half



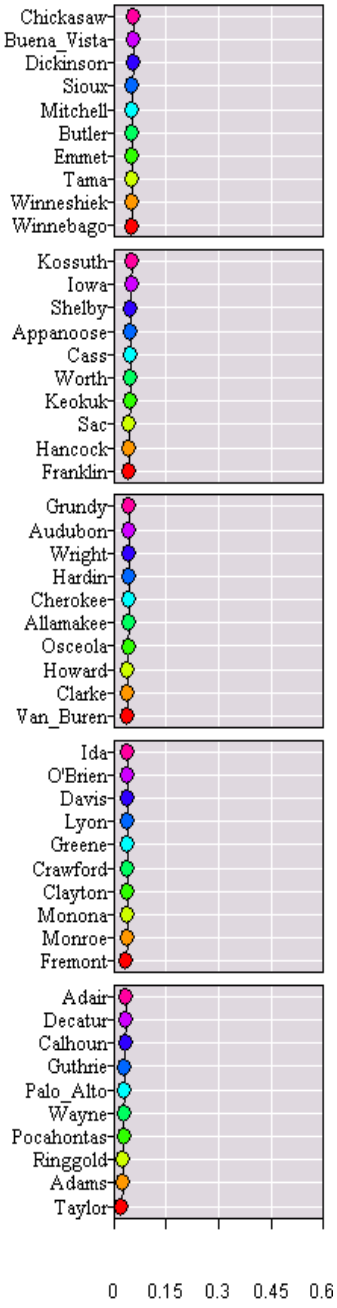
1990 Modeled Lead Concentrations



Iowa: Lower Half



1990 Modeled Lead Concentrations



Completed Work

- Interactive displays: Queries & meta data
- Access of multiple micromaps and tables through main display
- Scrollable maps and tables
-  Demo

Possible Future Work with nViZn

- Final goal: Hierarchical clickable micromaps and tables for the display of Federal statistical data
  - Hierarchy of maps and tables
  - Full selection of variables
  - Sorting w.r.t. multiple criteria
  - Access to Federal data base

Advantages of nViZn

- New versions released every few months
- Training courses offered by SPSS
- Good communication with users
- Might become a very useful tool to deliver interactive statistical graphics on the Web
- Huge potential for use with Federal statistical data

Disdvantages of nViZn

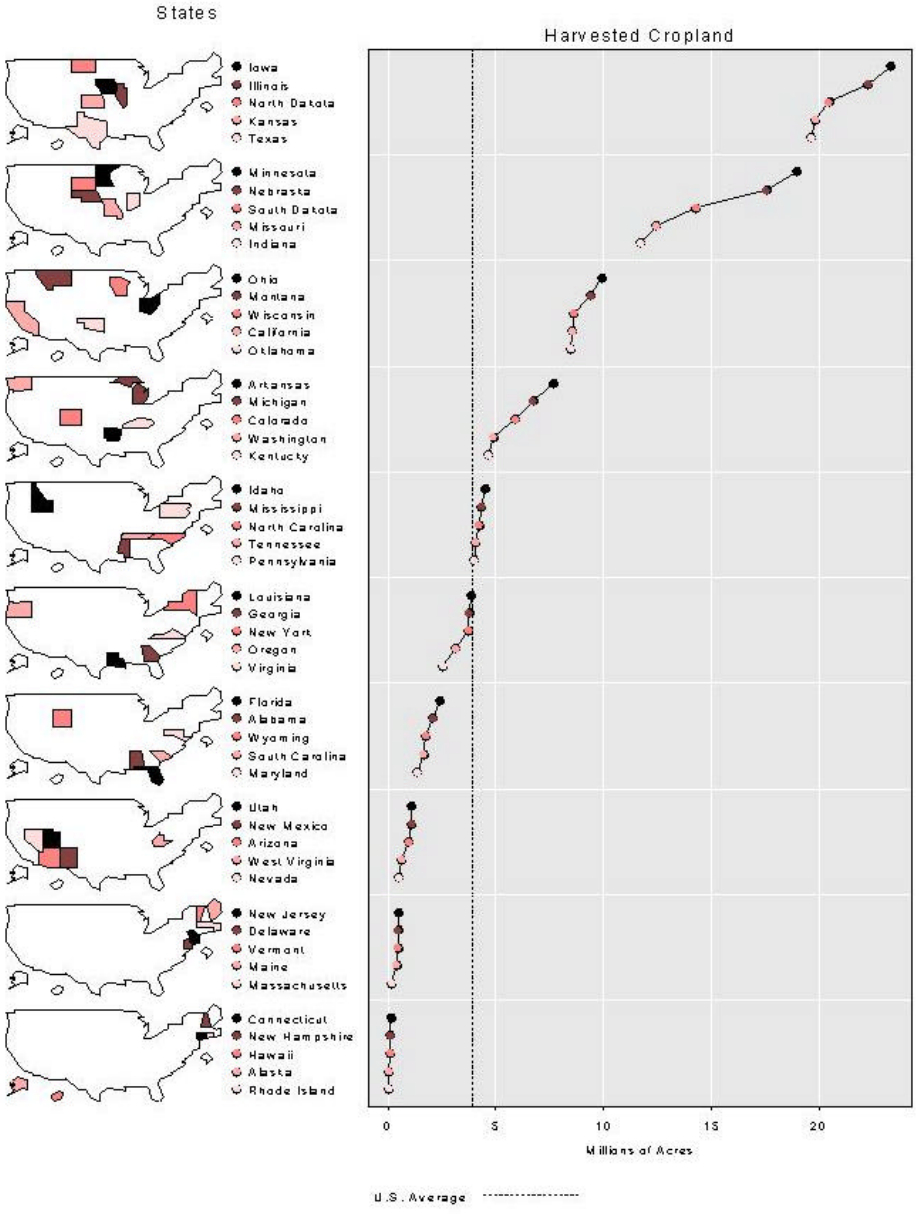
- Little documentation available
- Good JAVA knowledge required
- Sensitive to browsers and plugins
- High cost
- Huge overhead of Java code when only micromaps are needed

- **Meanwhile . . .**

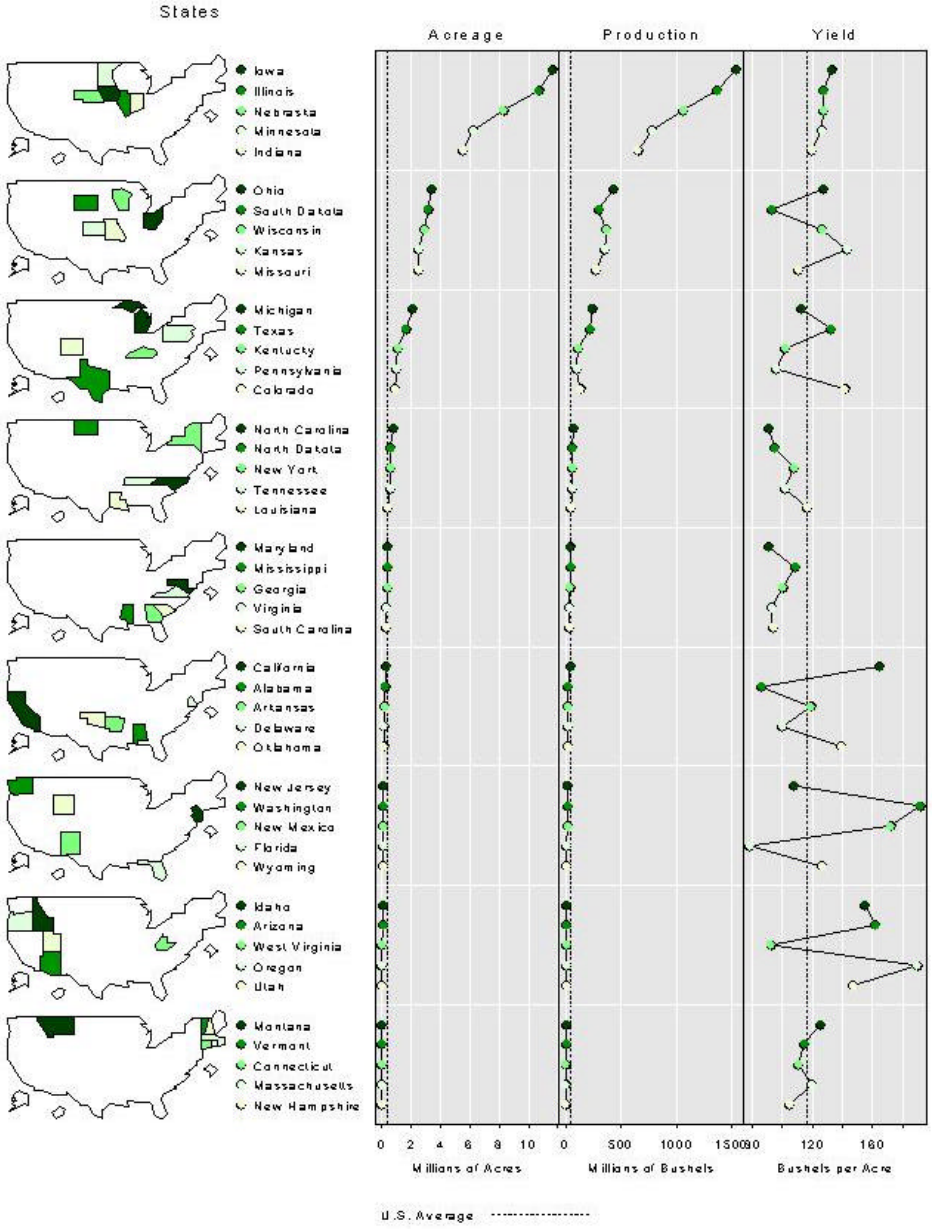
Micromaps at USDA-NASS

- U.S. Department of Agriculture - National Agricultural Statistics Service (USDA-NASS)
- *http://www.nass.usda.gov/research/sumpant.htm*
- Released in September 1999
- 1997 Census of Agriculture:
  - Acreage, production, yield
  - Corn, soybeans, wheat, hay, cotton
- Pre-calculated micromaps

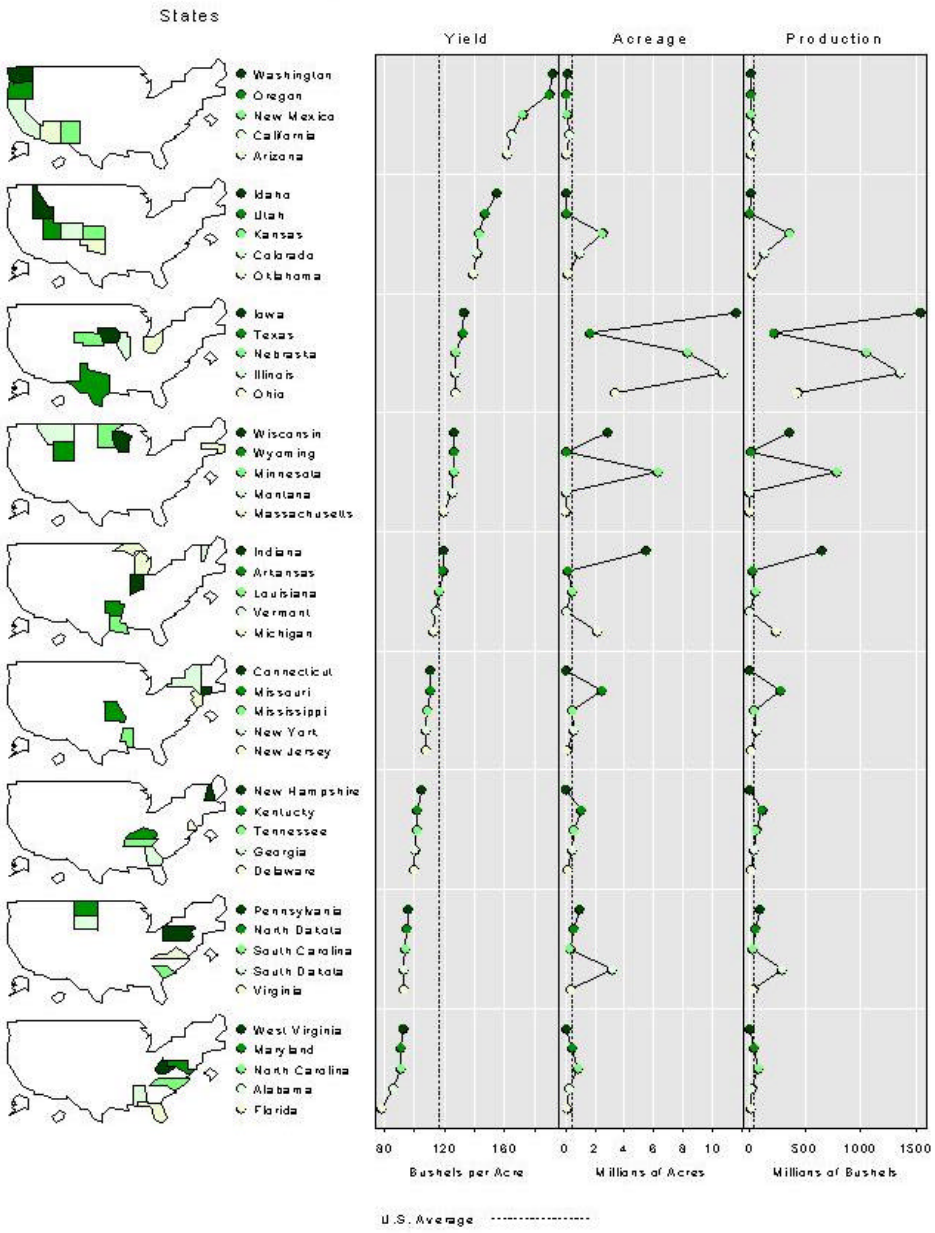
Harvested Cropland by State, 1997 Census of Agriculture



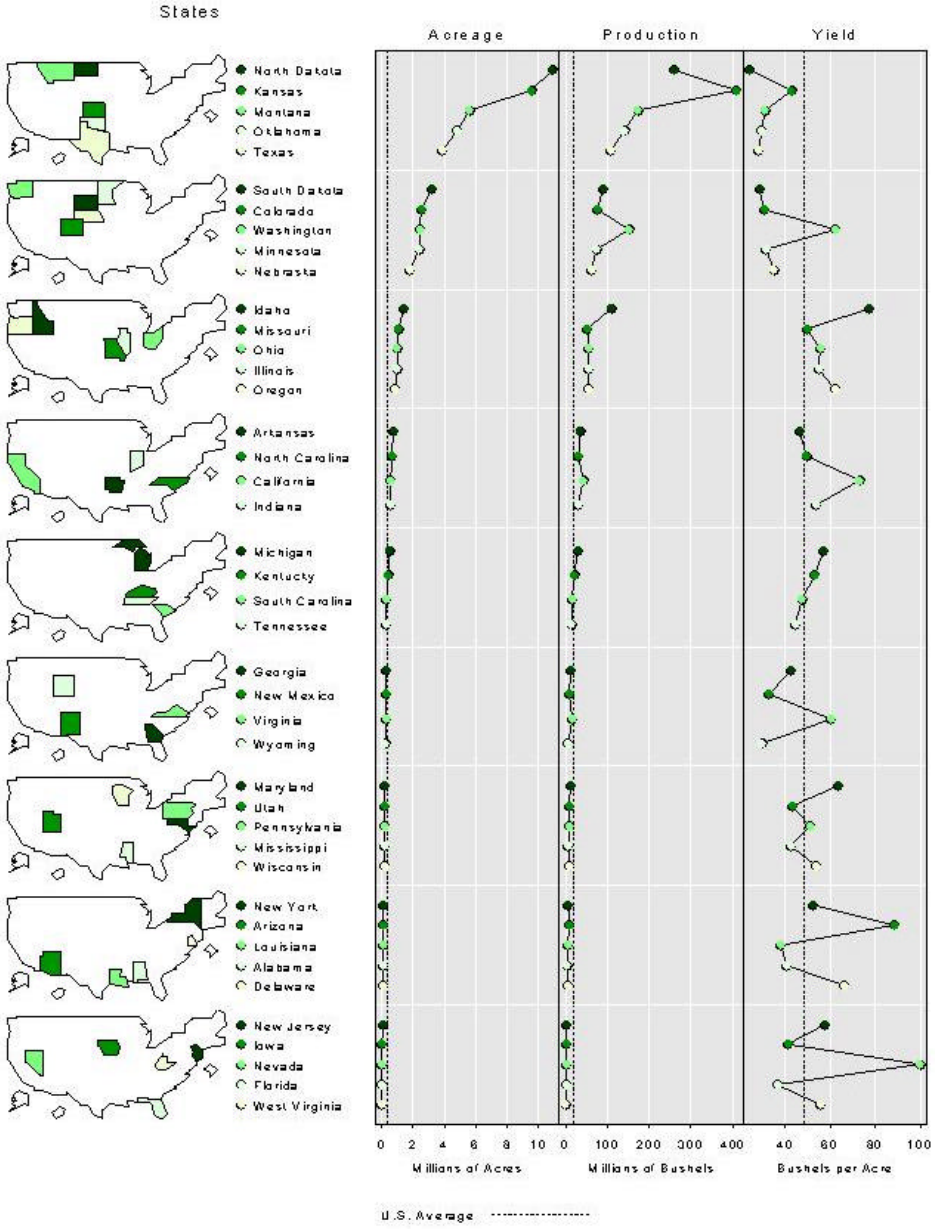
Corn Statistics by State, 1997 Census of Agriculture



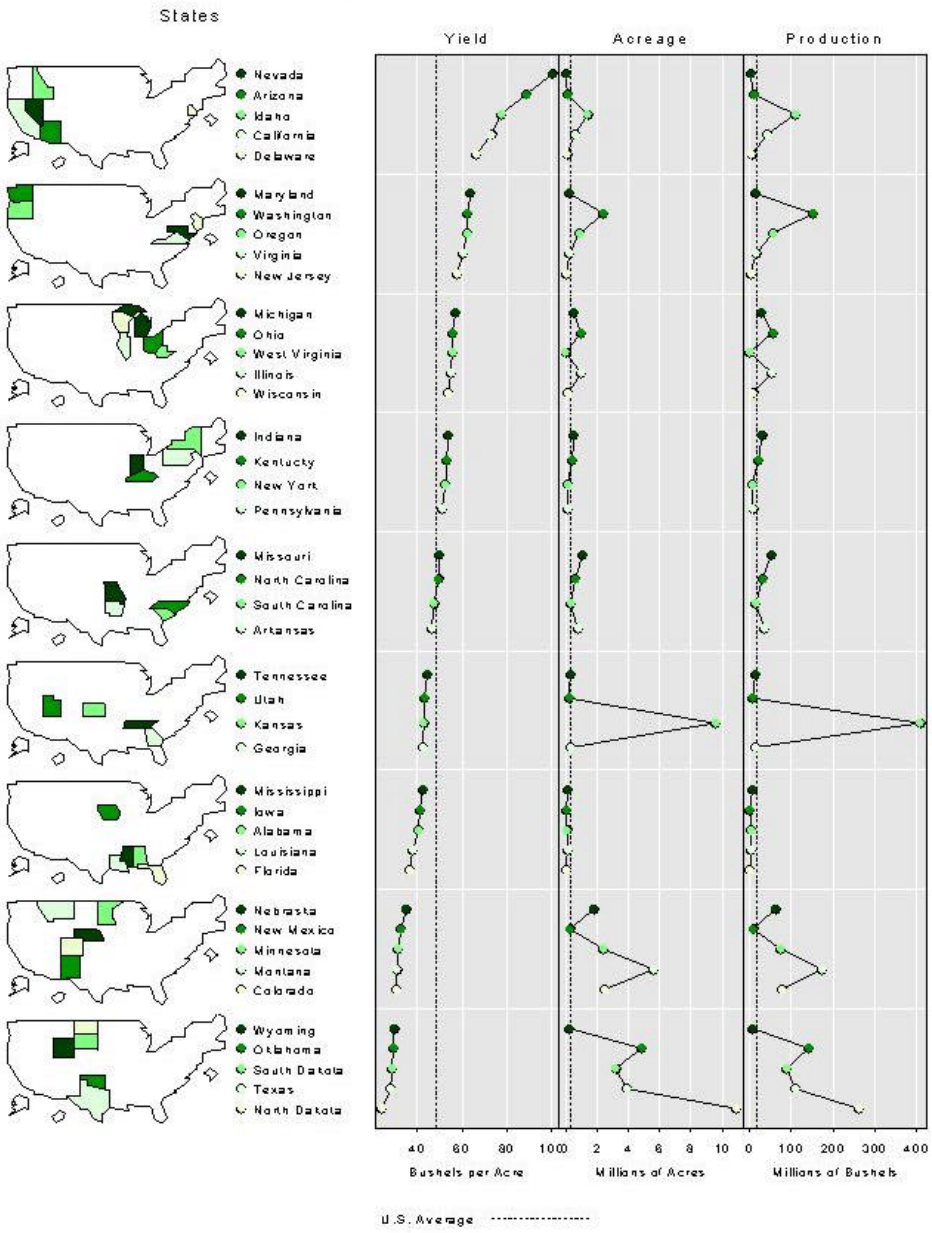
Corn Statistics by State, 1997 Census of Agriculture



Wheat Statistics by State, 1997 Census of Agriculture



Wheat Statistics by State, 1997 Census of Agriculture



Micromaps at NCI

- National Cancer Institute (NCI)
- *http://www.statecancerprofiles.cancer.gov/micromaps*
- Released in April 2003
- Cancer statistics:
  - Mortality and incidence counts and rates
  - Trends by sex and race/ethnicity
- Fully interactive
- Extensive usability testing

Wang, Chen, Carr, Bell, Pickle (2002): Geographic Statistics Visualization: Web-based Linked Micromap Plots, Computing in Science & Engineering 4(3):90-94.

statecancerprofiles.cancer.gov - Microsoft Internet Explorer provided by America Online

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Links Address http://statecancerprofiles.cancer.gov/micromaps/

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NATIONAL CANCER INSTITUTE

State Cancer Profiles

Dynamic views of cancer statistics for prioritizing cancer control efforts in the nation, states, and counties

Help us improve! Contact us with feedback.

CDC

Profiles Home > Latest Rates, Percents, and Counts

Left Column Data

Area: US - state level
Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Female
Age: All Ages

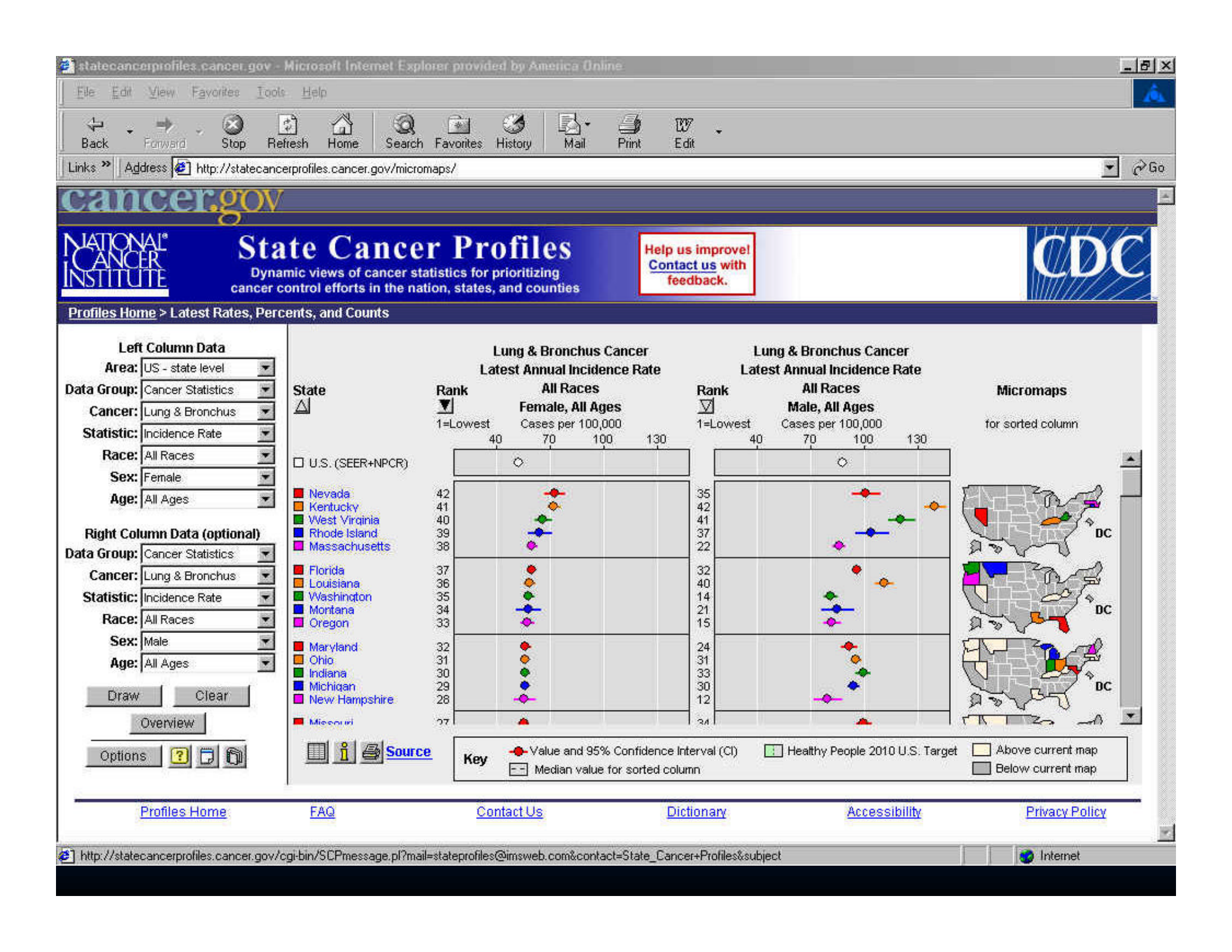
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Male
Age: All Ages

Draw Clear

Overview

Options



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http://statecancerprofiles.cancer.gov/cgi-bin/SCPmessage.pl?mail=stateprofiles@imsweb.com&contact=State_Cancer+Profiles&subject

Internet

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Go

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Statistic: Incidence Rate
Race: All Races
Sex: Female
Age: All Ages

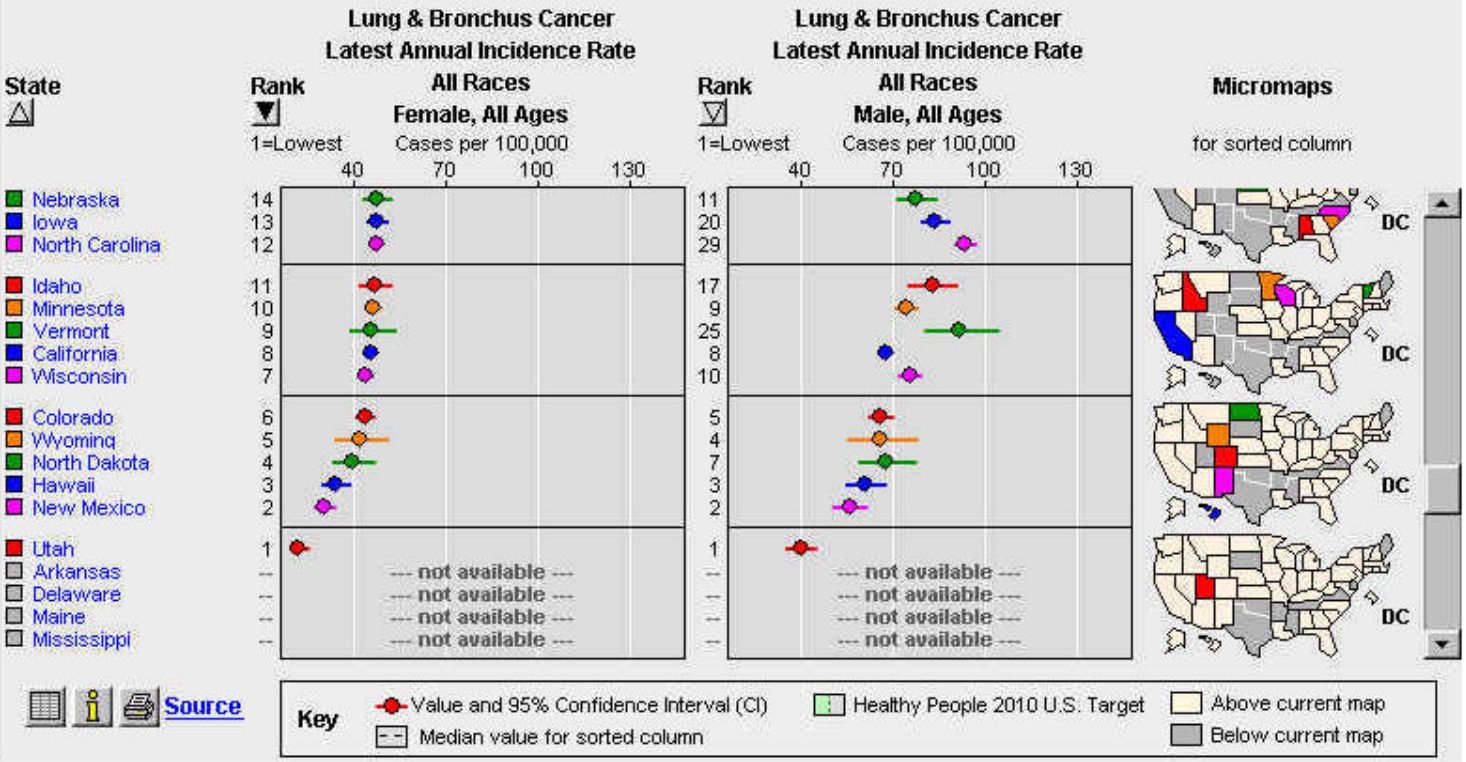
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Male
Age: All Ages

Draw Clear

Overview

Options



Source

Key
Value and 95% Confidence Interval (CI)
Median value for sorted column
Healthy People 2010 U.S. Target
Above current map
Below current map

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http://www.cancer.gov/

Internet

statecancerprofiles.cancer.gov - Microsoft Internet Explorer provided by America Online

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Links Address http://statecancerprofiles.cancer.gov/micromaps/

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Left Column Data

Area: US - state level
Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Female
Age: All Ages

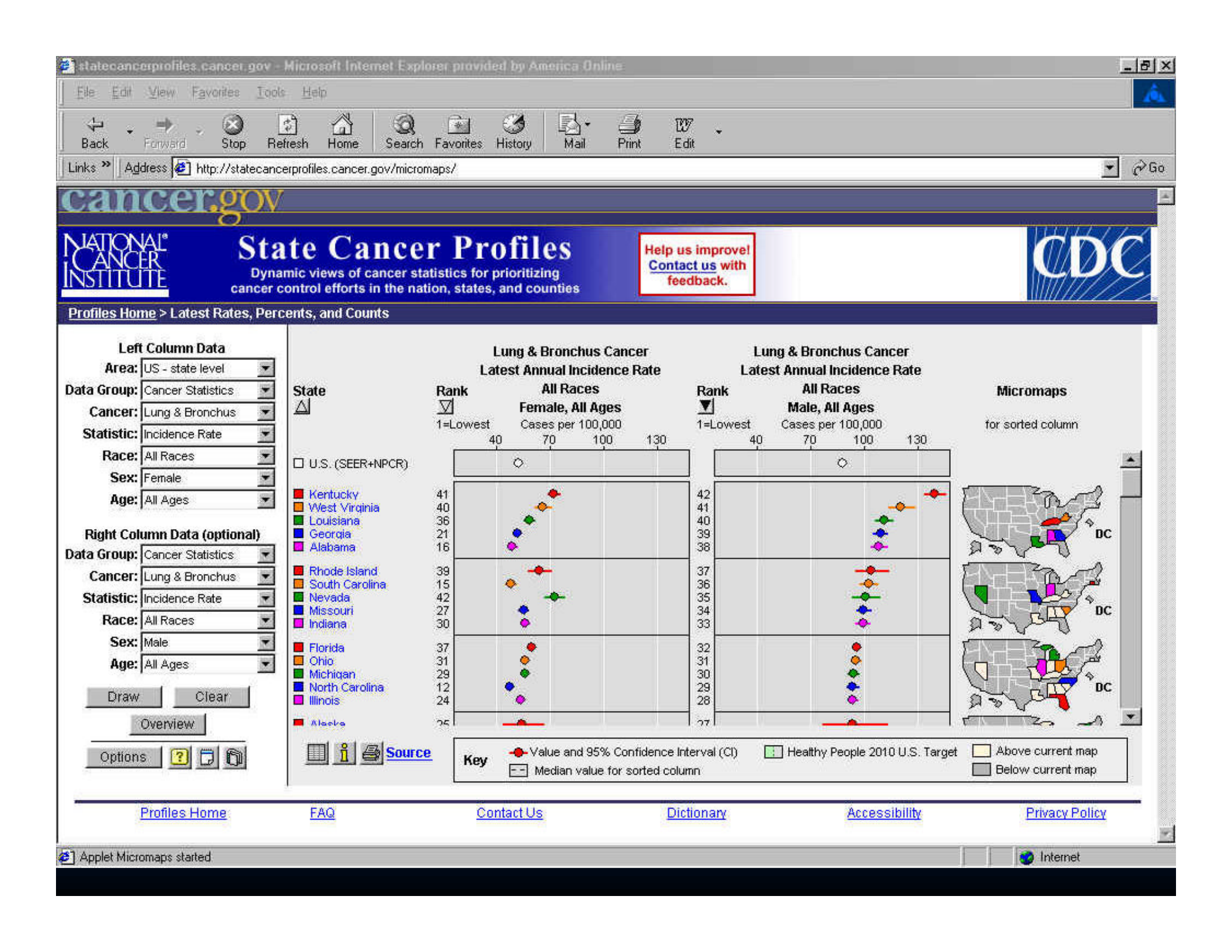
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Male
Age: All Ages

Draw Clear

Overview

Options



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Left Column Data

Area: US - state level
Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Female
Age: All Ages

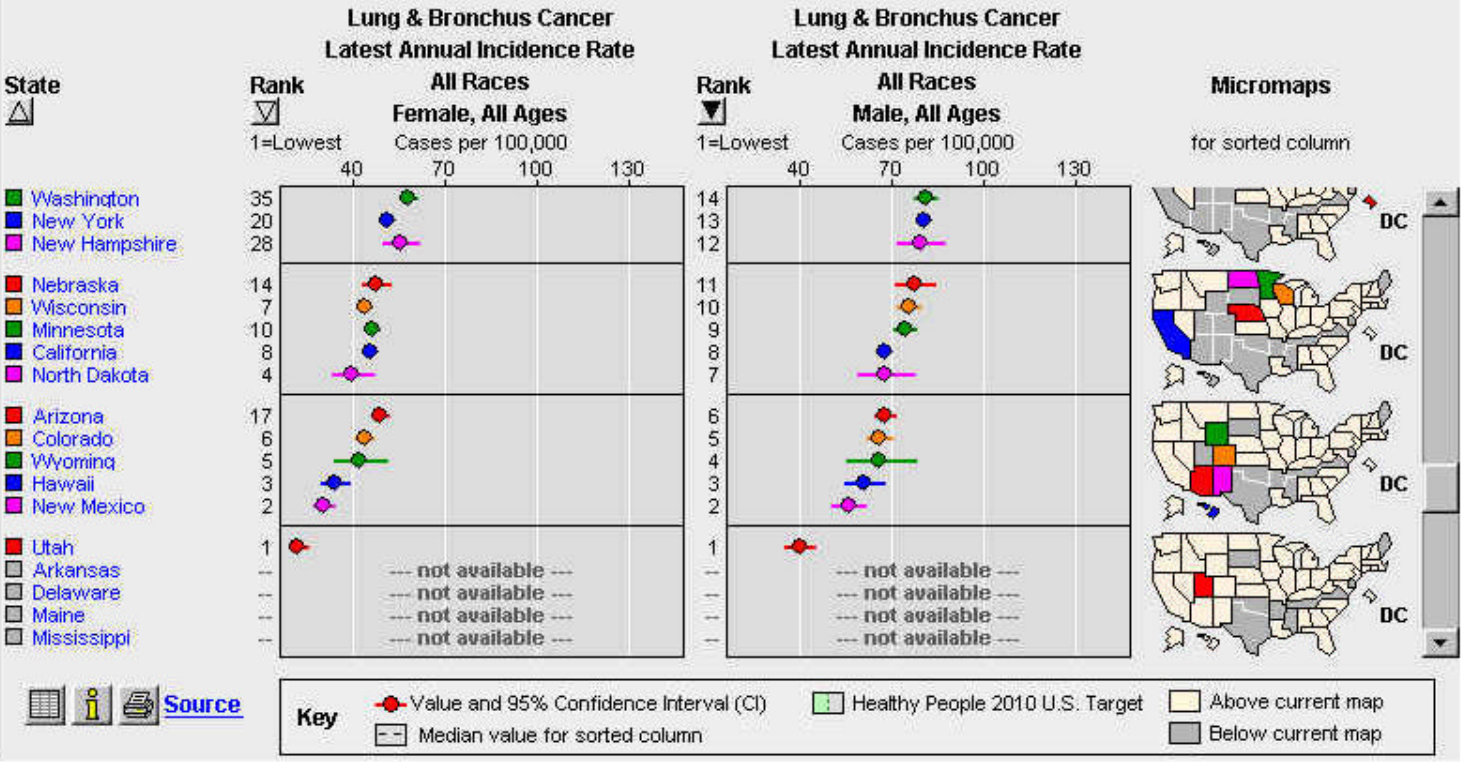
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: All Races
Sex: Male
Age: All Ages

Draw Clear

Overview

Options



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Internet

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CDC

Profiles Home > Latest Rates, Percents, and Counts

Left Column Data

Area: US - state level
Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: White
Sex: Both Sexes
Age: All Ages

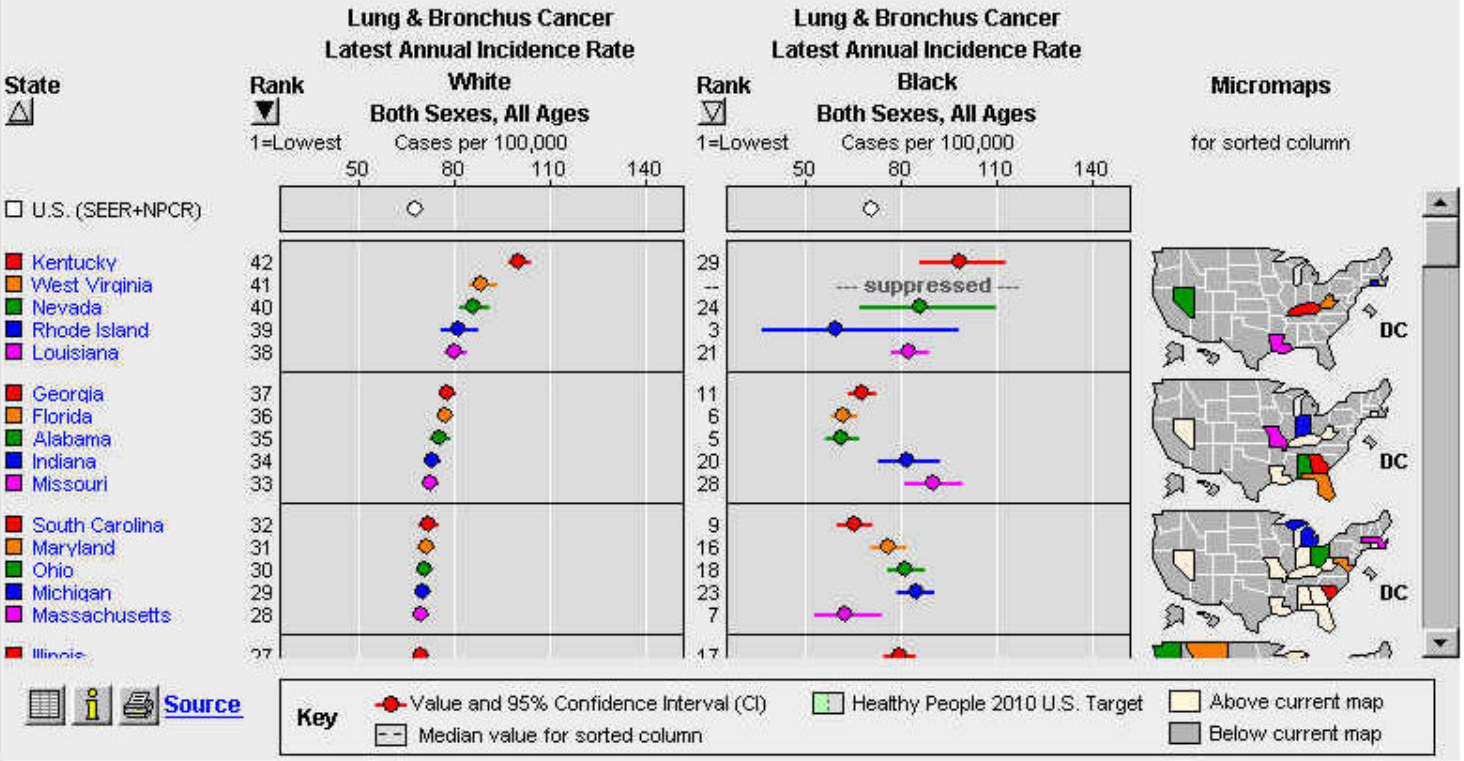
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: Black
Sex: Both Sexes
Age: All Ages

Draw Clear

Overview

Options



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Statistic: Incidence Rate
Race: White
Sex: Both Sexes
Age: All Ages

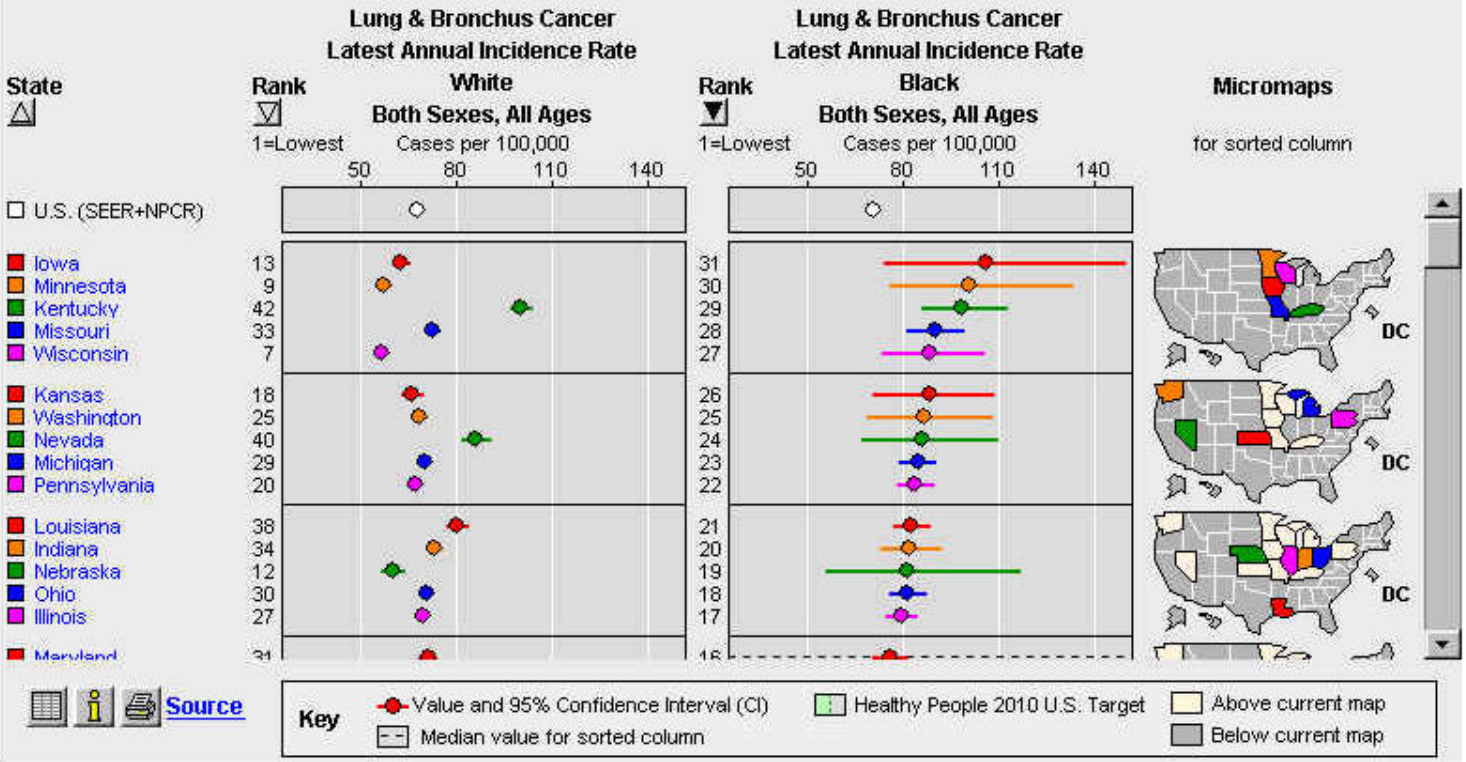
Right Column Data (optional)

Data Group: Cancer Statistics
Cancer: Lung & Bronchus
Statistic: Incidence Rate
Race: Black
Sex: Both Sexes
Age: All Ages

Draw Clear

Overview

Options



Profiles Home FAQ Contact Us Dictionary Accessibility Privacy Policy

Applet Micromaps started

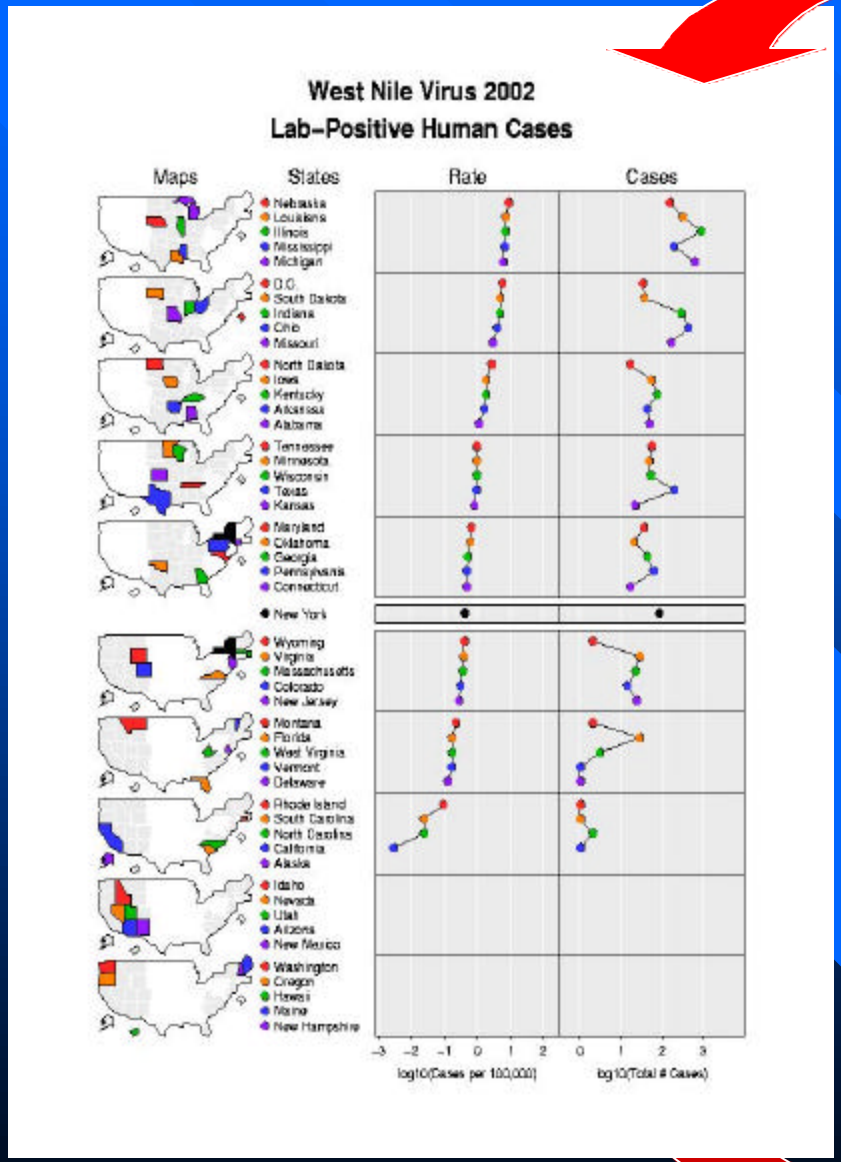
Internet

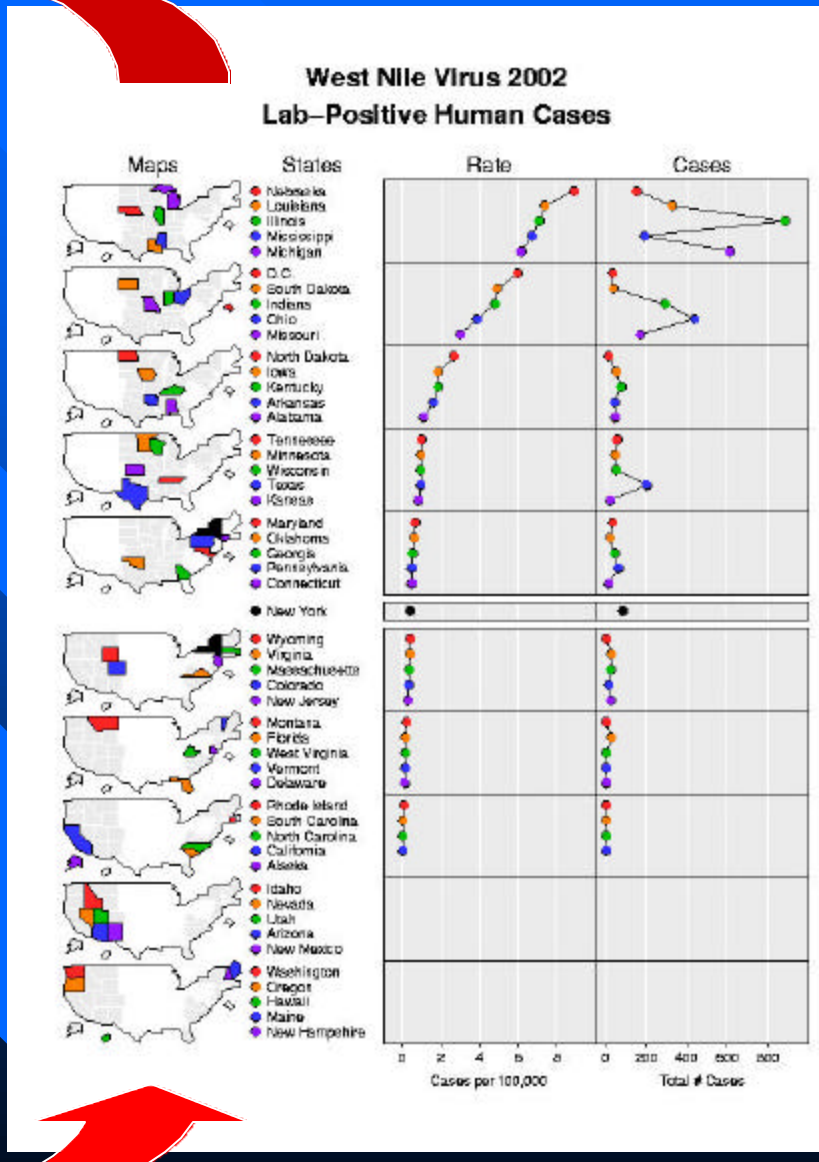
Micromaps for the Display of West Nile Virus (WNV) Data

West Nile Virus (WNV) ???

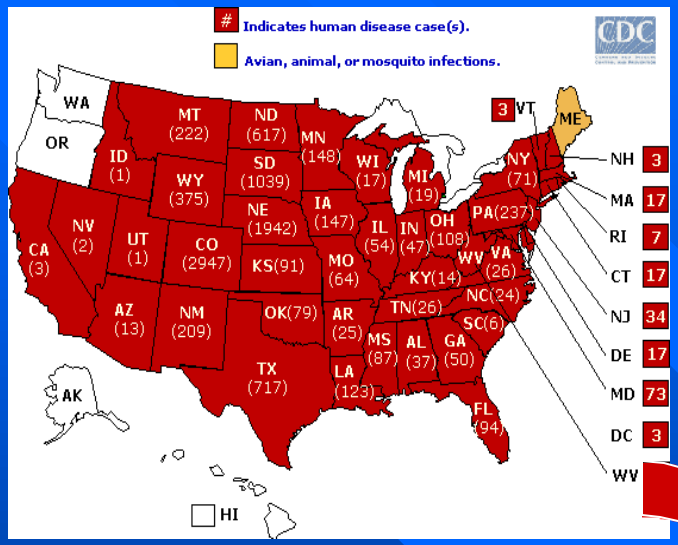
- Introduced to the US in 1999
- Spread across North America in 5 years
- Initial event - Culex mosquito transmits virus within avian populations
- Bridging Aedes albopictus transmits virus from birds to animals and humans

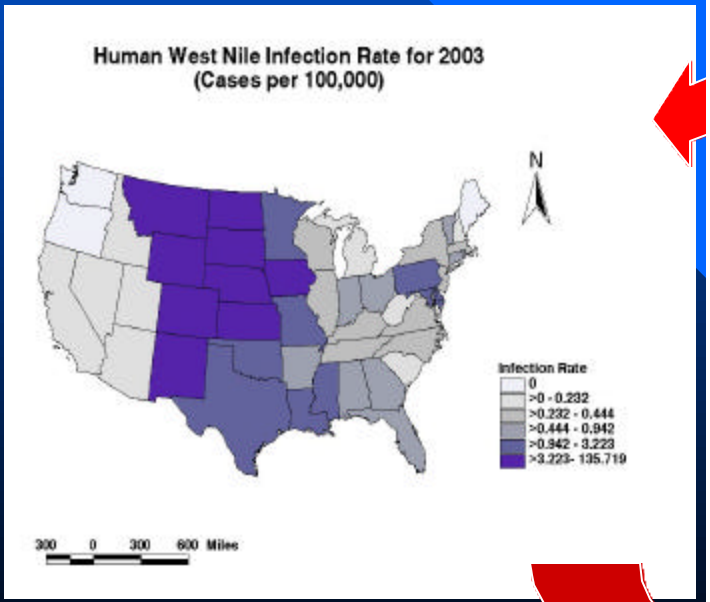
From 2002 CDC Web Page to Micromaps

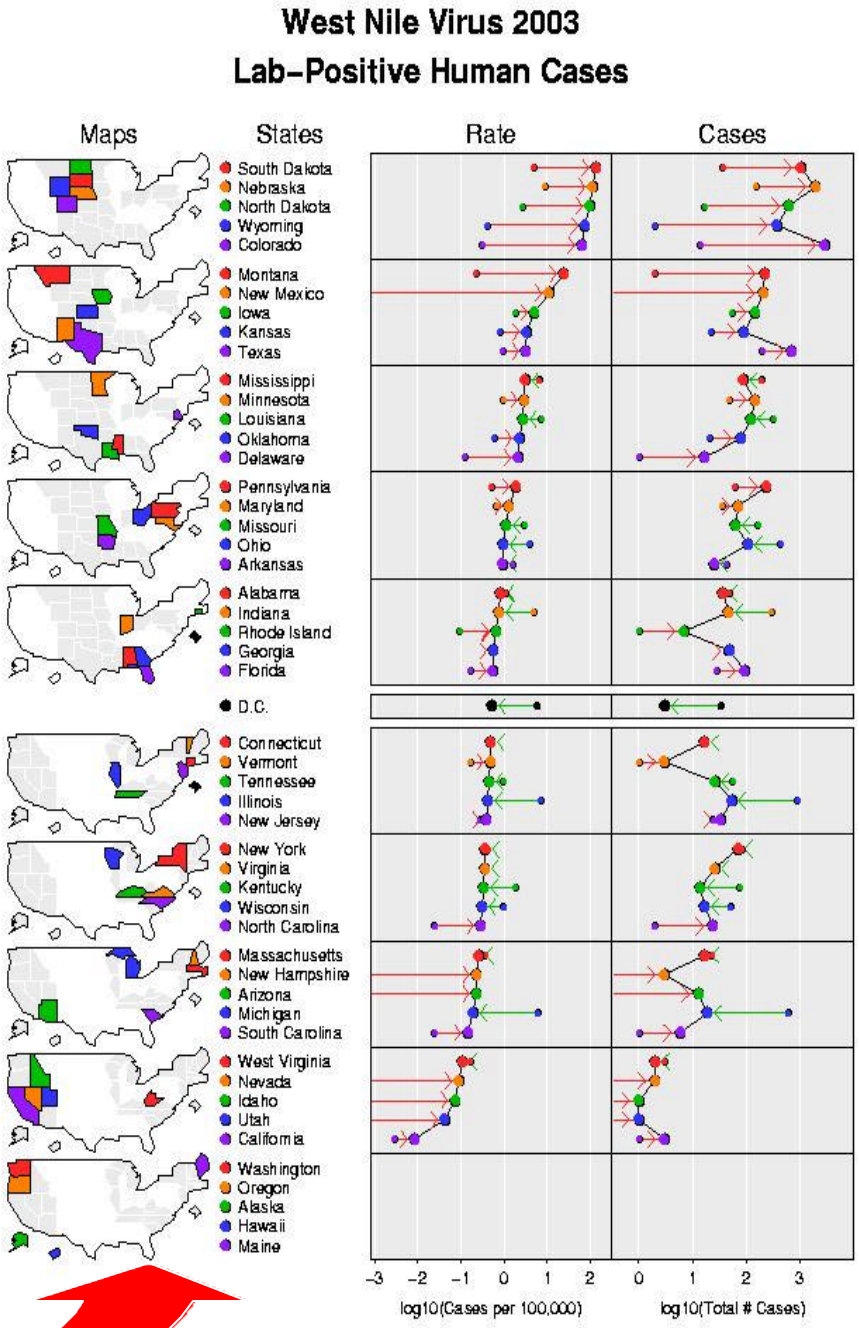




From 2003 CDC

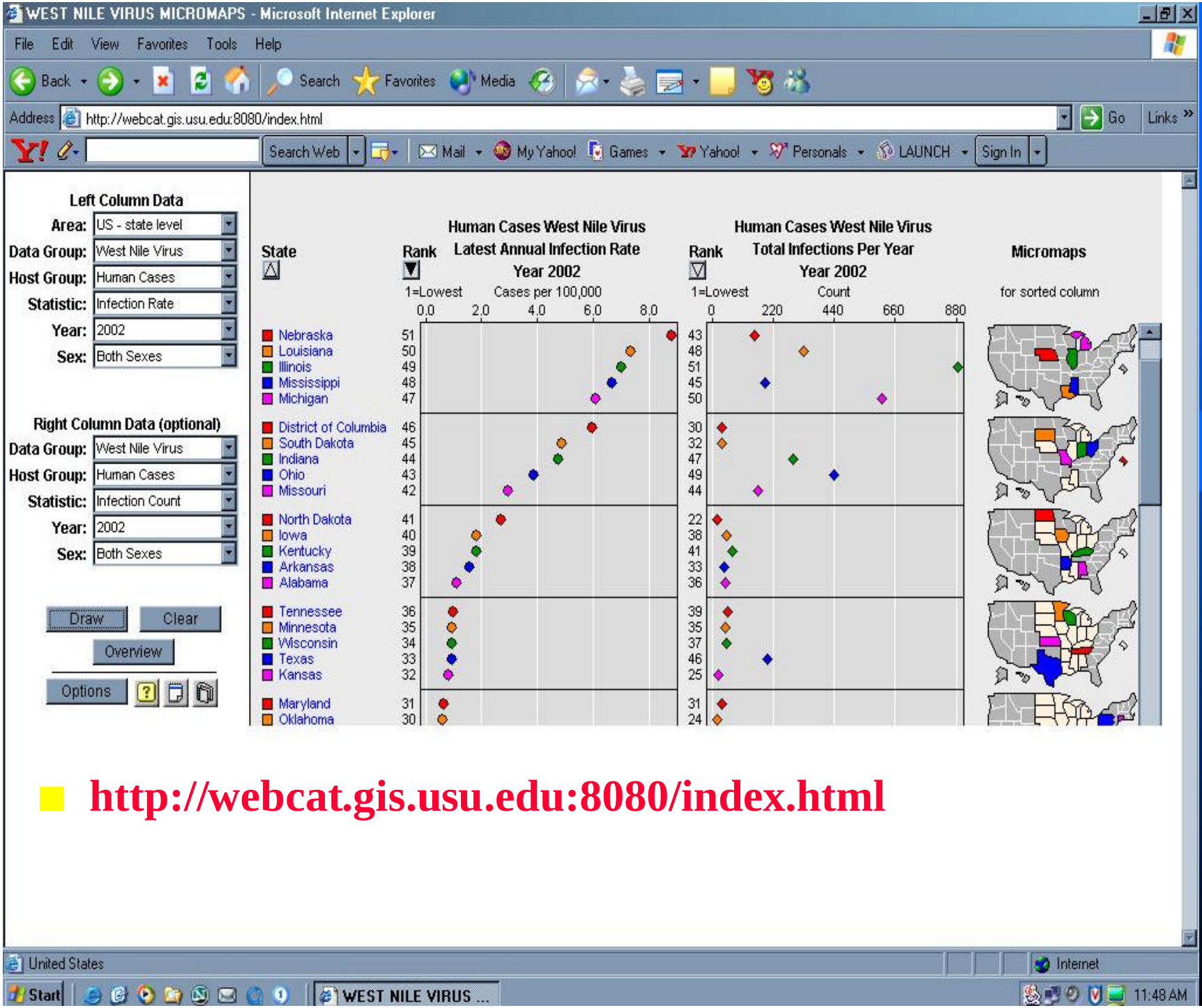




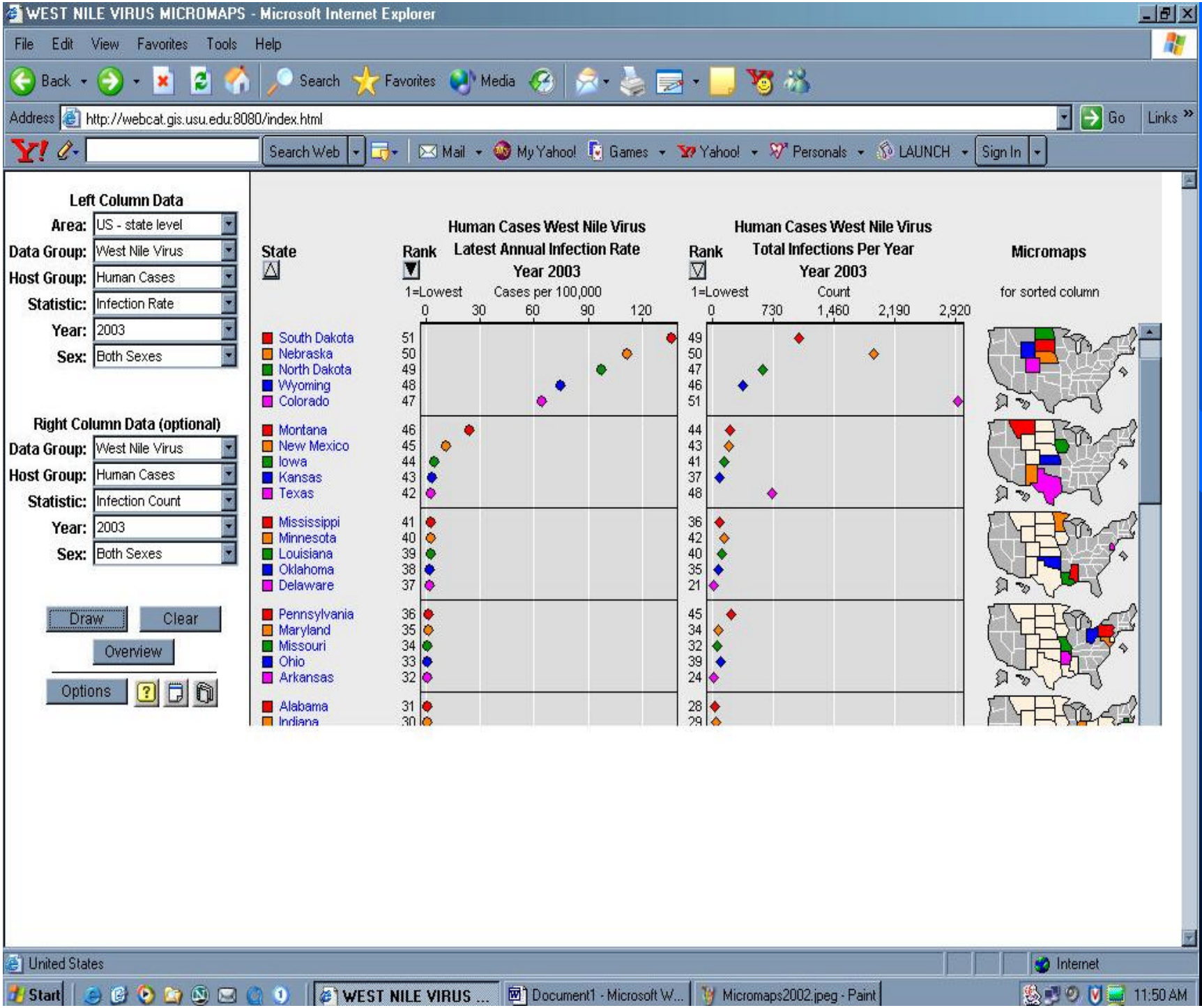


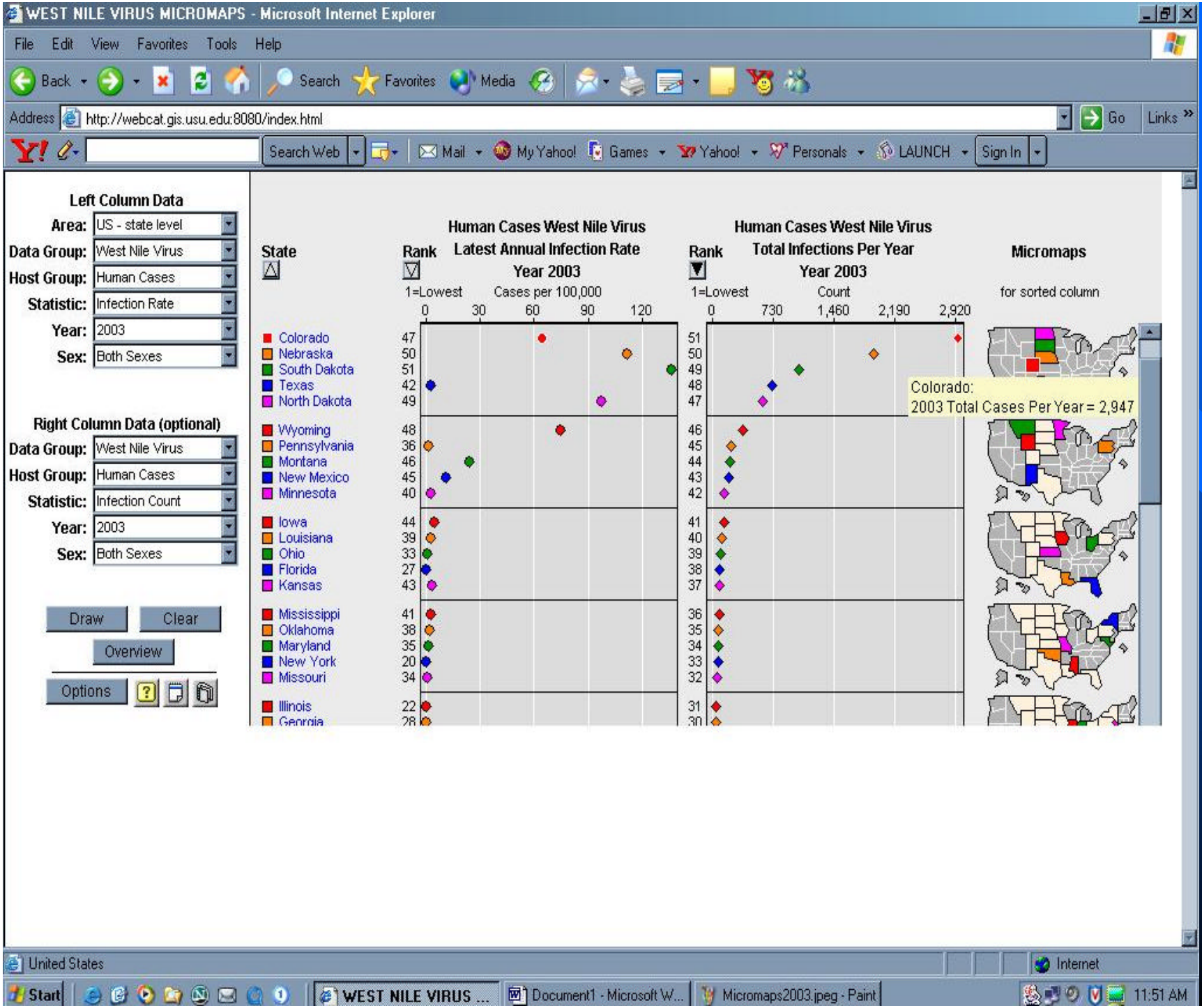
Web-Based Access to WNV Data

- Decision at Utah State University (USU):
  - Obtain NCI Java code for Web-based WNV micromaps
  - Upgrades for the display of WNV data
  - Reference: Symanzik, Gebreab, Gillies, Wilson (2003): Visualizing the Spread of West Nile Virus, Proceedings, ASA, CD.



- **http://webcat.gis.usu.edu:8080/index.html**


WEST NILE VIRUS MICROMAPS - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://webcat.gis.usu.edu:8080/index.html
Go Links
Search Web Mail My Yahoo! Games Yahoo! Personals LAUNCH Sign In
Left Column Data
Area: US - state level
Data Group: West Nile Virus
Host Group: Human Cases
Statistic: Infection Rate
Year: 2003
Sex: Both Sexes
Right Column Data (optional)
Data Group: West Nile Virus
Host Group: Human Cases
Statistic: Infection Count
Year: 2003
Sex: Both Sexes
Draw
Clear
Overview
Options
State
Human Cases West Nile Virus
Latest Annual Infection Rate
Year 2003
Rank
1=Lowest
Cases per 100,000
0 30 60 90 120
Human Cases West Nile Virus
Total Infections Per Year
Year 2003
Rank
1=Lowest
Count
0 730 1,460 2,190 2,920
Micromaps
for sorted column
South Dakota 51 49
Nebraska 50 50
North Dakota 49 47
Wyoming 48 46
Colorado 47 51
Montana 46 44
New Mexico 45 43
Iowa 44 41
Kansas 43 37
Texas 42 48
Mississippi 41 36
Minnesota 40 42
Louisiana 39 40
Oklahoma 38 35
Delaware 37 21
Pennsylvania 36 45
Maryland 35 34
Missouri 34 32
Ohio 33 39
Arkansas 32 24
Alabama 31 28
Indiana 30 29
United States
Internet
Start
WEST NILE VIRUS ...
Document1 - Microsoft W...
Micromaps2002.jpeg - Paint
11:50 AM


WEST NILE VIRUS MICROMAPS - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://webcat.gis.usu.edu:8080/index.html
Go Links
Search Web Mail My Yahoo! Games Yahoo! Personals LAUNCH Sign In
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Area: US - state level
Data Group: West Nile Virus
Host Group: Human Cases
Statistic: Infection Rate
Year: 2003
Sex: Both Sexes
Right Column Data (optional)
Data Group: West Nile Virus
Host Group: Human Cases
Statistic: Infection Count
Year: 2003
Sex: Both Sexes
Draw
Clear
Overview
Options
State
Human Cases West Nile Virus
Latest Annual Infection Rate
Year 2003
Rank
1=Lowest
Cases per 100,000
0 30 60 90 120
Human Cases West Nile Virus
Total Infections Per Year
Year 2003
Rank
1=Lowest
Count
0 730 1,460 2,190 2,920
Micromaps
for sorted column
Colorado 47 51
Nebraska 50 50
South Dakota 51 49
Texas 42 48
North Dakota 49 47
Wyoming 48 46
Pennsylvania 36 45
Montana 46 44
New Mexico 45 43
Minnesota 40 42
Iowa 44 41
Louisiana 39 40
Ohio 33 39
Florida 27 38
Kansas 43 37
Mississippi 41 36
Oklahoma 38 35
Maryland 35 34
New York 20 33
Missouri 34 32
Illinois 22 31
Georgia 28 30
Colorado:
2003 Total Cases Per Year = 2,947
United States
Internet
Start
WEST NILE VIRUS ...
Document1 - Microsoft W...
Micromaps2003.jpeg - Paint
11:51 AM

Concluding Remarks

- WNV, as an example of a vector-borne pathogen, is a spatially and temporally complex phenomenon, but can be
  - Described well &
  - Summarized, using visualization techniques, in particular micromaps

Ongoing Work

- Linking of West Nile Micromap Server with USU Climate Data Base
- Extension of Micromap Server with
  - Metadata
  - Password-restricted access to sensitive data
  - Additional medical data sources

Questions ???