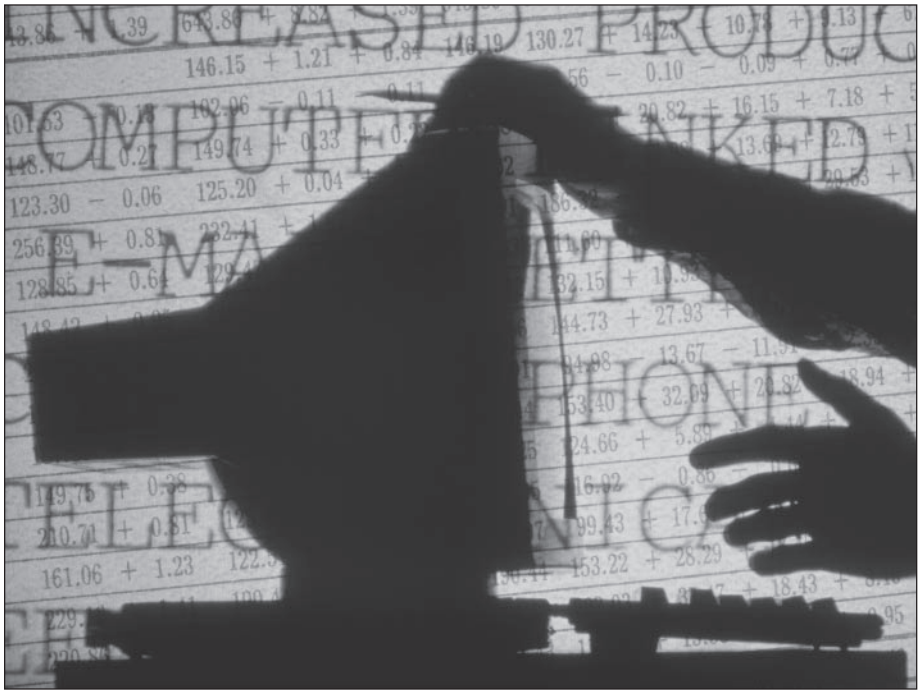
Accessing Population Health Information through Interactive Systems: Lessons Learned and Future Directions

Daniel J. Friedman, PhD[a]
Marlene Anderka, MPH[a]
James W. Krieger, MD, MPH[b]
Garland Land, MPH[c]
David Solet, PhD[b]

SYNOPSIS

In the mid-1990s, several state and county public health departments implemented interactive software systems that provided easy access to public health-related data for local boards of health, other public health agencies, health care providers, community groups, and other interested members of the public. Based on their experiences with two well-established state interactive systems and one well-established county system, the authors summarize lessons that could prove useful to state and local public health agencies interested in developing new interactive systems or adapting existing ones. The article addresses issues such as: basing interactive systems on a broad definition of health, designing systems to incorporate user preferences, moving from data warehouses to information warehouses, and fostering prevention communities. Finally, the article provides recommendations to assist federal, state, and local public health agencies in developing the next generation of interactive data access systems.



[a]Bureau of Health Statistics, Research and Evaluation, Massachusetts Department of Public Health, Boston, MA

[b]Epidemiology, Planning and Evaluation Unit, Public Health–Seattle & King County, Seattle, WA

[c]Center for Health Information Management and Evaluation, Missouri Department of Health, Jefferson City, MO

Address correspondence to Daniel J. Friedman, PhD, Bureau of Health Statistics, Research and Evaluation, MDPH, 250 Washington St., Boston, MA 02108; tel. 617-624-5613; fax 617- 624-5698; e-mail <danieljfriedman@attglobal.net>.

Editor's Note: A World Wide Web demonstration version of VISTA/PH has recently been deployed and can be accessed at www.vistaphw.net.

Assessment, which has been defined as a core function of public health, can help public health agencies and communities to better understand and respond to health issues.[1] Comprehensive community assessments typically address: community resources and health status; behavioral, environmental, and other risks to health; perceived and actual health and health care needs; and other influences on community health. Successful assessments depend on the ready availability of a wide range of data, only some of which are typically collected or maintained by state or county public health agencies.[2]

The widespread adoption of personal computers in the 1980s, followed by the expansion of the Internet and the development of Windows-based graphic user interfaces and the World Wide Web in the 1990s, have dramatically increased the potential to make public health data available for comprehensive community assessments and other purposes to a wide range of users, including users without specialized statistical or computer expertise. This includes members of citizen groups, local boards of health, public library patrons, and health care providers. Public health data can now be made available in a more timely way than in the past.[3,4] These data can be presented in formats understandable to broad audiences, consequently increasing the knowledge and sophistication of users. Data typically collected by public health agencies can be integrated with data not usually included within the purview of these agencies, such as employment, social services, housing, and population-based demographic data.[5,6]

In the mid-1990s, several state and county health departments implemented interactive systems to make data easily and rapidly available to public health professionals and the public. Interactive data access systems allow the public and public health professionals to pose data questions and to have them answered directly and immediately, instead of relying on public health agency programmers, epidemiologists, or analysts to interpret their questions and provide data in response.

Interactive systems for accessing public health data share four characteristics. First, they provide users with flexibility in choosing data parameters; for example, users may choose to subset data on a chosen health topic by age, gender, or geographic area. Unlike static data tables available on World Wide Web sites, interactive systems allow users to specify the contents of table rows and columns. Second, interactive systems provide users the choice of geographic areas for which data are selected. Third, these systems calculate statistics for designated areas, instead of simply storing already generated statistics, and they contain datasets that provide population denominators for local areas so that small-area analysis can be conducted. Local areas typically include substate health planning regions, counties, cities and towns, Zip Codes, or census tracts. Fourth, interactive systems can serve as learning tools, increasing users' knowledge of appropriate ways of using public health–related information, through the inclusion of context-sensitive help, appropriate data caveats, and explanations of data sources and statistics. Despite these similarities, there are differences among existing systems. The most basic variations relate to their missions and intended user audiences. Other characteristics also vary, such as the nature of the interface, ease of use, number and scope of datasets, methods of building queries, and mapping and graphing capabilities. These similarities and differences are explored in this article.

The purpose of this article is to assist states and counties in realizing the potential of interactive public health data access systems as existing systems are re-evaluated and re-engineered and as new generations of systems are developed. We first provide a brief overview of the current status of state- and county-developed interactive systems, and particularly of three well-established systems. We then describe lessons learned from our cumulative experience in designing, developing, and operating these three mature systems with differing characteristics. Finally, we offer recommendations for refining existing interactive systems, adapting them for use by additional state and county health departments, and developing the next generation of systems.

HISTORY AND CURRENT STATUS OF INTERACTIVE SYSTEMS

Interactive public health data access systems have been developed at the international, national, state, and county levels, and in the US by both government agencies and private corporations. Early examples of such interactive systems were either entirely PC-based or client-server applications operating through modem connections to a central server. Internationally, the World Health Organization–Europe's Health Care for All was a PC-based application introduced in 1987–1988, which provided cause-specific age-adjusted mortality rates for European countries and maps of those rates. At the national level, the Centers for Disease Control (now the Centers for Disease Control and Prevention) introduced the CDC WONDER system to the public in 1990 as a client-server system operating via modem to a central server, initially providing

access to four datasets.[7,8] An early example of a PC-based interactive application at the state level was Massachusetts's HEADS-M, instituted in 1994. At the county level, an early example of a PC-based interactive application was Seattle–King County's VISTA/PH, made available to epidemiologists at the county health department beginning in 1991. With the expansion of the Internet and the growth of the World Wide Web in the 1990s, the architecture of interactive systems expanded to include client–server applications operating on the Internet and entirely Web-based applications.

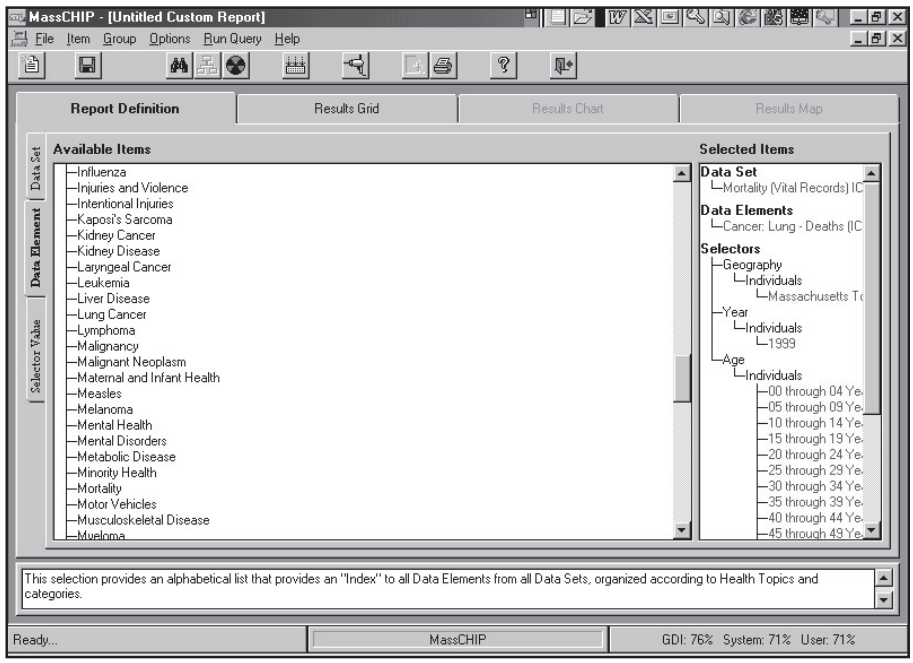
A recent study by ORC Macro under contract to CDC found at least 10 state- or county-based interactive Web-based systems.[9] Both the ORC Macro survey and an informal 1999 survey by authors DJF and GL of seven states and four private firms known to have interactive systems revealed a wide range of intended users, datasets, and features.[10] The datasets included in these systems vary substantially, with some systems including only datasets traditionally under the purview of state public health agencies, and other systems providing access to educational, social services, unemployment, Medicaid, and US Census of Population datasets in addition to traditional public health datasets. The statistical features of these systems vary greatly as well and include simple counts and crude rates; age-adjusted and age-specific rates; indirectly standardized ratios such as standardized mortality ratios; and choice of confidence intervals, standard millions for calculating age-adjusted rates, and age groupings for calculating age-adjusted and age-specific rates. Available geographic levels also vary, ranging from neighborhoods, minor civil divisions, counties, cities and towns, substate regions, census tracts and census block groups to user-defined aggregations of these geographic building blocks. Finally, the presence and nature of mapping and graphing features also vary across systems.

Massachusetts' Community Health Information Profile system (MassCHIP),[11] Missouri's Information for Community Assessment (MICA),[12,13] and Seattle–King County's VISTA/PH[14] are three of the more mature systems, with a cumulative total of 14 years of availability. As summarized in the text boxes on pages 142–147, MassCHIP, MICA, and VISTA/PH were designed with different primary users, technical environments, interfaces, search options, datasets, statistics, and special features. This article reflects both the authors' experiences in designing, implementing, evaluating, and re-engineering MassCHIP, MICA, and VISTA/PH, and insights resulting from user feedback.

LESSONS LEARNED FROM MASSCHIP, MICA, AND VISTA/PH

First lesson: Know your users. The first and most basic lesson is the necessity for sponsors and developers to target interactive systems for accessing public health data to specific user groups. MassCHIP, MICA, and

Illustration 1. MassCHIP webpage



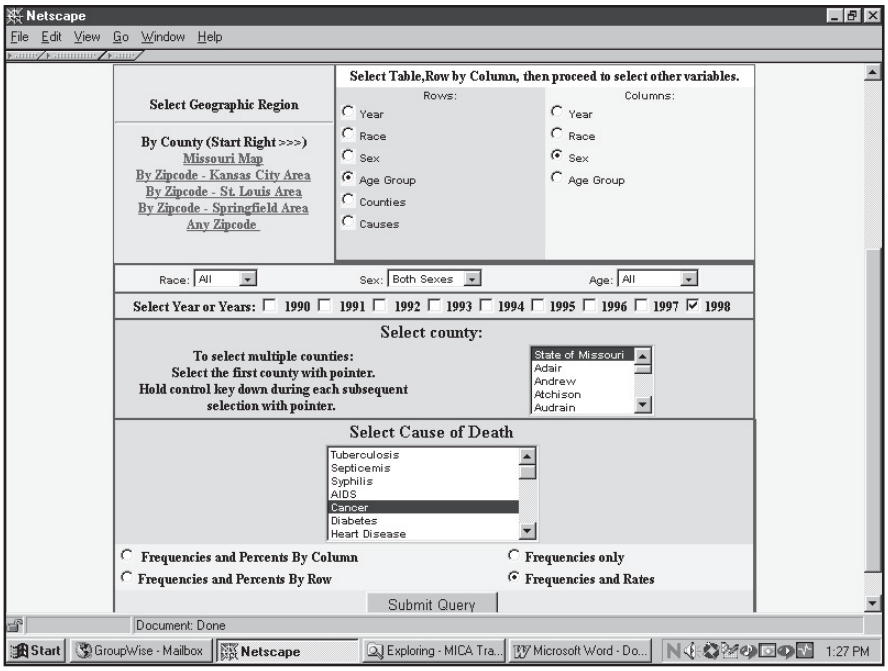
VISTA/PH have been designed for differing combinations of users. MassCHIP was designed for novice users from community groups as well as public health agency users with data manipulation experience. As a result, MassCHIP incorporates features with a range of complexity; for example, the system provides pre-designed reports for novice users as well as the capacity to generate custom queries, directed at users who want to specify query conditions. MICA was designed primarily for local public health agencies and other organizations conducting health assessments. VISTA/PH was designed to help local public health assessment staff to meet the demand for analyses of population-based health data for user-defined small areas and to carry out state-mandated community health assessments.

As a result of differences in target user groups, MassCHIP, MICA, and VISTA/PH have different features. For example, to help local assessment staff define flexible areas of analysis meaningful to communities, VISTA/PH was designed to allow the user to interactively group smaller geographic building blocks, such as census block groups and postal Zip Codes, into user-defined larger areas to generate geocoded data. Features designed for public health information professionals may be confusing for members of community groups. For example, public health professionals may find useful a choice of age-adjusted, age-specific, and crude rates; a broad array of rates and other statistical choices may be less helpful or even confusing to members of community groups who do not have statistical training.

Second lesson: Know your users' goals. A corollary of "Know your users" is "Know your users' goals." As Alan Cooper points out in *The Inmates Are Running the Asylum,*[15] users have both practical goals and personal goals. For example, one of the practical goals for a hospital community benefits director might be the ability to conduct health needs analyses for the hospital's market area as rapidly as possible, with minimum time invested in learning how to use the system. The personal goals for the community benefits director could include learning the system without feeling intimidated or overwhelmed by the application's complexity.

If an interactive system is designed for users with diverse practical and personal goals, it may be necessary to design separate interfaces with features that differ. An interface designed for a public health information professional may need substantial flexibility, including choices of confidence intervals; standard millions for calculating age-adjusted rates; statistical measures; and custom aggregations of geographies, International Classification of Diseases (ICD) codes, and data years. On the other hand, an interface designed for community groups may need to provide users solely with choices of health topic and geography. Different interfaces may be needed for community

Illustration 2. MICA webpage

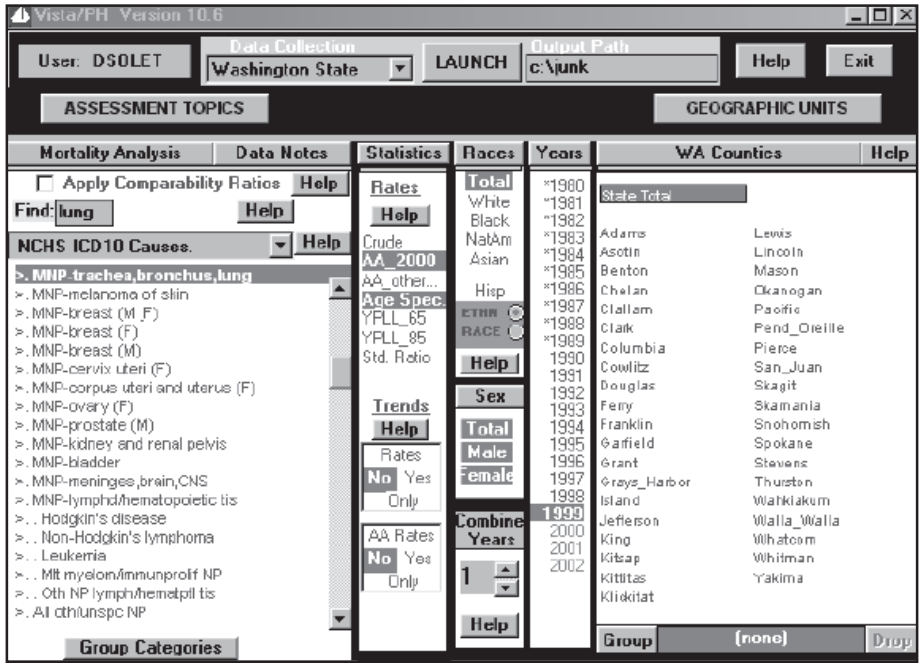


groups interested in conducting a community health assessment only a single time than for occasional users in community health agencies or institutions, or for frequent users with intensive analytic needs. For example, MassCHIP v3.0, currently under development, will have three separate interfaces: one for the casual user, providing choices of geographic area and predesigned health topic reports (such as on smoking prevalence or community Healthy People 2010 chronic disease indicators) with data drawn from multiple datasets; another for the occasional professional user, providing a highly structured, step by step "Wizard" process for building a custom query; and a third interface for the frequent user with substantial statistical knowledge, providing maximum flexibility in designing custom queries.

Third lesson: Learn from your users. The design of public health data access systems should be based on continuously updated information from users about their needs and preferences.[16] The design, development, and implementation of MassCHIP, MICA, and VISTA/PH have all involved formal and informal mechanisms for obtaining user feedback, including user surveys, focus groups, mechanisms for e-mail and telephone queries, ongoing review of tabulations of numbers and types of uses by user affiliation and by dataset, and informal discussions during demonstrations of the product. These feedback mechanisms have provided insights that have been essential to system improvements; based on user feedback, both minor adjustments as well as major re-engineering of MassCHIP, MICA, and VISTA/PH have occurred. For example, a 1999 survey of more than 2,000 MassCHIP v1.0 registrants revealed that a substantial number had failed to use the system because the time needed to download the 6-megabyte client file using a 28.8 bpm modem was considered excessive. In response, MassCHIP v2.0 was designed to allow existing users to download only new components and new data years. Also in response, MassCHIP v3.0 is now being developed as a purely Web-based system requiring no downloading time beyond the time needed to access the website. A user survey also provided the impetus for abandoning SPSS as the VISTA/PH data analysis engine, because it required users to have SPSS on their computers. In response, VISTA/PH is now being redesigned as a Web-based system with no dependence on other software packages for data analysis.

Fourth lesson: Most users don't care who "owns" the data. Users of MassCHIP, MICA, and VISTA/PH are seeking a single gateway for obtaining access to public health data. The specific agency collecting, maintaining, and "owning" those data is largely irrelevant to most users. User interfaces for interactive systems should avoid organizational schema that are narrowly based on organizational sub-divisions of the public

Illustration 3. VISTA/PH webpage



health agencies collecting the data, or on whether the data are collected by the sponsoring public health agency or other federal, state, or private agencies. Of course, technically sophisticated users will benefit from the inclusion of detailed information on data collection sources and methods.

Fifth lesson: Most users care about data, not datasets. Interactive systems designed for community users should provide a choice of individual health topics without requiring prior knowledge of which particular dataset contains information about that topic, in addition to the choice of initially selecting a dataset and then selecting the individual health topic. Regardless of whether users initially choose a health topic or initially choose a dataset, context-sensitive caveats and help text should be made readily available, and should document dataset limitations, data sources, and warnings about using the dataset, such as warnings about changes in coding systems and about the accuracy and completeness of the data.

Sixth lesson: Everybody cares about privacy, confidentiality, and security. The credibility and acceptability of publicly available systems for accessing public health data will largely depend on protecting the privacy of data subjects, maintaining the confidentiality of individual health information, and ensuring the security of data. Attention needs to be paid to protecting interactive systems from intentional broaches of the security of their underlying databases, through which a determined unauthorized user might obtain access to the records of individual data subjects. Attention also needs to be paid—by implementing guidelines for small cell size suppression—to preventing any attempts to identify individuals from aggregated data. While maximizing the actuality of privacy, confidentiality, and security is essential, designing interactive systems that also provide users with visible assurances that such protections are in place is important for enhancing credibility and acceptability. For example, interactive systems can facilitate the use of confidentiality rules appropriate for small-area analysis by incorporating small-cell-size suppression algorithms based simultaneously on numerator and denominator sizes.

RECOMMENDATIONS FOR NEXT GENERATION OF INTERACTIVE SYSTEMS

The recommendations posed here are intended to help state and county public health departments and federal agencies advance toward the next generation of interactive public health data access systems. Recommendations for achieving greater efficiencies at lower costs in the development of interactive systems are presented, followed by recommendations for the characteristics of the next generation of interactive systems.

With CDC funding, the National Association for Public Health Statistics and Information Systems (NAPHSIS) and the National Association of Health Data Organizations (NAHDO) will undertake a three-year project that should achieve greater efficiencies at lower costs in the adaptation of existing interactive systems and the development of new systems. This project will initiate the recommendations described here.[17,18]

Need for coordination

According to ORC Macro's recent *Evaluation of State-Based Integrated Health Information Systems*, all state public health agencies maintain websites offering statistical data, and at least 10 state and county agencies have made interactive data access systems publicly available.[9] These websites and interactive systems have been developed with no central guidance, little coordination across states and counties, limited interstate technology transfer, and minimal opportunity to learn from the successes and failures of other localities and the evolving digital economy. Needless expense, unnecessary development time, and failure to rapidly share information on innovative systems have resulted. It is very clear that other states and localities have a need to make data available through these kinds of systems; MassCHIP, MICA, and VISTA/PH have been demonstrated to numerous states and counties at several national meetings; training has been provided to help 14 states and one county adapt MICA; and VISTA/PH has been exported to one county outside of Washington State.

Central support for the exchange of information would help other states and localities to develop their own applications or choose among those that are already available, according to their needs. Lack of central guidance and coordination also impedes implementation of data content and format standards. Standards that should be incorporated into interactive systems include the Office of Management and Budget's (OMB's) *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*[19] as well as standards developed by the CDC such as the *Common Information for Public Health Electronic Reporting*[20] guidelines, the National Electronic Disease Surveillance System,[21] and the Public Health Conceptual Data Model.[22]

Need for national facilitation

Federal agencies, acting in concert with each other and with appropriate national organizations such as NAPHSIS and NAHDO should facilitate discussion with state and county public health agencies about the desirable goals, components, standards, and features of interactive systems for accessing public health data.

Federal agencies and appropriate national organizations, working collaboratively, should support the development of model systems using standard platforms and platform-neutral software to facilitate the adaptation of interactive systems by states and counties at minimal cost. This effort should involve the development of recommended components for new systems, documentation of components in existing systems, and support for the adoption of components by states and counties introducing their own interactive systems. A library of components should be centrally maintained, updated on an ongoing basis, and made publicly available under appropriate agreements about acceptable uses, adaptations, and acknowledgements.

Need for interstate and intercounty collaboration

Fostered by a coordinated effort at the federal level among the appropriate agencies, active collaboration should be encouraged among public health agencies developing interactive systems. Mechanisms should be established for ongoing discussion of specific technical issues, such as rules for small cell size suppression, implementation of the OMB's revised race/ethnicity standards,[19] implementation of the periodic changes to the ICD coding schema, handling missing data, and small area imputation. Collaboration should also occur through developing model training manuals, establishing priorities for inclusion of specific datasets, and mentoring of states and counties with minimal experience with interactive systems.

Need for standards for data content, data format, and statistics

Standards need to be developed that are common to all datasets as well as unique to individual datasets when appropriate. Standards common to all datasets could include minimum lists of demographic variables and ICD codes, standardized codes for demographic variables, a minimum set of statistical tests, common definitions of statistical tests, and rules for minimum cell size suppression. Examples of standards unique to individual datasets include rules governing the development of life tables from mortality datasets and the development of fertility rates from birth files.

OPPORTUNITIES FOR NEW FEATURES IN THE NEXT GENERATION OF SYSTEMS

The next generation of interactive systems for accessing public health data should at a minimum be based on the lessons outlined above. New systems should reflect the needs and goals of distinct end-user communities, and as necessary offer separate interfaces to match differing needs and goals. New systems should permit users to access data on their chosen health topics without prior knowledge of individual datasets or the government agencies responsible for collecting those data. Finally, new systems should include mechanisms for continually soliciting users' criticisms and suggestions, and for incorporating new datasets and features based on user feedback.

In addition to the basic recommendations described above, designers and developers of new public health data access systems should take into consideration five opportunities for incorporating new features.

First opportunity: Working from a broad definition of health. Interactive systems provide opportunities for the integration of a wide range of information about population health and the determinants of population health, as envisioned by Evans and Stoddart[23] and in Healthy People 2010.[24] The integration of multiple datasets emphasizes a conceptualization of health as more than disease or the absence of disease. Data can be integrated at various geographic levels—statewide, substate regions, census tracts, and so forth. Analysis of the relationship between income inequalities and health can be facilitated by stratification of substate geographies into high- and low-income areas.[25] Areal integration of data can move beyond traditional public health datasets—for example, to include areal data on social determinants of health.[26,27] MassCHIP, for example, includes data pertaining to unemployment, child abuse and neglect, utilization of social services, Medicaid enrollment, and school dropout rates. MICA contains data on participation in the Temporary Assistance for Needy Families program, Medicaid, and the Food Stamp program.

Second opportunity: Designing for markets of one.[28–31] The next generation of Web-based interactive public health data access systems can incorporate learning interfaces with intelligent mechanisms to identify user preferences relating to health topics, statistical measures, demographic variables, and geographic levels.

Third opportunity: Moving from data warehouses to information warehouses. The World Wide Web provides opportunities for public health data access sys-

tems to move beyond their current construction as primarily data warehouses to truly become information warehouses. Population health information warehouses would contain information on risk factors, prevention guidelines, and geographically based prevention resources and would thus provide information to help communities act on the health problems identified through interactive systems that are more narrowly focused on data analysis. For example, the Missouri website contains context-sensitive resource pages with information on risk factors, intervention strategies, resources, and links to appropriate other websites in order to help communities respond to identified health problems.

Fourth opportunity: Enhancing small-area maps. The utility of interactive systems in providing data from multiple and disparate data sources for small substate areas will be increased through enhanced mapping features. The next generation of interactive systems could allow users to show data from multiple datasets on a single map and to import geographically based data from datasets not included in the interactive system into Geographic Information System (GIS) maps. For example, users could develop a single map that would show census tract-level poverty rates, percentages of owner-occupied buildings, and lead poisoning rates.

Fifth opportunity: Fostering prevention communities. The next generation of interactive public health data access systems can foster virtual prevention communities by allowing people with similar public health concerns and goals to share prevention and intervention strategies on-line. Interactive systems can be used in real time at community meetings to plan prevention strategies and other public health interventions. For example, VISTA/PH has been used at the county level to target asthma interventions by generating county-specific asthma hospitalization rates.

CONCLUSIONS

In *Being Digital,* Nicholas Negroponte describes his "dream for the interface that computers will be more like people." Negroponte emphasizes that "'ease of use' has been such a compelling goal that we sometimes forget the many people don't want to use the machine at all."[33] In building the next generation of interactive public health data access systems, sponsors and developers should rely on Negroponte's admonition as a touchstone. Instead of building ever more complex systems, we should strive for systems that simply and concisely meet the needs of well-defined communities of users, build on the lessons of existing systems, and incorporate the opportunities provided by the World Wide Web.

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Illustration 4. Mortality rates, 1999, state total, >. MHP-trachea, bronchus, lung

STAT:

aa2_0099 RATE = Deaths per 100,000, age-adjusted to year 2000 US population.
age_4554 RATE = Deaths per 100,000 in age range 45-54 (age-specific rate).
age_5564 RATE = Deaths per 100,000 in age range 55-64 (age-specific rate).
age_6574 RATE = Deaths per 100,000 in age range 65-74 (age-specific rate).
age_7584 RATE = Deaths per 100,000 in age range 75-84 (age-specific rate).
age_8599 RATE = Deaths per 100,000 in age range 85 plus (age-specific rate).

STAT	RATE	PER	LB	UB	CNT	POP
aa2_0099	57.7	100,000	55.6	59.7	3054	5757425
age_4554	27.1	100,000	23.6	30.9	218	804621
age_5564	117.8	100,000	108.3	128.0	562	476989
age_6574	300.7	100,000	282.6	319.7	1026	341176
age_7584	395.5	100,000	370.4	421.9	921	232867
age_8599	346.0	100,000	306.8	388.9	281	81213

STAT	M_RATE	M_PER	M_LB	M_UB	M_CNT	M_POP
aa2_0099	73.3	100,000	69.8	77.0	1685	2867045
age_4554	28.8	100,000	23.8	34.6	116	402453
age_5564	132.9	100,000	118.6	148.4	316	237822
age_6574	370.9	100,000	341.5	402.3	585	157714
age_7584	515.7	100,000	471.1	563.3	492	95413
age_8599	596.3	100,000	504.0	700.9	147	24650

STAT	F_RATE	F_PER	F_LB	F_UB	F_CNT	F_POP
aa2_0099	46.5	100,000	44.1	49.0	1369	2890380
age_4554	25.4	100,000	20.7	30.8	102	402168
age_5564	102.9	100,000	90.4	116.5	246	239167
age_6574	240.4	100,000	218.5	263.9	441	183462
age_7584	312.1	100,000	283 3	343.1	429	137454
age_8599	236.9	100,000	198.6	280.6	134	56563

Data Sources:

Death Certificate Data: Washington State Department of Health, Center for Health Statistics.

1990-2002 Population Estimates and Projections: Department of Social and Health Services, Washington State

1980-1989 Population Estimates are unofficial, based on estimates by the Washington State Office of Finance

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Massachusetts Community Health Information Profile (MassCHIP)

- **Collaborators:** New datasets, variables, and predesigned reports are added to MassCHIP through ongoing collaboration within the Massachusetts Department of Public Health and with other state agencies responsible for Medicaid, unemployment compensation, social services, education, hospital discharge datasets, and so forth.
- **Year first available to users:** 1997
- **Primary users:** state and local public health professionals, community agencies, local boards of health, health care providers, advocacy groups, public libraries
- **Geographic levels:** statewide; substate regions; cities and towns; neighborhoods for larger cities
- **Datasets and data years:**
  - — *Vital statistics:*
    - Births, 1989–1999
    - Deaths, 1989–1999
    - Infant deaths, 1989–1999
    - Linked birth/infant death file, 1989–1998
  - — *Communicable diseases (incidence):*
    - Measles, pertussis, hepatitis B, 1989–1996
    - Tuberculosis, 1989–1999
    - Gonorrhea, chlamydia, syphilis, 1989–1999
    - AIDS, 1986–1998
  - — *Sociodemographic data:*
    - US Census population data: counts, 1990 and 2000; interpolations, 1985–1998
    - US Census socioeconomic data, 1990
    - Medicaid recipients, 1993–1996
    - Unemployment counts and rates, 1990–1999
    - Income assistance, 1998–1999
  - — *Program utilization:*
    - Early Intervention, 1991–1996
    - WIC, 1992–2000
    - Inpatient admissions for substance abuse treatment, 1992–1999
  - — *Other data:*
    - Childhood lead poisoning case counts, 1990–1999
    - Cancer incidence, 1985–1997
    - Hospital discharges (includes preventable hospitalizations), 1989–1998
    - Behavioral Risk Factor Survey results, 1986–1999
    - Use of child care services, 1998–1999
    - School drop out rates, 1993–1999
    - Childhood vaccinations: percentage of children at age 2 and at school entry, 1989–1999
- **Calculated statistics and measures:**
  - — Percents
  - — Crude rates
  - — Age-adjusted rates
  - — Age-specific rates
  - — Standardized ratios (standardized hospitalization ratios, standardized mortality ratios, and standardized incidence ratios)
  - — Confidence intervals

- **Search options:**
  - — By dataset
    - By health topic
    - By ICD-9 and ICD-10 codes
    - By Healthy People 2010 objectives
- **Cross-tabulation variables:** data year; other variables may differ by dataset and include age, gender, race, ethnicity, education, income
- **Maps:** mapping of counts and rates by city or town
- **Graphs:** charting with user-defined choices of different types of charts
- **Cell size suppression:** both numerator- and denominator-based, with algorithms specific to each dataset
- **Pre-designed reports:** available by user-specified geographic area: minority health and demographics, adolescent health, breast cancer, community health status indicators, Healthy People 2000 chronic disease and maternal and child health objectives, perinatal health, smoking, Kids Count
- **Special features**:
  - — User-defined custom grouping
  - — Results sorting in ascending or descending order by values of counts or rates
  - — Data elements linked to Healthy People 2010 objectives
  - — Small numbers suppressed to protect confidentiality (varies by dataset)
  - — Caveats about dataset use
- **Technical environment:** Currently, a client/sever application requiring downloading of client portion onto personal computer, which accesses central server via the Internet. Now being redesigned as pure Web-based application requiring no downloading of client portion.
- **User support:**
  - — On-line, context-sensitive extended data descriptions and caveats
  - — On-line user manuals
  - — Toll–free help desk
  - — Regularly scheduled trainings
- **Website:** http://www.masschip.state.ma.us/

Missouri Information for Community Assessment (MICA)

- **Collaborators:** MICA is modified with input from an advisory committee that includes representatives from Department of Health programs, local public health agencies, universities, hospitals, and other state agencies.
- **Year first available to users:** 1998
- **Primary users:** state and local public health professionals, community agencies, advocacy groups
- **Geographic levels:** statewide, health districts, counties, Zip Codes
- **Datasets and data years:**
  - — *Vital statistics:*
    - Births, 1990–1999
    - Deaths, 1990–1998
    - Pregnancies (births, fetal deaths, abortions), 1990–1998
  - — *Program utilization*
    - Medicaid recipients, 2000–2001
    - Temporary Assistance for Needy Families (TANF) recipients, 2001
  - — *Other:*
    - Inpatient hospitalizations, 1993–1999
    - Emergency room visits, 1993–1999
    - Inpatient procedures, 1993–1997
    - Preventable hospitalizations, 1993–1999
    - All injuries, 1994–1999
    - Assault injuries, 1994–1999
    - Self-inflicted injuries, 1994–1999
    - Unintended injuries, 1994–1999
    - Head injuries, 1994–1998
    - Motor vehicle crashes and outcomes, 1993–1996
    - Cancer incidence 1996–1998
    - Behavior Risk Factor Survey results, 1998–2000
    - Physician characteristics, 2000
    - Registered nurse characteristics, 2001
    - Licensed practical nurse characteristics, 2000
- **Calculated statistics and measures:**
  - — Row or column percents
  - — Crude rates
  - — Age-adjusted rates with choice of standard population
  - — Age-specific rates
  - — Confidence intervals
  - — Average length of stay and charges
- **Search options:**
  - — By dataset
  - — By health topic
- **Cross-tabulation variables**: may differ by dataset and include age, gender, race/ethnicity, marital status, Medicaid or other payer status, data year, causes
- **Maps:** mapping of counts and rates by county
- **Graphs:** can download a table into Excel to produce graphs

- **Cell size suppression:** Each cell of a table for a specific condition is compared with the corresponding denominator. If the difference between any numerator and denominator is less than 10, the table is not presented.
- **Pre-designed reports:** County profiles are available for 20 different subject areas (for example, chronic conditions, infectious diseases). Each profile gives the data years, number of events, county rate, statistical significance, quintile ranking, and state rate. Each profile offers data on 20 to 30 indicators; a resource page provides more information on each indicator.
- **Special features:**
  - — Can create more specific diagnostic, age, and racial/ethnic groupings for a previously created table
  - — Results sorting
  - — Can download to Excel
- **Technical environment:** Web-based application that runs on Unix or NT central server and through any client browser
- **User support:** on-line, context-sensitive data descriptions and caveats
- **Website:** http://www.health.state.mo.us (select "Data and Resources")

VISTA/PH Software for Community Health Assessment

- **Collaborators:** partnership among Public Health–Seattle & King County and agencies serving 34 other local health jurisdictions in Washington State, supported by the Washington State Department of Health
- **Year first available to users:** 1991
- **Primary users:** county and state public health department community assessment staff, students, educators, and researchers
- **Geographic levels:** statewide, county, substate regions, health planning areas, ZIP Code, Census tract, census block group, or any user-defined area based on these building blocks
- **Datasets and data years:**
  - — *Vital statistics:*
    - Births, 1980–1999
    - Deaths, 1980–1999
    - Pregnancies, births, and abortions, 1981–1999
    - Linked birth/infant death file, 1981–1999
  - — *Communicable disease incidence:*
    - Tuberculosis, 1980–1998
    - Gonorrhea, chlamydia, syphilis, herpes, 1987–2000
    - Hepatitis (acute and chronic), measles, pertussis, enteric bacterial disease, 1988–1998
  - — *Sociodemographic data:*
    - US Census population data, 1980, 1990, 2000
    - Population estimates and projections 1981–2002 (intercensal estimates from Washington State Department of Social and Health Services)
    - US Census sociodemographic measures: poverty, income, education, single-parent households and all other variables from Census long form (STF3A), 1990
  - — *Other:*
    - Hospital discharges (includes preventable hospitalizations), 1987–1999
    - Children with chronic conditions
    - Cancer incidence
      - — Any user–defined dataset, 1980 through present (user provides numerator file that VISTA/PH combines with population denominators to calculate rates)
      - — Emergency room visits, 1993–1999
- **Calculated statistics and measures:**
  - — *Rates:* crude, age-specific, age-adjusted (with choice of population standard), life expectancy, standardized mortality ratios, Years of Potential Life Lost to age 65 and to age 85
  - — *Statistical measures***:** confidence intervals (choice of negative gamma [default], Poisson, normal); test for trend over time
- **Search options:** vary; for example, for deaths, the options include *ICD-10* categories; Healthy People 2000 and 2010 objectives (when available)
- **Cross-tabulation variables:** may differ by dataset and include age, gender, race/ethnicity
- **Maps:** Excel or DBF format may be loaded into GIS software by user
- **Graphs:** Can be made in Excel by user.
- **Cell size suppression:** <5 events, except with password
- **Pre-designed reports:** none

- **Special features:**
  - — User-defined small areas based on census tract/block group, Zip Code, health planning area, substate region, or county
  - — User, time of run, definition of run, and source of data delivered with each result
  - — Results sorting
- **Technical environment:** Windows-based
- **User support:** on-line help for overall program operation; definitions of measures and rates; *ICD* codes provided for causes or death and hospitalizations; comparability ratios provided for causes of death; hard copy manual; telephone and in-person help offered by statewide VISTA/PH coordinator
- **Website:** http://www.doh.wa.gov/os/vista/homepage.htm