Program Evaluation Tip Sheet: **Integrating GIS into Evaluation**

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This tip sheet is for programs funded through the Centers for Disease Control and Prevention's (CDC) Division for Heart Disease and Stroke Prevention and describes how geographic information system (GIS) maps can be used to help evaluate public health efforts. It offers a brief overview of using GIS throughout the six steps of CDC's Framework for Program Evaluation in Public Health,[1] provides examples, and presents practical tips. It is not intended as a comprehensive guide for implementing GIS in program evaluation.

What Is GIS? GIS is a computer-based system for integrating and analyzing geographic or spatial data.[2] GIS can be used to examine patterns of population health characteristics along with physical and social environmental characteristics.[3] For examples of how GIS is being used to address heart disease, stroke, and other chronic diseases, visit www.cdc.gov/dhdsp/maps/gisx.

To create GIS maps for evaluation purposes, you'll need the following:

- Datasets with location information, such as county codes, ZIP codes, or street addresses.
- GIS software, such as ESRI ArcView/GIS, Geocoder, Quantum GIS, or Map Info.
- An interdisciplinary team comprising epidemiologists, evaluators, GIS analysts, program staff, management, and leadership.
- Ample time for an iterative process of preparing datasets and creating maps.

INCORPORATING GIS THROUGHOUT THE STEPS OF THE CDC EVALUATION FRAMEWORK

Engage Stakeholders. Evaluators can use maps to synthesize and convey multiple pieces of information—such as health, sociodemographic, and program services data—to evaluation stakeholders who share a common, local geography. For example:

Tips for Engaging Stakeholders

Rather than keeping a list, use a map to identify and locate active stakeholders who can help inform and carry out the evaluation. Geographic distributions may reveal populations or entities that are well represented or absent.

- Stakeholders can benefit from seeing "the whole picture" in a simplified format, thereby facilitating increased dialogue and understanding. This information may bridge gaps between the purpose of the evaluation and stakeholder perspectives, resulting in a collective goal and greater use of evaluation findings for decision making and local action.

Describe the Program. Evaluators often need to describe and communicate the diverse components of the program(s) being evaluated. Maps can enhance this step in the following ways:

- Describe the issue or need addressed by the program. For example, maps can provide documentation of the prevalence of risk factors or health conditions.
- Document the projected and actual reach of a program. For example, in Figure 1, Minnesota used a map to show the proportion of the state population served by Coverdell stroke hospitals.
- Identify clusters or gaps of available resources related to the program.
- Display geographic, social, economic, environmental, and political contextual information that may influence the program.

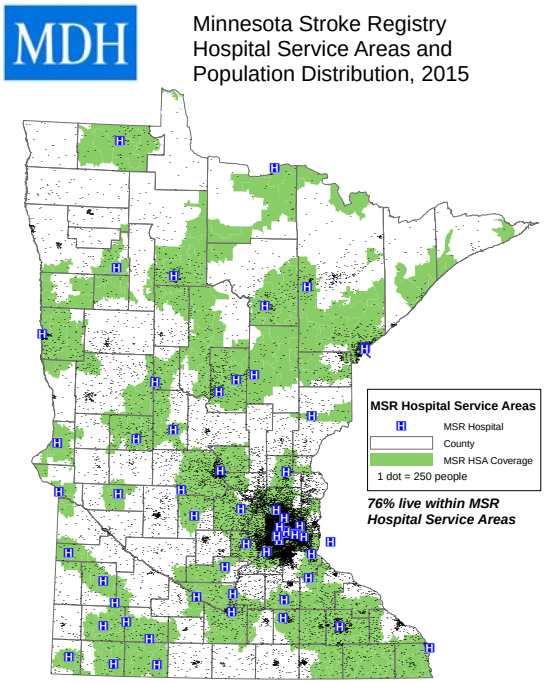

Figure 1. Documenting Reach: Minnesota Stroke Registry (MSR) Hospital Service Areas and Population Distribution, 2015

Focus the Evaluation Design. GIS can help evaluators develop, communicate, and disseminate the methods, sampling, and design of the evaluation. For example, maps can help with the following:

- Facilitate the efficient development of more specific and meaningful evaluation questions.
- Clarify the boundaries of an evaluation and the unit of analysis using geographic parameters.
- Inform and refine the selection of data collection methods, sampling, and analysis approach by overlapping the strategy with relevant geographic or sociodemographic attributes.

Tip for Focusing the Evaluation Design

Use GIS data to determine possible sampling frames based on geographic regions.

Gather Credible Evidence. Although GIS is a good tool to help evaluate public health programs, it is only useful if you have credible data. Consider the following tips:

- Use existing evaluation data that can be geocoded to create maps, such as the number of community health centers in a region or the proportion of counties that have higher prevalence rates of heart disease.
- Local or county-level data can be difficult to find; therefore, before integrating GIS into your evaluation, examine the quality and accuracy of local data.
- GIS can serve as a data source that can be integrated into multiple methods in your evaluation design.

Justify Conclusions. Evaluators can use GIS to describe and synthesize evaluation outcomes. For example:

- Maps can be used to compare and triangulate findings from quantitative and qualitative methods employed in an evaluation.
- Maps can provide alternative explanations for evaluation findings and better display those findings. For example, a good use of GIS might be to show how geographic variation impacts the quality of clinical care individuals receive in addressing hypertension in a state.

Tip for Justifying Conclusions

Consider using maps to display your evaluation outcomes instead of a table or graph in an evaluation report.

Ensure Use and Lessons Learned. Evaluators can use maps as a powerful tool to promote the use of findings and lessons learned from an evaluation in the following ways:

- To easily report data findings in a visually appealing format.
- To inform geographic areas in need of program intervention or improvement and help mobilize action.
- To increase the reach of prevention services in three rural Delta counties (Figure 2), the Arkansas Department of Health produced a map to educate policymakers about the location and number of Southeast Targeted Area Resource (STAR) Health Programs (e.g., community health worker programs, hypertension continuing medical education conferences, heart health events) in those communities.

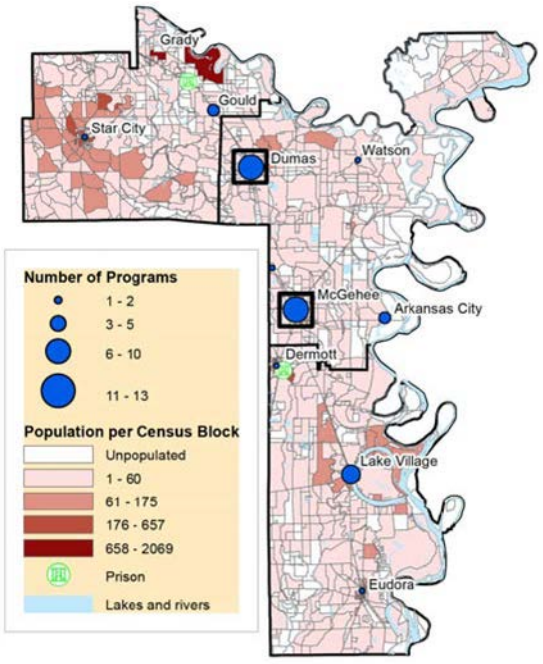

Figure 2. Number of STAR Health Programs by population per census block, 2010

Resources

1. Centers for Disease Control and Prevention. Framework for program evaluation in public health. MMWR.1999;48(RR-11):1-40.
2. Cromley EK, McLafferty SL. GIS and Public Health, 2nd edition. New York: Guilford Press; 2011.
3. Rushton G. Public health, GIS, and spatial analytic tools. Annu Rev Public Health.2003;24:43-56. www.annualreviews.org/doi/pdf/10.1146/annurev.publhealth.24.012902.140843. Accessed September 17, 2012