DEVELOPMENT OF NEIGHBORHOOD
HEALTH PROFILES
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Introduction and Purpose

In the last few years, municipal officials and health facilities administrators in the Twin Cities (Minnesota) Metropolitan Area have expressed a need for specific health data about the neighborhoods they serve. In addition, the Metropolitan Health Board (the HSA, Health Systems Agency), needed data at the neighborhood level. As an HSA, the Health Board has a responsibility defined by law to collect and analyze data on health status, use of the health care delivery system, effect of the health care delivery system on health status, health resources, use of health resources and environmental and occupational factors affecting health. Health status of the population, health resources and socio-demographic characteristics of the population were defined by Health Board staff to be three separate, but interacting elements of the health system, as shown in Figure 1. The data that the Health Board collects on health resources and use of these resources is organized by health planning area (HPA). In order to have comparable population data, socio-demographic and vital statistics profiles have been prepared [4] for each of the 105 health planning areas (HPAs) in this seven county metropolitan region. Figure 2 shows a map of the region.

Socio-demographic profiles were to be used in determining areas of real or potential need, types of services needed and appropriateness of approaches to meeting the needs. These needs can then be compared with existing resources to determine areas of gaps and overlaps. Health planning areas were compared to each other based on selected socio-demographic characteristics. HPAs which were similar in character were identified.

The vital statistics profiles were needed to indicate areas of real or potential health need, and to serve as a baseline for measuring the effect that changes in health care delivery have on selected health status indicators for area residents. The vital statistics profiles were presented as a first step toward developing a more comprehensive health status profile.

Relationship of Social and Demographic Variables to the Health System

The relationship between socio-demographic variables and the health system was examined from two perspectives. The first was to determine the ways in which socio-demographic characteristics affect use of the health system. The second was to select a relatively small set of socio-demographic characteristics which most clearly described a given area.

A survey of the literature documented at least four ways in which socio-demographic variables affected the health system. They were, 1) health status or need for care, 2) demand for and utilization of health services, 3) the mix of

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health services needed or demanded, and 4) the manner in which care is delivered. Need for care implies an objective assessment of what care is required. Demand for care, on the other hand, refers to the desire for services together with the ability to pay for them. Need may be greater than demand in an area for which there is a high incidence of disease and an inability to pay for health care. Demand may be greater than need in an area for which people seek out more services than are actually required for their well-being.

Next, a set of socio-demographic factors was selected centered around the social area analysis framework devised by Shevky and Bell [6]. They developed indexes measuring each of the three factors, social rank, urbanization, and segregation, and suggested that these indexes would be useful in describing the essential differences among the populations of different sub-areas.

Several studies conducted during the 1950's and 1960's indicated that this approach was useful in a variety of urban settings [3, 7]. More recently, in 1975, a modification of the social area analysis approach was presented by the National Institutes of Mental Health (NIMH) [5] as a technique to use for describing the areas serviced by community mental health centers.

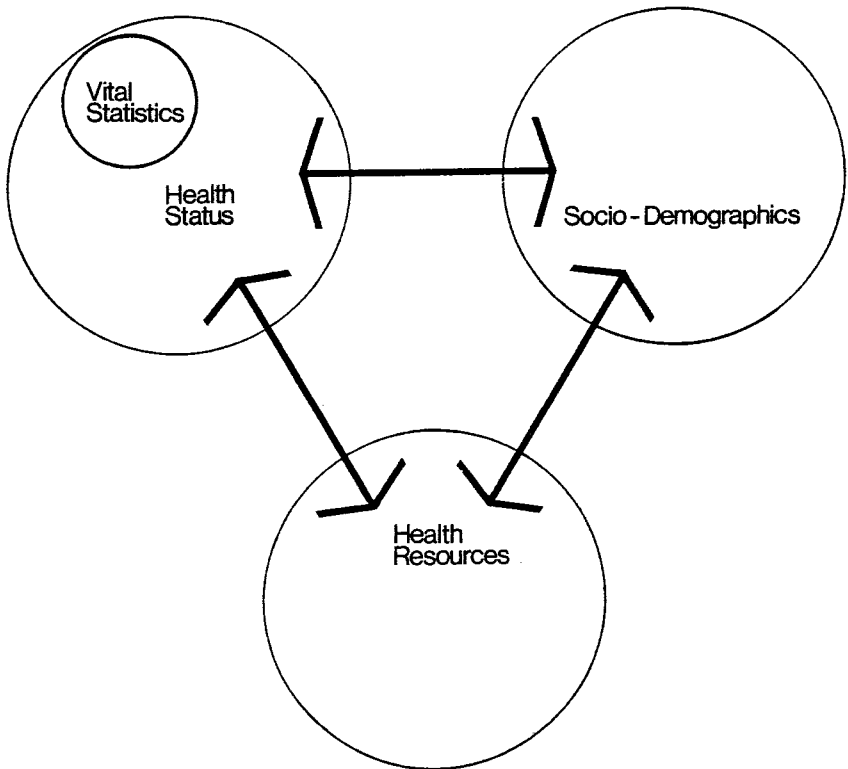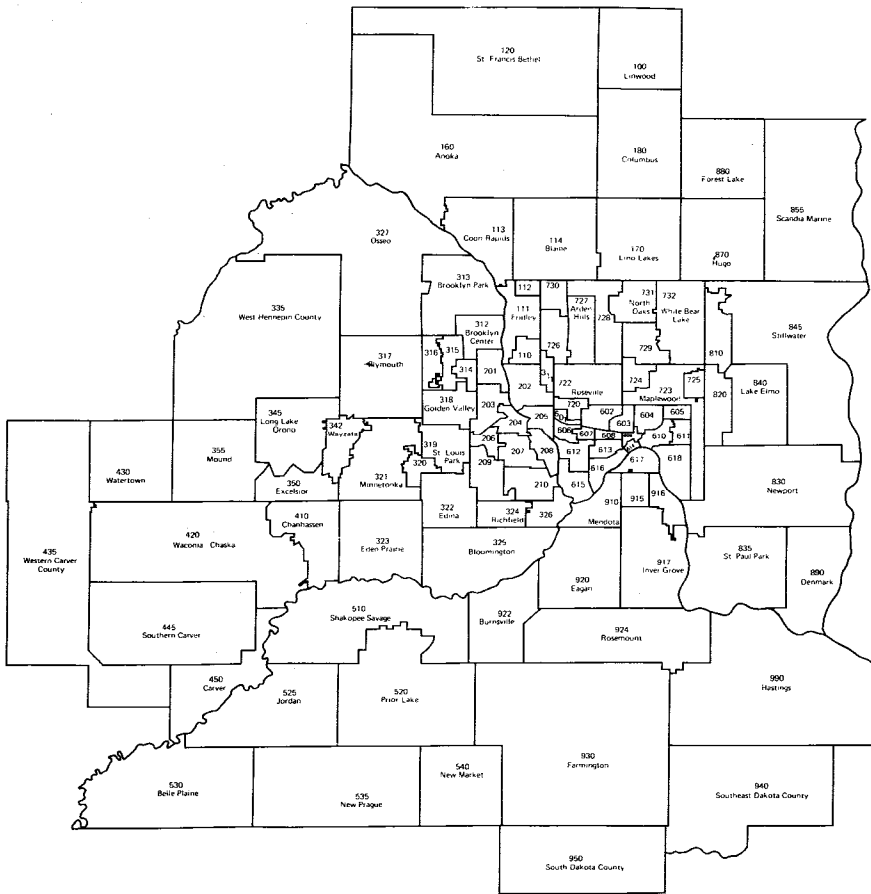The three Shevky-Bell indexes were revised to be more sensitive to differ-

FIGURE 1: Model Showing Interactions Among Three Components of the Health System

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ences among neighborhoods in the Twin Cities Metropolitan region. These revised indexes were referred to as: 1) education-occupation, 2) urbanization, and 3) race-ethnicity. Other socio-demographic dimensions which have a particular impact on the health services system were identified. They include: 1) age, 2) income, 3) population growth, 4) population density, 5) stability, 6) housing conditions, 7) unemployment, and 8) persons living alone.

ANOKA COUNTY
110 Columbia Heights
112 Spring Lake Park

HENNEPIN COUNTY-Mpls
201 Camden
202 Northeast
203 Near North
204 Central
205 University
206 Calhoun-Isles
207 Powderhorn
208 Longfellow

209 Southwest
210 Nokomis

HENNEPIN COUNTY-Suburbs
311 St. Anthony
314 Robbinsdale
315 Crystal
318 New Hope
320 Hopkins
326 Fort Snelling Area

RAMSEY COUNTY-St. Paul
601 St. Anthony Park

602 Como Park
603 Rice Street
604 Phalen Park
605 Hayden Heights
606 Midway
607 Hamline
608 Thomas-Dale
609 Mt. Airy
610 Daytons' Bluff
611 Hazel Park
612 Macalester
613 Summit-Dale
614 Downtown

615 Highland Park
616 West Seventh Street
617 Riverview
618 Battle Creek

RAMSEY COUNTY-Suburbs
720 Falcon Heights
724 Little Canada
725 North St. Paul
726 New Brighton
728 Shoreview
729 Vadnais Heights
730 Mounds View

WASHINGTON COUNTY
810 West White Bear
820 Oakdale

DAKOTA COUNTY
915 West St. Paul
916 South St. Paul

FIGURE 2: Health Planning Areas of the Twin Cities Metropolitan Region

Socio-Demographic Profile Methodology

For each of these dimensions, a list of possible indicators was selected, primarily from 1970 census data. From this list of possible indicators, one indicator or index was chosen to represent each dimension in the neighborhood profiles. Those indicators selected have been shown repeatedly in past studies to be related to use of the health system and they were of the type that could be ranked. They were, corresponding to the dimensions listed above: 1) education-occupation index, 2) urbanization index, 3) race-ethnicity index, 4) median age, total population, 5) median family income, 6) population growth rate, 1960-1970, 7) population per square mile, 8) percent of population who live in the same house, 1965-1970, 9) housing index, 10) unemployment rate, and 11) percent of total population living in one-person households. An additional widely used index which was also included was a socio-economic status index based on occupation, education and income. The definitions and formulas for these indicators and indexes are given in Figure 3.

Since the data used was from the 1970 census, the age of the data limits its use in some cases. However, it was the most current available data for most areas. It is expected that people using the profiles will consider them as a base and add more recent information as it becomes available for their area. The 1970 data has been computerized so when 1980 census data is available, a trend comparison can be made.

For each of the 105 health planning areas (HPAs), the socio-demographic profile included a list of the 12 profile characteristics, the value of the characteristic for that area, its ranking among the 105 HPAs and the quartile for that HPA. There were two graphs — one which shows the age-sex pyramid of the HPA compared to the regional distribution and the other showing the family income distribution of the HPA compared to the regional distribution. For each HPA, there was also a short description of the area, based on the profile characteristics and which identified other similar HPAs.

Vital Statistics Profile Methodology

The following measures were included in the vital statistics profile: birth rate, fertility rate, illegitimacy rate, prenatal care — none or third trimester, low birthweight rate, immature births, infant mortality rate, age-specific death rate — ages 45-64, age-specific death rates — ages 65 and over and accidental death rate. All of these measures were obtained from the Minnesota State Department of Health. These measures were selected because of their wide use as health measures and because they represent several aspects of health status.

The vital statistics profiles are a step toward developing a more comprehensive health status profile. It is hoped that in the future other types of information such a morbidity, level of functioning, fitness, disease-free or disability-free days and possibly satisfaction with health can be included in the health status profiles.

The vital statistics used were the average values for the years 1972 through 1975. Using four years of data as the base increased the reliability of these measures. Even with four years of data, the figures for the smaller HPAs should be interpreted with caution.

A vital statistics profile was developed for each health planning area (HPA) which gives for each measure the value for that HPA, the comparable value for the Metropolitan Region and the rank for that HPA among the 105 HPAs.

FIGURE 3:   Definitions and Formulas for Socio-Demographic
            Indicators and Indexes

Median age - the age for which exactly half of the population is that
             age or older

Median family income - the income for which exactly half of the families
                       in an area have that income or greater

Education-Occupation index - Take the average of the following 2 percentages:

                        Percent of employed persons 14+ who are
                        professional, managerial, sales, clerical.
                        Percent of persons 25+ who have had 12 or
                        more years education.

Urbanization index - Take the average of the following three values:

                  1.   100 - number of children under 5
                             100 females age 15-44

                  2.   100 - percent of housing units in 1-unit structures

                  3.   Numbers of females in labor force per 100 females
                       16 and over.

Race ethnicity index - Add the following 2 percentages:

                        Percent of persons who are non-white
                        Percent of persons who are foreign-born,
                        other than Western Europe.

Population growth rate - 1970 Total Population
                              1960 Population

Population density - 1970 Total Population
                     Area in square miles

Stability rate - proportion of persons age 5 years and older who lived
                 in the same house in 1970 as they did in 1965.

Proportion of persons living alone - proportion of the total population
                                     who were living in one-person households.

Unemployment rate - Number of persons (both male and female) unemployed
                    Number of persons unemployed and number of persons employed
                    (Do not use person not in labor force as part of the base)

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FIGURE 3 - Continued

Socio-ecomomic status index =

$$\frac{\sum\limits_{n=1}^{5} ES_n EP_n \ + \ \sum\limits_{n=1}^{10} IS_n IP_n \ + \ \sum\limits_{n=1}^{5} OS_n OP_n}{300}$$

where ES_n = education score for the nth educational level category, a "categorical percentile" score

EP_n = proportion of persons in an HPA with nth educational level

IS_n = income score for n^{th} income category

IP_n = proportion of persons in an HPA in n^{th} income category

OS_n = occupation score for n^{th} occupation category

OP_n = proportion of persons in an HPA in n^{th} occupation category

This index can range from 0 to 100.

Housing Index -

Rank HPAs on each of the following variables:

1. Percent of housing units with all plumbing facilities
    1 = lowest percent, 105 highest percent

2. Percent of units with 1.01 or more persons/room
    1 = highest percent, 105 lowest percent

3. Median home value
    1 = lowest value, 105 highest value

4. Median contract rent
    1 = lowest rent, 105 highest rent

5. Percent of households owned
    1 = lowest percent, 105 highest percent

6. Estimated percent of units needing no rehabilitation
    1 = lowest percent, 105 highest percent.

Housing Index = $\frac{R - m}{m(n-1)}$ X 100

Where R = the sum of the 6 ranks referred to above for a given HPA
m = 6, the number of variables involved
n = 105, the number of HPAs.

This index can range from 0 to 100.

An Example of How Profiles May Be Used

An examination of the profile for one HPA will indicate one way these profiles may be used. A Minneapolis neighborhood, Camden, HPA 201, was selected for this example because it was not a typical central city, surburban or rural area, but it did have some distinctive characteristics which have implications for health services in that community. Figures 4 and 5 show the twelve-characteristic profile and the graphs for the Camden area. Figure 6 shows the vital statistics profile for this area.

The most distinctive characteristics of the area (as indicated by a particularly low or particularly high rank among HPAs) were the relatively old median age, high stability rate, high population density and a small negative growth rate. All of these characteristics were indicative of a mature, fully developed neighborhood. Using the three Shevky-Bell indexes, the neighborhood could be characterized as low on the education-occupation index, moderate on the urbanization index and having less then 5% of the population belonging to minority racial or ethnic groups. Based on these indexes, twelve other HPAs were identified as similar to this area. Almost all of these twelve other areas also had a high median age and a high stability rate. The low education-occupation index and relatively large proportion of persons living alone were characteristics which were often associated with areas which had a large proportion of elderly people. The age-sex pyramid in Figure 4 indicated that Camden does have an overrepresentation in all age groups over 45 and an underrepresentation in all age groups under 45 when compared with the entire Metropolitan age distribution.

Because there was a large proportion of elderly people in this area, there will be a relatively high need for health services. The combination of a large proportion of elderly people with a relatively low income and education level indicated a population which is often associated with a reluctance to seek service. The relatively large percent of persons living alone suggested a potential need for home care services and for transportation to other sites of service.

The vital statistics profile for Camden (see Figure 6) shows a relatively low birth rate and moderate fertility rate. This is a good example of how, in an area where a large proportion of the population is not of child-bearing age, these two measures can give different information. On all four birth risk measures — illegitimacy rate, lack of prenatal care, low birthweight rate and immature births, Camden had a higher than average rate. This indicated a possible need for improved maternal and child health services. The infant mortality rate, as well as the other mortality rates, was moderate. This suggests the problem that there is in using *only* the infant mortality rate as a measure of need for maternal services. These observations provide one example of how the profiles may be used. It was expected that the pieces of information in the profiles which are of most use will vary from user to user.

Conclusion

The development of neighborhood profiles provides a foundation for any type of needs assesment. The socio-demographic characteristics and health status of a population are the major determinants of both the needs and the demand for health services. A knowledge of these characteristics also enables one to plan for or deliver care in a manner which is sensitive to the needs of

Social and Demographic Profile

Camden
HPA 201

Hennepin County-
Minneapolis

		Value	Rank Among 105 HPAs	Quartile
1.	Median Age	31.74	99	IV High
2.	Median Family Income	$10,523	30	II Medium Low
3.	Education-Occupation Index	46.08	24	I Low
4.	Urbanization Index	39.82	50	II Medium Low
5.	Race-Ethnicity Index	2.68%	74	Less than 5%
6.	Population Growth rate, 1960-1970	-7.67%	11	I Low
7.	Population per Square Mile	7,062	92	IV High
8.	Stability Rate, same house, 1965-1970	63.05%	93	IV High
9.	Proportion of persons living alone	5.84%	84	IV High
10.	Unemployment rate, 1970 Census	3.10	51	II Medium Low
11.	Socio-economic status	41.30	24	I Low
12.	Housing Index	37.82	32.5	II Medium Low

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FIGURE 5: Age-Sex Pyramid and Income Distribution Graph, Camden Area

Age-Sex Distribution of
HPA 201 Camden
compared to Metropolitan Regional Distribution
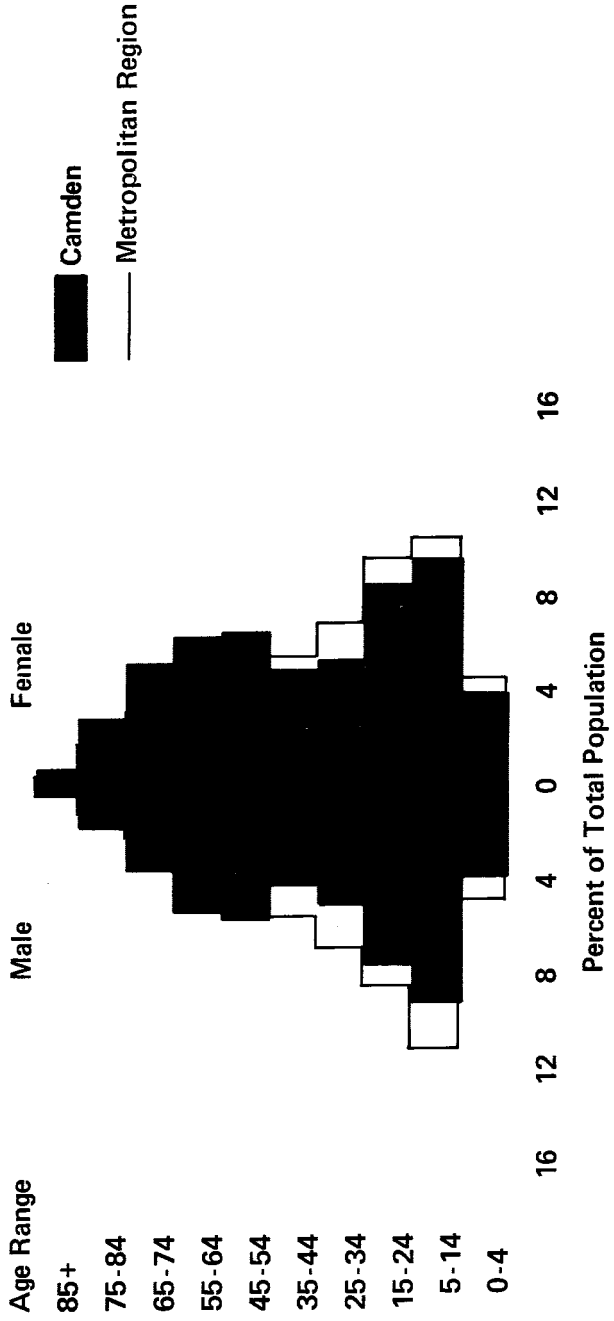
Camden

Metropolitan Region

Family Income Distribution of
HPA 201 Camden
compared to Metropolitan Regional Distribution

Camden

Metropolitan Region

Percent
of Families

50

40

30

20

10

0

0-6   6-10 10-15 15-25   25+

Family Income
in $1,000's

67
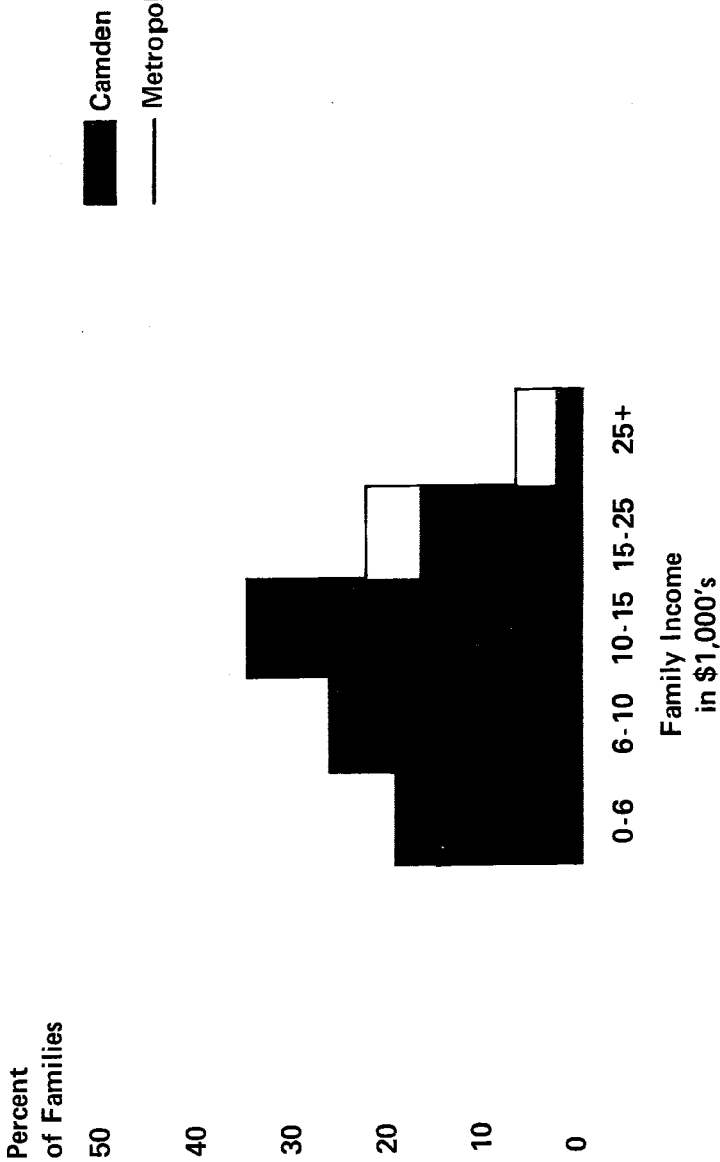
specific population groups.

The profile methodology provides for the reduction of a large amount of information that can be known about a neighborhood to a small number of sensitive indicators which most adequately describe a given area. By concentrating on a relatively small number of indicators, not only is it possible to get a clearer picture of a given neighborhood, but it is also possible to more easily compare and contrast across several neighborhoods.

Suggestions for Additional Analyses

This work suggested a need for at least two types of further analyses. One was the development of a more comprehensive health status profile. It was hoped that eventually data on morbidity, level of functioning, fitness, disease-free or disability-free days and possible satisfaction with health state can be combined with vital statistics in a health status profile.

This work also demonstrated the need for further examination of the relationship among health status, use of health resources and socio-demographic characteristics. The intent of the health care delivery system is to improve the health status of the population. However, health status is determined by human biology, lifestyle and environment at least as much as, if not more than, by use of the health care delivery system [1, 2]. General socio-demographic characteristics partially describe human biology and are important factors in determining lifestyle and environment. Thus, a more complete model which shows the relationships among health status, health resources and socio-demographic characteristics is needed in order to determine the most effective approaches to improving health status of the population.

FIGURE 6:   Vital Statistics Profile, Camden Area

Vital Statistics Profile

Camden
HPA 201

Hennepin County –
Minneapolis

	HPA Value	Rank Among 105 HPAs	Metropolitan Value
Birth Rate	11	22.5	14
Fertility rate	63.9	41	65.7
Illegitimacy rate	12.0	88	10.9%
Prenatal care - none or third trimester	4.9%	75	4.7%
Low birthweight rate, $\leq$ 2500 grams	7.1%	85	6.0%
Immature births, <37 weeks gestation	8.4%	78	7.5%
Infant mortality rate	14.7	54	14.7
Age-specific death rate, ages 45-64	84.8	55	89.3
Age-specific death rate, ages 65 and over	595.4	59	576.0

Accidental death rate   Medium High Quartile

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