SPATIAL MARKETING
PREDICTING HOSPITAL SERVICE AREAS IN CONNECTICUT

Background
Hospital service areas, or those areas from which hospitals draw the majority of their patient admissions, help to define the form and extent of U.S. health care coverage. Geographic information systems (GIS) are increasingly being used in public health, ranging from applications in epidemiology to examinations of health care coverage. The purpose of this research is to apply geospatial techniques available in GIS to examine the hospital service areas of Connecticut’s two largest children’s health care providers: Connecticut Children’s Medical Center (CCMC) and Yale-New Haven Hospital (YNHH). Project funded by CCMC Injury Prevention Center

Data and Methods
This research uses ArcGIS 9.3 software in conjunction with Connecticut Hospital Information Management Exchange (CHIME) data, U.S. Census population projection data, and Connecticut streets data to explore the hospital service areas of CCMC and YNHH.

Population Based Model
With ArcGIS, CHIME data are used to assess the percentage share of pediatric admissions to both CCMC and YNHH for each of 169 towns in Connecticut. Primary service areas are defined as those towns where greater than 50% of all admissions are to one of the hospitals. Using U.S. Census population projections for children ages 0 – 19 in 2010, 2015, and 2020, the current and future market populations are then estimated for the towns designated as primary service areas.

Distance Based Model
Connecticut streets data are incorporated into the ArcGIS framework and the distances from CCMC to adjacent areas are estimated using the Network Analyst extension.

Combinatorial Model
The population and distance models are combined in ArcGIS to show those locations in CCMC’s primary service area that are farther than a 20 minute threshold distance away and require further interest.

Results

Population Based Model

Distance Based Model

Combinatorial Model

Discussion
GIS can be used to create alternative models of hospital service areas, specifically those which combine criteria from both examples. The results emphasize the need to view hospital service areas in a spatio-temporal context, which can be facilitated through exploratory GIS usage.