

CARTOGRAPHY AS AN AID FOR TARGETING  
FEDERAL RESOURCES TO RURAL AREAS

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I. Introduction

This paper focuses on the use of computer assisted cartography in the planning and implementation of the U.S. Public Health Service's Rural Health Initiative (RHI) program between 1976 and 1979.

The RHI was established early in 1975 by the Public Health Service's Bureau of Community Health Services (BCHS) to support medically underserved rural communities in their efforts to establish primary care clinics. By 1976, bureau staff had committed themselves to allocate RHI funds to those rural areas throughout the country with the most severe health problems and shortages of physicians and other health professionals. Early that same year, the Bureau Office of Rural Health Staff, agreed upon the use of four criteria to identify the severity of need and prioritize rural areas for funding purposes. Listed below is a brief description of each of the criteria:

1. Medically underserved areas - defined and designated for health maintenance organizations and Community Health Center (CHC) programs (including the RHI), and necessary for funding through these programs. The formula used to designate these areas takes into account the percentage of people under the poverty level and over the age of 65, the infant mortality

rate, and the physician to population ratio.

2. Health manpower shortage area - defined and designated for the National Health Service Corps (NHSC) program, and necessary for assignment personnel. This designation is determined by ratio of physicians, dentists, and other health manpower to populations.

3. High migrant impact areas and high impact areas - defined and designated for the migrant health program (including the RHI) and necessary for funding through these programs. These areas are designated by a formula which identifies the numbers of migrant and seasonal agricultural workers and dependents in a given area for a given length of time.

4. High infant mortality areas - areas identified by NCHS which have the highest rates of infant mortality. Until early 1979, areas with infant deaths of at least 23.8 per 1,000 live births were given these designations. A task force recommended changes in this designation to the bureau director, and earlier this year, the bureau established a more complicated formula which generally allows areas (one or more counties) with an infant mortality rate of above 21.5 deaths per 1,000 live births to be designated.

## II. Computer Data and Related Cartography

The Office of Rural Health Staff obtained assistance from the BCHS computer support unit, the division of monitoring and analysis, in the form of printouts identifying all rural (i.e., Non-Standard Metropolitan Statistical Area (SMSA) counties), and whether the counties met any of the four need criteria used to determine priorities for the RHI program. The computer run also identified whether BCHS resources were already being allocated to these counties. After analyzing the computer run, it was found that there were 242 rural counties that met three or four of the need criteria, which did not already receive assistance from BCHS. These counties became the first priority list identified by the bureau as of priority importance for the development of RHI supported primary care clinics. Copies of this list were made available to headquarters and regional office staff, with instructions to allocate staff and contractor time to assist individuals and organizations within these counties to submit RHI

applications.

Toward the end of 1976, Dr. Michael Samuels and Mr. Louis Gorin, the Director and Deputy Director of the Office of Rural Health, arranged with the Census Bureau to have large transparency maps made to display the information related to the four need criteria and allocation of bureau resources mentioned earlier. On July 10, 1977, the Census Bureau's Cartographic Methods Branch, within the Geography Division, delivered 10 sets of national maps and one map of each of the Public Health Service's 10 regional offices. Approximately 42 inches by 30 inches in size, the maps included four transparent plastic overlays that displayed which of the rural counties throughout the country were medically underserved areas, health manpower shortage areas, high migrant and seasonal farmworker impact areas, and high infant mortality areas. Four additional overlays identified counties where bureau resources from each of the following programs had already been allocated: Rural Health Initiative/Health Underserved Rural Areas programs, Community Health Center program, Migrant Health Center program, and National Health Service Corps program.

### III. Use of Data and Related Cartography in the Planning and Implementation of the RHI

The large maps and transparencies, and later 1050 copies of single sheet 11 inch by 17 inch paper maps of each of the 10 regions were to become very useful in planning for the RHI program during 1977 and 1978. Copies of the large and small maps were distributed to each of the 10 regional offices and to key bureau staff and a select number of Public Health Service Rural Health Coordinating Committee members. Regional office staff began to use the maps in planning meetings with state and county health departments, state and local planning agencies, and with program staff responsible for developing the RHI program. Both regional office and Office of Rural Health staff used the maps in discussions with technical assistance contractors who would be assigned to help individuals and organizations within the priority counties to submit RHI applications. Bureau and Office of Rural Health staff would use the maps to discuss health needs in rural areas, and resources available to address these needs. The maps would also be used by regional office review committees

and the Rural Health Coordinating Committee in their review of proposals submitted requesting RHI funding.

Computer data and related cartography simplified the task of explaining the RHI program and identifying areas which were of priority concern for funding. This information was exceedingly helpful to regional offices, particularly those located in Philadelphia (region III), Atlanta (region IV), and Dallas (region VI), the three regions with the highest number of priority rural counties. By September of 1978, BCHS had approved and funded new RHI projects in over 50 percent of the original 242 priority rural counties. Once the projects approved through September 30, 1979, are funded, the bureau will support RHI projects in approximately two thirds of the original priority counties.

The RHI program grew rapidly from a \$7.3 million program, June 30, 1975, to \$17.7 million, June 30, 1976, to \$28.9 million by June 30, 1978. Grant awards issued increased from 47 in 1975 to 330 by September 30, 1978.

Although the maps have been extremely useful to BCHS and the Office of Rural Health, there have been some problems. So many new projects were approved in 1977 and early 1978, that the four overlays identifying bureau resources quickly became outdated. In addition, the need indicator designations for some of the counties changed over the ensuing two year period. The bureau did ask the Census Bureau if they could update the overlays, but the Census had such a backlog of requests that they were unable to promise delivery without a delay of more than one year. Several of the regional offices did, however, mark the maps themselves to update the information being displayed. The cost of preparing the maps was also fairly high. Cost for the national maps and the 11 by 17 inch handouts cost slightly more than \$40,000.

#### IV. Cartography as a Useful Tool in Planning a Wide Range of Programs or Projects

The data principles and cartography techniques used in the development of the RHI program can serve as useful tools in the planning of a wide range of federal, state, and local government programs. In fact, transparency cartography or composite cartography, either computer assisted or manual, can also be used by non-government-

al organizations and firms managing complex projects. Cartography can simply and clearly identify data, for example, on average farm size productivity per acre, the percentage of people below the poverty line, the percentage of unemployment, the level of educational attainment and the number of Ford or Chevrolet owners in a given area. Cartography can also identify the resources available to address a given problem and increase product yield or automobile sales in a given area.

As with the RHI program, cartography certainly can play a valuable role as a planning, operational, evaluation-al or public relations tool.