Integrating open-source technologies to build low-cost information systems for improved access to public health data

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O'Carroll P, Yasnoff WA, Ward ME, Ripp LH, Martin EL, eds. *Public Health Informatics and Information Systems*. NY, Springer, 2003:5.

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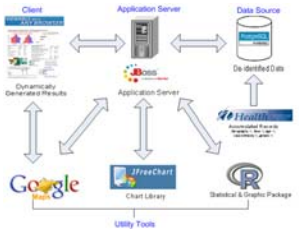
Introduction

Information access is of critical importance for the practice of public health. Effective public health practice relies on the availability of public health data sources and assessment tools to convey information to investigators, practitioners, policy makers, and the general public. Emerging communication technologies on the Internet can deliver all of the who, what, when, and where components more quickly, with a potentially higher level of quality and assurance, using new analysis and visualization tools. Open-source software provides the opportunity to build low-cost information systems allowing health departments with modest resources access to modern data analysis and visualization tools. We integrate open-source technologies and public health data to create a web information system, ***EpiVue***, which is accessible to a wide audience through the Internet.

Method

EpiVue, which stands for Epidemiologic Visual User Environment, is built exclusively with freely available open-source software including PostgresSQL, a relational database for data storage; JBoss, a widely used J2EE Java application server; JFreeChart, an open-source Java chart library; the R statistical computing and graphics toolkit; and Google Maps for interactive Geographic Information System (GIS) visualization.

Application Architecture

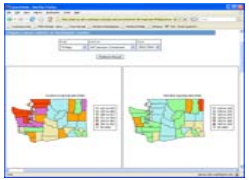


Results

EpiVue was tested using two public health datasets from the Washington State Cancer Registry and Washington State Center for Health Statistics and publicly accessible longevity statistics from a twenty-year interval for 3,143 United States counties.

EpiVue Examples:

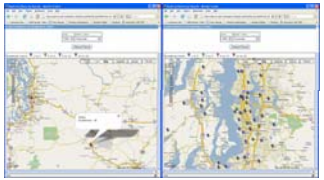
Bar charts and the corresponding data table comparing cancer incidence and mortality age-adjusted rates/100,000 for racial and ethnic groups in Washington State in 2004.



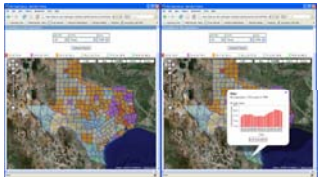
Side-by-side comparisons of incidence and mortality age-adjusted rates/100,000 among counties in Washington State presented in R maps.

Side-by-side comparisons of incidence and mortality age-adjusted rates/100,000 among counties in Washington State presented in Google Maps.

EpiVue interactive geocoder overlaid with user's geospatial data on Google Maps.



Maps generated with the Google Maps API showing death incidence data grouped by ZIP code and illustrating the EpiVue custom zoom feature.



Left panel shows a Google Maps mashup with the life expectancy in 1999 in 254 Texas counties. Right panel is an embedded JFreeChart chart popup displaying the life expectancy trend from 1980 to 1999 for Starr County, Texas integrated into the Google Maps information window.

References

This work has been recently published in the *International Journal of Health Geographics* 2008, 7:29. (http://www.ij-healthgeographics.com/content/7/1/29)

The EpiVue application is accessible at https://epivue.cphi.washington.edu/epivue

EpiVue interface to upload end-user data based on U.S. ZIP code, County, State, street address or longitude and latitude.

Future Development

- Integration with spatial and temporal analysis tools, such as SaTScan.
- Integration of data from Behavioral Risk Factor Surveillance System (BRFSS) into EpiVue's data source.
- Integration of data from international public health studies.

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