11. GEOGRAPHIC MAPS

Average numbers and percentages frequently do not convey a pictorial view of a community. In order to provide that visual image, we have used zip code data and other information from the Kansas Department of Health and Environment (KDHE) to create geographic maps of Sedgwick County. We also have a nice Claritas Map by NPDC Demographics showing a socioeconomic status profile across the County.

Socioeconomic Status

These maps summarize income levels and poverty, unemployment, education, and single parent families. The center city along the I-135 corridor has the largest population of residents below 200% poverty. This distribution pattern extends eastward, beyond McConnell Air Force Base, in Zip Code area 67210. Unemployment rates are highest in Zip Code areas 67214 and 67202, while low educational achievement is most pronounced in Zip Code areas 67214 and 67219. Single parent families are analyzed by block group, but show high rates diffusely among the Zip Code areas. This analysis by block groups emphasizes the fact that even Zip Code areas are very diverse and by no means homogenous. An interesting composite of socioeconomic status is created by the Geo Unit Quality Score analyzed by block group. This measure rates block groups as a function of (1) household; (2) educational attainment of people over 25; (3) occupation of civilian labor force; and (4) home value. As you can see, the lowest scoring areas follow I-135 north and south with isolated low scoring areas elsewhere.

Death, Disease and a Primary Care Index by Zip Code

These maps summarize various death rates, disease rates, and rates of disease precursors among the various Zip Code areas in Wichita. It also maps Zip Code areas using a Primary Care Status Index. This Index consists of six separate indices divided into three indicator categories:

Risk Measurements (Health Status and Behavior)

Index 1: Population Characteristics Index
Index 2: Maternal Child Health Index
Index 3: Mortality Index
Index 4: Morbidity Index

Community Ability to Meet Risk

Index 5: Local Health Resources Index

Barriers Inhibiting Access

Index 6: Transportation Index

A detailed explanation of this Index is attached.

In general, there is considerable overlap between low socioeconomic status Zip Codes and high death rate/disease rate Zip Codes. Zip Code 67214 has high rates for nearly every category. Zip Code 67219 frequently demonstrates higher rates. These two Zip Codes plus 67202 have the highest (worst) Primary Care Index.

Health Care Resources

These maps show the physical location of various health care resources. In general, Wichita/Sedgwick County has a great many resources. Appropriately, areas of high need contain many resources. For instance, Zip Code area 67214, a low socioeconomic area with poor health, contains many, many resources: two hospitals (one just outside the Zip Code), the Medical School, many provider sites, etc. Does this correlation suggest that good health care resources cause poor health? Of course not. Undoubtedly, many barriers prevent residents from using available resources. Lack of money and health insurance are the largest barriers. Also, these maps suggest that interventions other than illness care providers and resources may be extremely important for improving health. Better socioeconomic status, more education, more family stability (fewer single parent households), and fewer risk factors for disease may be the best resources for improved health.

Our CHAP has also developed a detailed Health Care Resource Inventory. This Inventory catalogues about 335 organizations, agencies or programs available in our City/County. We have an impressive array of resources. In fact, one wonders about their coordination and ability to reach all those in need. Their full capacity may not have been met (?).

Methods for Mapping Health and Related Data

There were four types of maps developed for the Sedgwick County Community Health Assessment Project. Each type is described here with its source of data and reporting rules. The mapping software used was ArcView 2.1.

Death Rates by Zip Code (Except Infant Mortality)

Source of Data:
These data were provided by the Kansas Department of Health and Environment. The original files were a series of space delimited text files that contained the causes of death by zip code for Sedgwick County. There were originally five separate files for the years 1990 through 1994. These files were merged and edited using SPSS, and the resulting database contained the following fields: Zip code, age group (under 1, 1-4, 5-9,..., over 90) cause of death (total deaths, malignant neoplasms, heart disease, atherosclerosis, cerebrovascular disease, hypertension, pneumonia and influenza, COPD, diabetes, nephritis, ulcer of the stomach, liver disorders and cirrhosis, homicide and legal intervention, suicide, motor vehicle accidents, and all other accidents), and the count for each category.

What was Mapped:
We intended to collapse the age groups into 1-24 years and 25-64 years and calculate death rates for each cause of death by Zip code in order to study premature death. However, we determined that there were not enough deaths in every category of cause to warrant separate maps for each. Because of the small number of deaths due to any one cause, years, we were only able to calculate the overall

death rate from all causes by Zip code for the age group 1-24 years. For the age group 25-64 years, we combined the causes of death into five categories and calculated the death rate for these categories by Zip code. The five categories are 1) total deaths, 2) malignant neoplasms, 3) all injuries (motor vehicle, homicide, suicide, and all other accidents), 4) heart and circulatory conditions (heart disease, atherosclerosis, cerebrovascular disease, and hypertension) and 5) all other causes of death (calculated by subtracting previous categories from the total deaths).

The death rates were calculated as the average annual rate for 5 years for each category within the two age groups-- 1-24 years and 25-64 years. The formula for each Zip code rate is:

$$\text{Rate} = \frac{\text{\# of Deaths Within an Age Group from 1990-1994}}{\text{\# of Persons in that Age Group (1990 Census) / 5 x 100,000}}$$

Reporting Rules:

There were two sets of rules for reporting cause of death rates:

1. For Zip codes within the boundaries of Wichita (urban)

   Rates for Zip codes with fewer than 10 deaths were not reported

2. For Zip codes with no portion within the boundaries of Wichita (rural)

   Deaths for Zip codes with fewer than 10 deaths were aggregated and one death rate for the entire area was calculated. We aggregated rural zip codes as follows:

   a) Derby and Mulvane
   b) all other rural Zip codes

Sexually Transmitted Disease Rates by Zip Code

Source of Data:
Data were provided by the Kansas Department of Health and Environment, Bureau of Disease Control. The database contained overall rates by zip code for each of the state's reportable diseases and the number of cases of each disease in each zip code.

Reporting Rules:
We did not report disease rates for zip codes with fewer than 10 cases of a disease or fewer than 2,000 persons. Only Chlamydia and Gonorrhea had enough cases to warrant mapping.

Single Parents by Block Group

Source of Data:
These data were obtained from the 1990 U.S. Census.

What was Mapped:

The formula for each block group was:

$$\text{Rate} = \frac{\text{\# of households with children < 18 headed by a single parent x 100}}{\text{\# of households}}$$

Other Health and Related Rates by Zip Code

Source of Data:
The data for all other maps were obtained from the Kansas Department of Health and Environment's Primary Care Index Database (by zip code).

What was Mapped:
The rates calculated for the Primary Care Index Database were mapped.

Reporting Rules:

We did not report rates for Zip codes with fewer than 1,000 persons.

List of Map Graphs by Title

APPENDIX
PRIMARY CARE STATUS INDEX

Introduction

Originally, several possible indicators were selected by the Primary Care Data Review Committee. Not all of these indicators were readily available, however, so a preliminary Primary Care Status Index (PCSI) was developed using available data. The PCSI consists of six separate indices divided into three indicator categories:

Risk Measurements (Health Status and Behavior)

Index 1: Population Characteristics Index
Index 2: Maternal Child Health Index
Index 3: Mortality Index
Index 4: Morbidity Index

Community Ability to Meet Risk

Index 5: Local Health Resources Index

Barriers Inhibiting Access

Index 6: Transportation Index

The indices were developed by summing either (1) z-scores or (2) assigned scores. All six indices were summed to determine the PCSI.

Calculating Z-scores

In general, z-scores are calculated as follows:

$$\frac{\text{(County Mean - County Observation)}}{\text{County Sample Standard Deviation}}$$

where County Mean = Mean percentage, rate, or ratio of specified indicator for all counties County Observation = County percentage or rate for specified indicator
County Sample Standard Deviation = Sample standard deviation of specified
indicator for all 105 counties

Index 1: Population Characteristics Index

The Population Characteristics Index consists of five demographic and socioeconomic indicators. Z-scores are calculated for each indicator and summed according to the following assigned weights:

Indicator	Weight
Percent of Population Under 1	25 %
Percent of Population Over 65	25 %
Percent Minority/Hispanic Population	25 %
Percent Below 100% Poverty	12.5%
Percent Below 200% Poverty	12.5%
	100 %

Note the two poverty indicators together account for 25% of the z-score, the same as the other three indicators, to insure that poverty is not weighted double the other indicators in the Population Characteristics Index.

Index 2: Maternal Child Health Index

The Maternal Child Health Index consists of five indicators. Z-scores are calculated for each indicator and summed according to the following assigned weights:

Indicator	Weight
Infant Mortality Rate	25 %
Low Birthweight Rate	25 %
Teenage Pregnancy Rate	25 %
1st Trimester Prenatal Care Rate	12.5%
3rd Trimester Prenatal Care Rate	12.5%
	100 %

First and third trimester prenatal care rate weights are half of 25% to insure that prenatal care is not weighted double the other indicators.

Index 3: Mortality Index

The Mortality Index consists of z-scores summed for the following eight mortality indicators:

Indicator	Weight
Age-Adjusted Death Rate - 10 Leading Causes	12.5 %
Age-Adjusted Death Rate - Heart Disease	12.5 %
Age-Adjusted Death Rate - Cancer	12.5 %
Age-Adjusted Death Rate - Unintentional Injuries	12.5 %
Years Potential Life Lost Rate - 10 Leading Causes	12.5 %
Years Potential Life Lost Rate - Heart Disease	12.5 %
Years Potential Life Lost Rate - Cancer	12.5 %
Years Potential Life Lost Rate - Unintentional Injuries	12.5 %
	100 %

Index 4: Morbidity Index

The Risk Behavior Index consists of z-scores summed for the following three indicators:

Indicator	Weight
Sexually Transmitted Disease Rate (Includes chlamydia, gonorrhea, and syphilis)	33.3 %
Percent Alcohol-Related Traffic Accidents	33.3 %
Percent Persons in Accidents Not Wearing Seatbelts	33.3 %
	100 %

Index 5: Local Health Resources Index

The Local Health Resources Index is made up of three indicators:

Primary Care Physician to Population Ratio
Number of Deliveries Occurring in County
Whether or Not County Has at Least One Home Health Agency

For the Primary Care Physician to Population Ration (PPPR), z-scores are used. For the Delivery indicator, counties are assigned a score of 0.5 if five or less deliveries occurred in the county in 1992 and a score of 0 otherwise. For the Home Health indicator, counties are assigned a score of 0.25 if the county did not have a Home Health Agency in 1992 and a score of 0 otherwise. The PPPR z-score and the two assigned scores are summed for the total Local Health Resources Index.

Index 6: Transportation Index

There is very little travel and transportation data readily available in this State. The Transportation Index consists of only two indicators:

Percent Rural Population
Availability of Public Transportation System

It is assumed that counties with a high rural percentage are sparsely populated, have relatively poor road conditions, and must travel long distances to health care providers. Furthermore, it is assumed that counties with very low rural percentages tend to be congested metropolitan areas. It is assumed that counties "in between" - neither very rural or very urban - are the best for travel and transportation. Thus, for the Rural Population indicator, the absolute value of z-scores are calculated using an assigned mean of 50% rural. By assigning a mean of 50%, we are assuming a county with 50% rural population is "ideal." Counties with a greater or lesser percentage of rural population are penalized (with high scores). For example, Kiowa County, 100% rural, is assigned a score of 1.57. On the other end, Wyandotte County, 1.11% rural, is assigned a score of 1.54, penalizing Wyandotte almost as much as Kiowa.

For the second indicator (Public Transportation System), counties are assigned a score of 1 if they do not have at least one of the following public transportation systems: (1) public bus system, (2) Section 16 grant, specialized public transportation program, or (3) Section 18 grant, rural public transportation program. Only seven counties in the State do not have at least one system and are assigned a score of 1. All other counties are assigned a score of 0.

The two indicator scores are summed to determine the total Transportation Index.

Total Index

All six indices are summed to determine the PCSI. The PCSI is still in the development stage and has not yet been formally adopted by the Primary Care Data Review Committee.