

The Treo Solutions healthcare utilization model has three primary components: demographic cohort population counts, cohort-specific healthcare utilization rates and a setting-specific regional adjustment. These components are described below in greater detail. In order to calculate healthcare utilization estimates and forecasts, counts for a dozen age-sex-specific demographic cohorts are multiplied by cohort-specific utilization rates, and then multiplied by a setting-specific regional adjustment factor.

Demographic Cohort Counts	x	Cohort-Specific Utilization Rates	x	Regional Variation Adjustment	=	Area Utilization Counts
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This model has the advantages of accounting for demographic variation down to the zip code level, beginning with nationally comprehensive utilization rates to insure comparability of estimates from diverse geographic areas, and adjustment for regional variation in healthcare utilization rates due to factors apart from demographic differences.

Components of the Model

Demographic Data

Treo Solutions uses data from Applied Geographic Systems (AGS) for baseline demographic data in its healthcare utilization models. The AGS data provides 2004 and 2009 population projections by age for both male and female, by zip code.

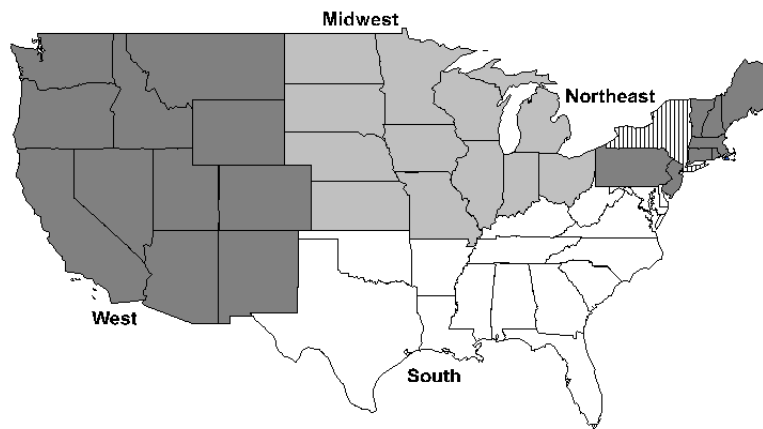
Cohort-specific demographic data are a keystone of healthcare utilization modeling, as age-sex cohort differences in disease and utilization rates are the major source of variation in healthcare utilization.

Baseline Healthcare Utilization Rates

Baseline healthcare utilization rates are calculated from several national survey data sources administered by the National Center for Health Statistics (NCHS). These databases, described below, are used in order to generate baseline utilization rates from sources that use consistent methodologies for sampling across the United States. A dozen cohort-specific use rates are calculated and multiplied by the demographic cohort counts. The resulting baseline cohort utilization counts are summed to generate a total utilization count for each geographic area.

Regional Variations in Utilization Rates

Ongoing healthcare utilization research continues to support the observation that regional differences exist in the patterns of healthcare utilization across the United States.¹ For the most part, use of services was higher in every age/sex cohort in the Northeast, lower in the West and somewhere in-between for the Midwest and South. Despite the goals of comprehensive health planning in the 1970's, the introduction of standardized DRGs in the 1980's, and the growth in managed care in the 1990's these differences in utilization between the regions persist.



The Treo Solutions model incorporates a regional adjustment by setting (physician office, hospital inpatient, hospital outpatient, hospital emergency department, and ambulatory surgery center) for the four regions of the United States pictured above (Figure 1) and listed below (Table 1).²

Table 1 - NCHS Region List

Northeast	Midwest	South	West
Maine	Michigan	Delaware	Montana
New Hampshire	Ohio	Maryland	Idaho
Vermont	Illinois	District of Columbia	Wyoming
Massachusetts	Indiana	Virginia	Colorado
Rhode Island	Wisconsin	West Virginia	New Mexico
Connecticut	Minnesota	North Carolina	Arizona
New York	Iowa	South Carolina	Utah
New Jersey	Missouri	Georgia	Nevada
Pennsylvania	North Dakota	Florida	Washington
	South Dakota	Kentucky	Oregon
	Nebraska	Tennessee	California
	Kansas	Alabama	Hawaii
		Mississippi	Alaska
		Arkansas	
		Louisiana	
		Oklahoma	
		Texas	

Healthcare Utilization Rate Data Sources

A key component of small area analysis using modeled data is the choice of “standard” databases from which baseline utilization rate estimates are calculated. Many of these standard databases are produced by the federal government, particularly the National Center for Health Statistics (NCHS). Advantages of using these national survey databases include the following:

- Strict probability sampling techniques are observed
- Surveys are carefully constructed, validated, and administered
- Proven analytical techniques are employed
- Underlying population estimates are available from US Census data
- Results are extrapolated to national populations

Brief descriptions of some of the principal survey sources are provided below³.

National Ambulatory Medical Care Survey (NAMCS)

A national survey designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the United States. Findings are based on a sample of visits to nonfederally employed office-based physicians who are primarily engaged in direct patient care. Physicians in the specialties of anesthesiology, pathology, and radiology are excluded from the survey. The survey was conducted annually from 1973 to 1981, in 1985, and annually since 1989.

National Hospital Ambulatory Medical Care Survey (NHAMCS)

Designed to collect data on the utilization and provision of ambulatory care services in hospital emergency and outpatient departments. Findings are based on a national sample of visits to the emergency departments and outpatient departments of noninstitutional general and short-stay hospitals, exclusive of Federal, military, and Veterans Administration hospitals, located in the 50 States and the District of Columbia. The survey uses a four-stage probability design with samples of geographically defined areas, hospitals within these areas, clinics within hospitals, and patient visits within clinics. Annual data collection began in 1992.

National Hospital Discharge Survey (NHDS)

Conducted annually since 1965, is a national probability survey designed to meet the need for information on characteristics of inpatients discharged from non-Federal short-stay hospitals in the United States. The NHDS collects data from a sample of approximately 270,000 inpatient records acquired from a national sample of about 500 hospitals. Only hospitals with an average length of stay of fewer than 30 days for all patients, general hospitals, or children’s general hospitals are included in the survey. Federal, military, and Department of Veterans Affairs hospitals, as well as hospital units of institutions (such as prison hospitals), and hospitals with fewer than six beds staffed for patient use, are excluded.

National Survey of Ambulatory Surgery (NSAS)

Initiated by the National Center for Health Statistics in 1994, is a national survey designed to meet the need for information about the use of ambulatory surgery services in the United States. For NSAS, ambulatory surgery refers to surgical and nonsurgical procedures performed on an ambulatory (outpatient) basis in a hospital or freestanding center’s general operating rooms, dedicated ambulatory surgery rooms, and other specialized rooms such as endoscopy units and cardiac catheterization labs. The survey was conducted annually from 1994 through 1996.

National Health Interview Survey

The National Health Interview Survey (NHIS) is the principal source of information on the health of the civilian noninstitutionalized population of the United States. The National Health Interview Survey is a cross-sectional household interview survey. Sampling and interviewing are continuous throughout each year. The sampling plan follows a multistage area probability design that permits the representative sampling of households. 1996 NHIS rates for acute and chronic conditions were used herein because beginning in 1997 questions on acute and chronic conditions were dramatically reduced in an effort to shorten the NHIS survey.

References

- ¹ Dartmouth Medical School. Center for the Evaluative Clinical Sciences.
The Dartmouth Atlas of Health Care 1999 / The Center for the Evaluative Clinical Sciences, Dartmouth Medical School, 1999.
- ² National Center for Health Statistics. Advance data from vital and health statistics: numbers 141 –150. National Center for Health Statistics. Vital Health Stat 16(15). 1995.
- ³ National Center for Health Statistics: Surveys and Data Collection Systems (<http://www.cdc.gov/nchs/express.htm>), September, 2004.