

Decision Support Systems for Linking Routine and Nonroutine Data Sources

Background

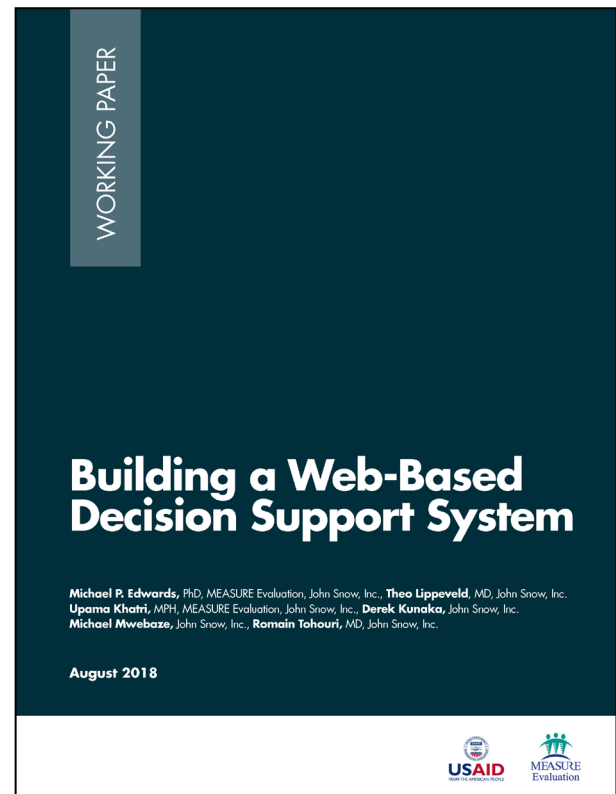
As countries strengthen their data infrastructures, global health professionals increasingly need data to monitor programs and to diagnose and control epidemics. These data come from “routine” and “nonroutine” sources. Routine sources are health facility and community information systems. Nonroutine sources are household and other population-based surveys, censuses, civil registration and vital statistics systems, disease surveillance systems, health facility surveys, and administrative data systems. These varied sources complement one another, and when data from them are combined, they are more comprehensive and, thus, more useful.

To exploit the possibilities of linking data, countries are establishing data warehouses where data are stored and linked. Data warehouses are connected to a “health observatory” that permits access to in-depth analyses of population health and health services at the national, subnational, and district levels. A health observatory consists of a decision support system (DSS) plus the various dashboards, portals, and web interfaces developed for specific stakeholders. It uses innovative data visualizations—graphs, spatial analysis and maps, health sector reports, and other media—that make health information more readily available and useful.

MEASURE Evaluation’s Web-Based DSS

For years, MEASURE Evaluation—funded by the United States Agency for International Development (USAID) and the United States President’s Emergency Plan for AIDS Relief (PEPFAR)—has supported the development and use of user-friendly and powerful computerized DSS linked to national health information systems (HIS), PEPFAR’s HIV/AIDS program monitoring systems, and other computerized information systems. With USAID’s support, MEASURE Evaluation has developed a web-based DSS that links to routine and nonroutine data sources. Click here to access it: dssbase.net/DSSDemo.html

For these data sources to function within the DSS, they must be converted to a “tidy” (that is, standardized) format that contains the necessary field information to enable temporal and geographic linkages. Because data sources have distinct



A decision support system (DSS) is a computer-based application that collects, organizes, and analyzes data to facilitate high-quality decision making for management, operations, and planning. A well-designed DSS helps decision makers to compile a variety of data from many sources. Decision support system analysis helps them identify and solve problems and make decisions.

structures and formats, a considerable amount of work may be necessary to make the data tidy (i.e., converted to a standard data structure) and linkable with other sources. More information about tidy data is available here: <https://www.measureevaluation.org/resources/publications/sr-17-142>.

“Building a Web-Based Decision Support System” (<https://www.measureevaluation.org/resources/publications/wp-18-216>) highlights some of the steps needed to link data sources, with particular focus on (1) using a master facility list (MFL) of a country’s health resources; (2) importing data from legacy data sources (Microsoft Excel and ACCESS); and (3) connecting to online data sources using web-based application programming interfaces (APIs).

We singled out MFLs, because such a list is an essential building block of a well-functioning HIS capable of providing information to a country’s decision makers and stakeholders. A MFL lists all of the levels of a country’s geographic hierarchy (i.e., organizational units): regions, provinces, and states; districts and subdistricts; counties and constituencies; and health facilities. Assigning a unique identifier in a MFL to each level allows analysts to use the DSS to drill down through the masses of data that a health system generates to those from the geographic unit of interest.

Because many countries, especially in Africa, are adopting DHIS 2 as the software platform for their HIS, there is a growing need to link these countries’ health data from legacy Excel- and Access-based systems to the DHIS 2 platform. Many countries are exploring APIs to make DHIS 2 interoperable with other databases. APIs make it possible to extract data housed in the DHIS 2 platform for analysis in other applications, such as a web-based DSS.

MEASURE Evaluation’s web-based DSS adds Demographic and Health Survey (DHS) data to the system. In older DSS, including these data was time-consuming, because each table was extracted from the tables formatted as PDF documents found in the final reports of the various surveys. The DHS staff have also developed an API for users to link to the DHS Statcompiler database and extract JavaScript Object Notation (i.e., JSON)-formatted data, which can be transformed into arrays to populate the DSS graphs and maps.

Next Steps

As countries develop and strengthen their health data sources, standardizing and formatting them is necessary to ensure that they can be linked and made interoperable. The MFL merits special focus, because it is essential for the exchange of data from various other data sources. To facilitate the standardization process, a MFL needs to be available for public search and download. Because several online HIS now use web-based APIs, the library of web-based API functions in a DSS tool needs to be expanded, to fully exploit the complexity of the underlying data sources.