Chapter XVI

Using GIS with Publicly Available Data for Hospital Market Share Analysis

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Publicly available data of all hospital discharges has been available since Medicare changed to a case-based reimbursement system. A non-confidential version of this dataset contains a Zip Code identifier for each discharge, in addition to diagnoses, procedures, payer information, hospital charges and basic demographic data. The method for converting the raw data into a useful marketing database is described. An application of this database in conjunction with GIS is presented here. In this application, the market share of a community hospital is analyzed. A series of maps shows that geography plays an important role in hospital choice, and a linear regression model provides quantitative evidence of this pattern. Finally, bivariate maps are used for more complex analysis.

INTRODUCTION

A dataset of all hospital discharges has been available for many years. This chapter describes the dataset and shows one of its potential applications with GIS. This application analyzes the market share of a community hospital and identifies potential opportunities for further hospital growth.
THE DATASET

In 1965, Medicare legislation was passed after many years of debate concerning national health insurance. During the succeeding 15 years, it became apparent that the original projections of hospital cost had been too low. In an attempt to control these costs, the Health Care Financing Administration (HCFA) changed to a radically different payment scheme. Rather than paying hospitals for their ongoing costs for each admission, they would reimburse hospitals with a fixed payment for each diagnosis. The goal was to shift some of the financial risk back to the hospitals. Thus, a hospital would be paid a previously decided upon amount for acute appendicitis, irrespective of the cost of the actual care given.

In order to implement the program, HCFA adopted a classification of diseases called Diagnostic Related Groups (DRGs). This classification scheme provided a way to group all hospital discharges into a few hundred diagnoses on which Medicare could base all its hospital payments. Upon discharge, the patient’s physician lists all the pertinent discharge diagnoses and procedures in the medical record. This sheet then goes to a “coder,” an individual who converts each diagnosis and procedure into an “ICD9” number. A computer program called a “grouper” then aggregates all the ICD9 codes into a single DRG number on which payment is made. In general, there are paired diagnoses for most major conditions—one code for the uncomplicated case and another for the more complex case. The system thus allows for two levels of severity of illness.

In order to implement the system, a dataset called UB82, for Uniform Bill, was constructed. This dataset has recently been updated to UB92 but has remained relatively stable for many years. Of great importance is that many states and fiscal intermediaries have adopted this dataset. The dataset contains several hundred fields of data, including the patient’s demographic data, age, sex, race, insurance coverage, as well as up to nine diagnoses, six procedures, length of stay, and the calculated DRG. There are several fields listing all the various hospital charges. Many states make their data publicly available in a non-confidential dataset that masks the ability to identify the individual patient, and often the individual physician. While individual street addresses are masked, Zip Codes are included in the dataset.

As a result of the availability of this data, many applications have been found for its use. Dr. John Wennberg at Dartmouth has developed a series of atlases showing the geographical variations in hospital care based on this dataset, as well as other claims data.

A more complex and controversial use of this dataset has been the efforts to analyze quality of hospital and physician care. Algorithms to assign a severity rating of illness to cases have been constructed by weighting the various diagnostic and
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