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# **White Paper on Income and Health**

**Minnesota Department of Health**

March 3, 2014

## **Income and Health**

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## **What is health?**

Health is defined as a state of complete physical, social and mental well-being and not merely the absence of disease or infirmity. Health is generated through the complex interaction of individual, social, economic, and environmental factors and the systems, policies, and processes encountered in everyday life. These factors include job opportunities, income, transportation options, quality of housing, food supply, the quality of education, access to health care, civic engagement, and availability of networks of social support.

Each of the factors contributing to health has an effect on the others. For example, income plays a strong role in health outcomes but it also influences other factors that affect health, such as transportation options, housing, nutrition and healthy foods, education, and future job opportunities. Most often, no single factor is predictive of an outcome because the outcome is a result of the interaction of many of these factors. Racism and discrimination compound the health effects of these social and environmental factors by limiting opportunities and by contributing a significant source of stress to everyday life.

This white paper presents research and data on income and poverty in Minnesota and documents the relationship between total household income (or proxy measures of income) and indicators of health. For the purposes of this paper, income is defined as the amount of money individuals receive in exchange for providing a good or service, while wages are defined as the fixed regular payments made by an employer to an employee.

## **1. Income as a Contributing Factor to Health**

For individuals, income is one of the strongest and most consistent predictors of health and disease in public health research literature (Yen 2002). Research finds that people with higher incomes generally enjoy better health and live longer than people with lower incomes. The relationship between income and health consistently (although not invariably) appears as a gradient, with the poor experiencing the worst health, but also where the health of those with modest incomes is worse than the health of those with the highest incomes (Kitagawa EM 1973) (Pappas G 1993) (Kawachi I 1999) (Minkler M 2006) (Kanjilal S 2006) (House JS 1994) (Braveman PA 2010) (Finch 2003). In other words, on average, the more money you make, the better your overall health (National Bureau of Economic Research 2003).

The relationship of socioeconomic status (measured variously by education, income or occupation) to health has been documented for many years (Krieger N 1996) (Marmot MG 1991). From an early focus on mortality (Kitagawa EM 1973) (Pappas G 1993) (Hahn 1996), research expanded to document the relationship between socioeconomic status and health status, disability, chronic conditions, and health risk behaviors (Kawachi I 1999) (Minkler M 2006) (Kanjilal S 2006) (House JS 1994) (Braveman PA 2010).

This relationship between health and income is not just about individual access to medical care, but how income affects a range of individual and community opportunities for health. Individuals and communities with higher incomes are more likely to have safe homes and neighborhoods, full-service grocery stores with healthy foods, safe spaces for physical activity, and high-quality schools (Marmot M 2001). As a result, those with higher incomes are more likely to live longer, healthier lives while those living in communities of poverty face conditions that lead to poor health including unsafe housing, lack of access to nutritious foods, less leisure time for physical activity, poorer education and more overall stress (Santa Clara County Public Health 2011).

Stress is another mechanism through which low income contributes to poorer health. Chronic stress results in constant elevations of cortisol and adrenal hormones, which lead to chronic inflammation. (Seeman 2010) Chronic inflammation underlies most of the diseases of modern life, such as cancer, hypertension, diabetes, heart disease, and stroke. Low income during childhood is correlated with poor cognitive and socio-emotional development (Cooper 2013) and poorer adult health (Cohen 2010).

Scientific literature confirms this persistent connection between low income and poor health. A summary of key findings from numerous studies include the following (Kaplan 2009) (Kaplan GA 1987):

- While health generally improves with increasing income, the health impacts are much stronger for those at the lowest end of the income spectrum;
- The vast majority of diseases are much more common among the poor and near-poor (less than 50 percent above the poverty line) at all ages; and
- Poverty leads to faster progression of diseases, as well as more complications and poorer survival rates.

The health effects of poverty accumulate over the years, leading to poorer health and shorter lives. For children, the impact of wealth on health is cumulative, and the greater proportion of life a child spends at the upper end of the income spectrum, the more benefits accrue. Children from affluent families are more likely to grow up in a house owned by their parents and to live in a neighborhood with healthy food options, safe places to play, good schools, libraries, and other quality public services that help set them on the path to a successful, healthy life. Children from less affluent families lack these advantages and are more likely to experience conditions that limit their health such as injuries, inadequate or delayed health care, physical inactivity, poor nutrition, insecure or substandard housing, and exposure to toxins, high lead levels, and violence (California Newsreel 2008).

The direction of association between income and health (that is, whether health affects income or income affects health) is bi-directional. Multiple studies clearly document that changes in economic resources result in changes in health (Robert Wood Johnson Foundation Commission to Build a Healthier America 2011) (Smith 1999), while other studies indicate poor health can lead to the loss of economic resources through reduced employment opportunities and/or the burden of medical care expenses.

## 2. Income and Poverty in Minnesota

Median income is the level of income that divides the income distribution of a population into two equal groups, with half of households earning less that amount and half earning more than that amount. Median household income includes the incomes of all members of a household and is used as an indicator of the relative wealth of an area or population. This indicator reflects the ability for that household to afford aspects of a healthy lifestyle (United Health Foundation 2013). In 2012, the median household income for Minnesota was \$58,906, slightly higher than median household income for the United States, which was \$51,371. Table 1 shows that median household incomes for African American, American Indian and Hispanic households in Minnesota were significantly lower (sometimes less than half) than that of Whites and Asians.

**Table 1: Median household income by race/ethnicity, Minnesota 2012**

Population Group	Income
Total	\$58,906
Asian	\$65,959
White	\$61,220
Hispanic/Latino	\$41,718
American Indian	\$32,153
Black or African American	\$28,136

Source: U.S. Census, American Community Survey, 2012 Table S1903

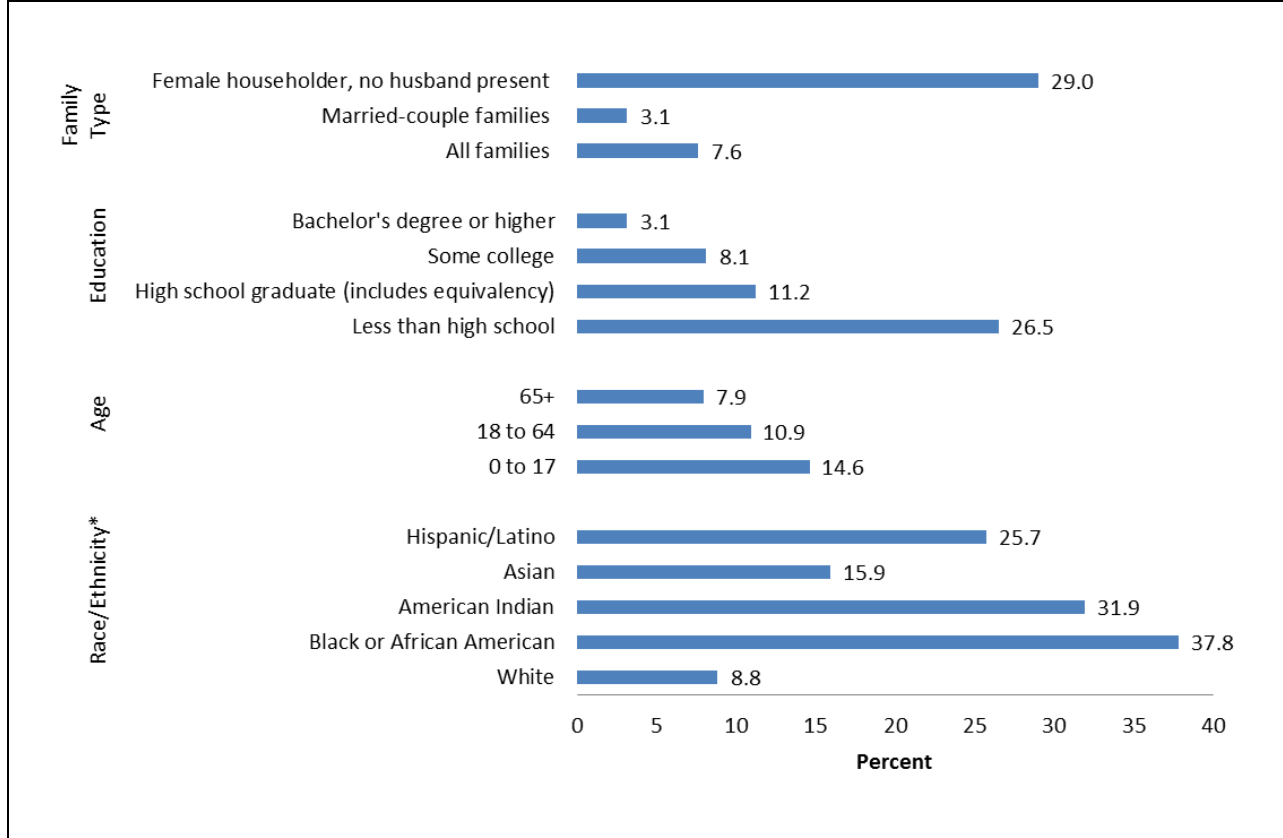
In 2012 inflation-adjusted dollars

Race is alone, not in combination with other race groups, Hispanics are included with Whites

Hispanic/Latino can be any race

Income and asset limits are often defined in terms of a percent of the federal poverty level. Income and asset limits set by the state governments (within some federal constraints) establish eligibility for food support programs such as WIC (Supplemental Nutrition Program for Women, Infants, and Children) and public cash assistance programs such as MFIP (Minnesota Family Investment Program), which combines federal TANF (Temporary Assistance for Needy Families) and state funds to support families. In 2012, the U.S. Census set the poverty threshold for a family of four at \$23,492. Figure 1 provides the percent of groups that live at or below the poverty level in Minnesota and demonstrates that poverty in Minnesota is not evenly distributed across racial/ethnic groups, ages or educational levels. Poverty is concentrated among populations of color, children, people with less education, female headed households and rural Minnesotans.

**Figure 1: Percent living in Poverty by Family Type, Education, Age and Race/Ethnicity Minnesota 2012**



Source: U.S. Census, American Community Survey, 2012 Tables S1701 and S1702

\*Race is alone, not in combination with other race groups, Hispanics are included with Whites, Hispanic/Latino can be any race

### Poverty among Populations of Color and American Indians

According to the 2012 American Community Survey, an estimated 11.4 percent of all Minnesotans live in poverty, compared to 15.9 percent for the U.S. population. Table 2 indicates that poverty rates for populations of color and American Indians are two to four times higher than the rate for Whites. More than 25 percent of African Americans, American Indians and Hispanics in Minnesota live in poverty, compared to 8.8 percent of Whites. The White population is the only racial group in Minnesota with a lower poverty rate than the group’s corresponding national rate.

**Table 2: Estimated Percent Living in Poverty by Race/Ethnicity, Minnesota and United States 2012**

Population	Percent	
	MN	U.S.
White	8.8	13.0
Asian	15.9	13.0
Hispanic/Latino	25.7	25.4
American Indian	31.9	29.1
Black or African American	37.8	28.1

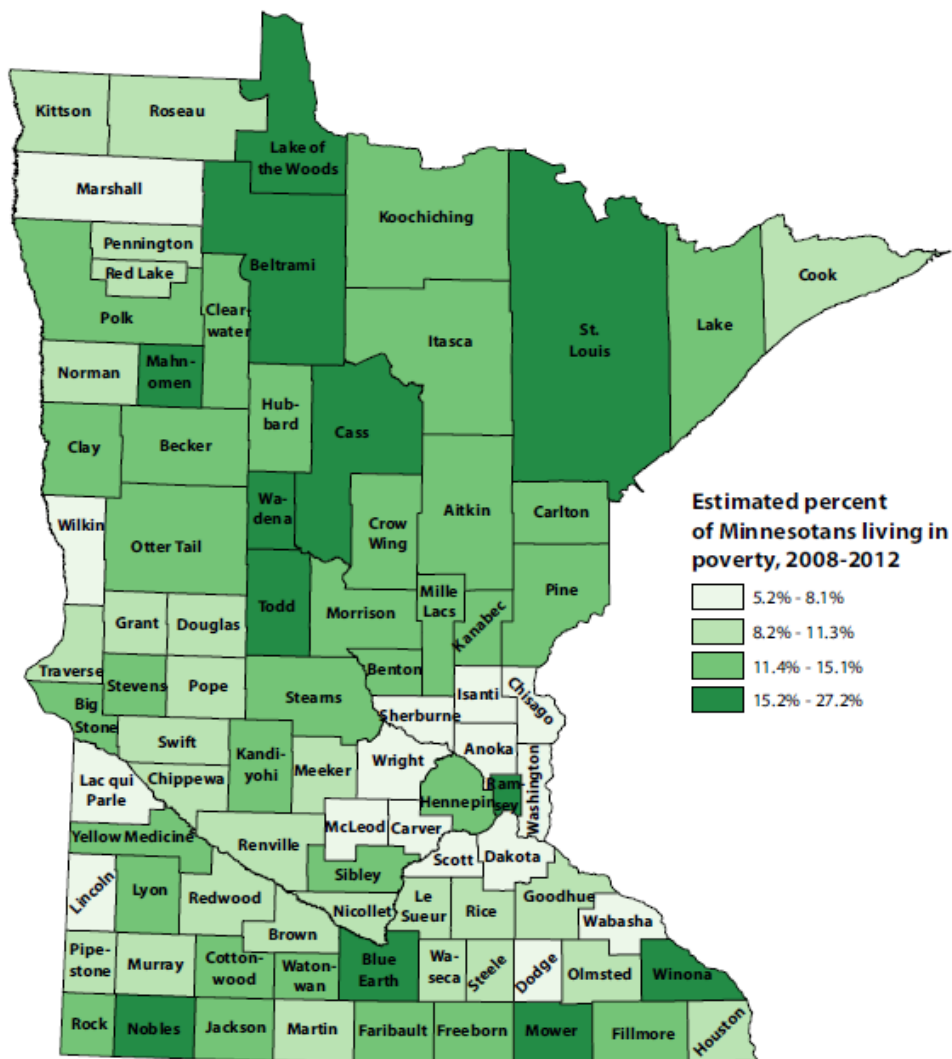
Source: U.S. Census, American Community Survey, 2012 Table S1701

Race is alone, not in combination with other race groups, Hispanics are included with Whites  
Hispanic/Latino can be any race

## Poverty by County

County-by-county data indicate wide variations in the percentage of the population living in poverty. Mahnomen County had the highest rate of its population living in poverty (27.1 percent), while Scott County and Carver County had the lowest rate at 5.2 percent (See the Data Appendix for poverty rates for all Minnesota counties). Counties with the highest percent of people living in poverty were primarily rural counties, with Ramsey County as an exception (Figure 2). The lowest rates of poverty were found in metro area suburban counties.

**Figure 2: Percent in Poverty, Minnesota Counties 2008-2012**



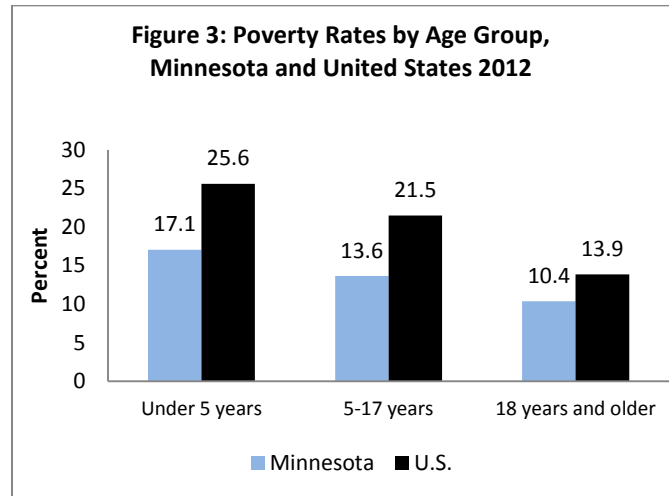
Map date: 2/12/2014  
Data source: U.S. Census Bureau, 2008-2012 American Community Survey (Table S1701)





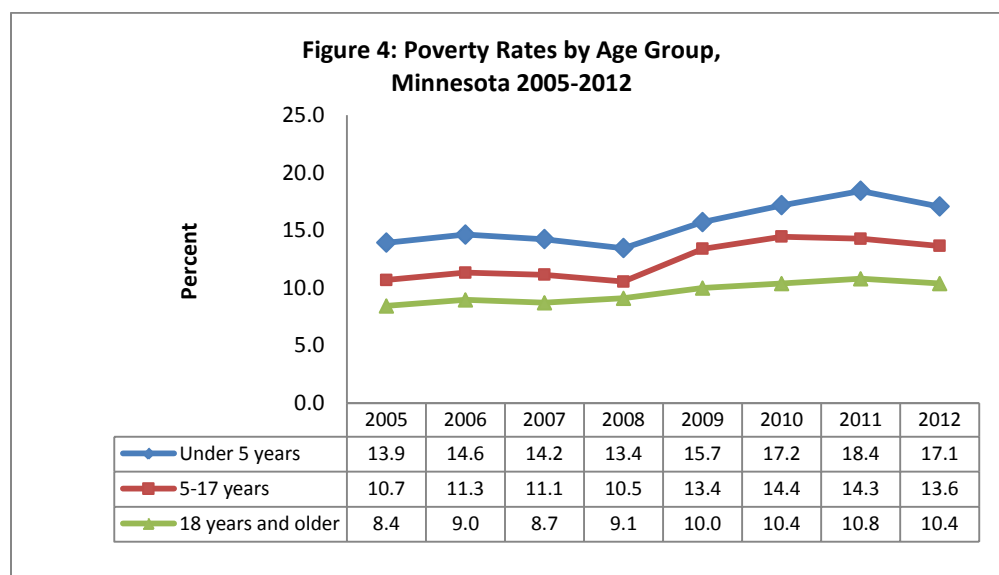
## Children in Poverty

Living in poverty is a challenge for anyone but is particularly troublesome for children, as poverty has been shown to be a significant contributor to physical and social development, school success, and health outcomes. In both Minnesota and the U.S., children under 18 years of age are more likely to live in poverty than adults (Figure 3). In 2012, 17.1 percent of Minnesota children under years of age lived in poverty compared to 13.6 percent of children between the ages 5 and 17 years and 10.4 percent for those 18 years and older.



Source: U.S. Census, American Community Survey, 2012 Table B17001

Figure 4 demonstrates that poverty rates for Minnesota children have been trending up during the last 8 years. From 2005 to 2011 poverty rates for children increased during the latter part of the prior decade. Between 2011 and 2012 poverty rates for all age groups declined slightly. The poverty rates among children remained consistently higher than the rates for adults 18 years and older.



Source: U.S. Census, American Community Survey, 2012 Table B17001

Data in figures 3 and 4 demonstrate that children less than 5 years of age are more vulnerable to poverty than other age groups. Children of color are at even higher risk of living in poverty. In Minnesota, African American, American Indian and Hispanic children less than 5 years of age are three to four times as likely to live in poverty compared to White children.

**Table 3: Estimated Percent of Children under 5 years of Age Living in Poverty by Race/Ethnicity, Minnesota 2012**

Population	Percent
White	12.3
Asian	16.9
Hispanic/Latino	39.0
American Indian	45.5
Black or African American	43.7

Source: U.S. Census, American Community Survey, 2012 Table B17001

Race is alone, not in combination with other race groups, Hispanics are included with Whites  
Hispanic/Latino can be any race

## Working Poor

The working poor are defined as people who spend 27 weeks or more in a year “in the labor force” either working or looking for work but whose incomes fall below the poverty level. Poverty despite work affects thousands in Minnesota. Through a methodology that identified a family “basic needs” budget - above poverty, but well below middle-class – Eilers (2006) determined that in both the metro and rural areas of Minnesota, about 27 percent of families with children under 18 years old and with at least one child in childcare are not meeting basic needs. This equates to a total of nearly 175,000 struggling families in Minnesota (Eilers 2006). While an analysis of the demographics of minimum wage workers is not included in this report, the effects of low wages on communities are important when examining income and health. There are whole communities of people working for minimum wage, people trying to support families – including immigrants and refugees, single mothers, people of color and American Indians. The effect of low wages is especially profound for children growing up in poverty. Research on early brain development has indicated a connection between the daily stress of poverty on parents and the negative effects on the lifetime health of children. This has enormous implications for the health care and other economic costs to individuals, communities and society. Low wages often means working more hours, which means limited parenting time, parental stress trying to make ends meet, limited access to family recreation, and negative impacts on the collective life of the community – including limited opportunities for civic engagement (MDH Office of Performance Improvement 2010). These issues are compounded for single parents.

## 4. Income and Health in Minnesota

Minnesota data also demonstrate a link between income and health. The narrative and accompanying figures in this section provide several examples of the relationship between health and income\*. These examples indicate that this relationship between income and health can be seen throughout life. Higher incomes are consistently associated with increased life expectancy, lower rates of disabilities, lower rates of chronic physical and mental health conditions, lower rates of certain behaviors that can compromise health, and greater access to health insurance and health care.

*In Minnesota, people with higher incomes are more likely to:*

*Live longer*

*Receive adequate prenatal care*

*Be insured*

*People with lower incomes are more likely to:*

*Have fair or poor health*

*Have an infant die in their first year of life*

*Have diabetes*

*Seriously consider suicide*

In Minnesota, people with higher incomes are more likely to:

- Live longer. As found elsewhere (Kitagawa EM 1973) (Pappas G 1993), a gradient pattern exists for the relationship between income and life expectancy in Minnesota (Figures 5 and 6). The figures show life expectancy increases in a stepwise fashion as income increases, with the greatest changes at the lower levels of income. At the extremes, Minnesotans who live in Twin Cities zip codes with the highest median household income live an average of 8 years longer than those who live in zip codes with the lowest median household income (Figure 5) (Wilder Research 2012). An almost identical pattern exists for residents of St. Louis County, where the difference in life expectancy between the highest and lowest income areas is an average of nearly 7 years (St. Louis County Public Health and Human Services 2014) (Figure 6).
- Receive adequate prenatal care. The 2006-2010 Minnesota Pregnancy Risk Assessment and Monitoring Survey reported that 88.2 percent of pregnant women with yearly incomes of \$50,000 or higher received adequate or intensive prenatal care, as compared to 67.9 percent of pregnant women who earn less than \$10,000 (Figure 7).
- Be insured. The 2011 Minnesota Health Access Survey indicated that 3.4 percent of Minnesotans with income greater than 400 percent of federal poverty guidelines were uninsured compared to more than 22 percent for those whose incomes were at or below 200 percent of poverty (Figure 8).

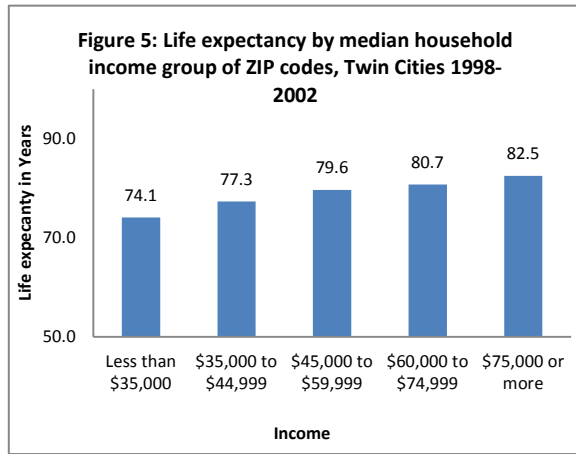
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\* Measures of income and poverty frequently vary across data source; proxy measures are sometimes used when income data are not available. In this document when income was not available in the data source other proxy measures were used. Please see the appendix for a complete description of these proxy measures.

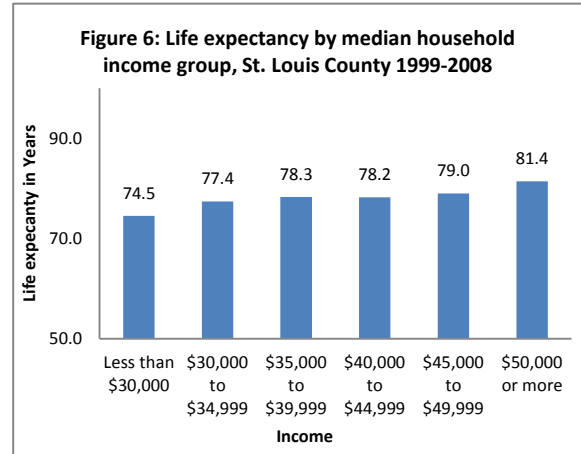
In contrast, Minnesotans with lower incomes are more likely to:

- Have an infant die in the first year of life. In 2006-2010 Minnesota infants born to women with a high school education (a proxy measure for income) or less are 1.7 times more likely to die than infants born to women with a college education (Figure 9).
- Report that their health is fair or poor. 3.1 percent of adult respondents (18-64 years) to the 2011 Behavioral Risk Factor Surveillance System (BRFSS) survey who earned \$75,000 or more reported their general health to be fair or poor, compared to 26.8 percent for those who earned less than \$20,000 (Figure 10).
- Report having diabetes. 9.5 percent of adult respondents (18-64 years) to the 2011 BRFSS who earned less than \$20,000 reported that a doctor has told them that they have diabetes, as compared to 4.0 percent for those who earned \$75,000 or more (Figure 11).
- Report having seriously considered attempting suicide. According to the 2013 Minnesota Student Survey, 16.3 percent of 9th grade students who receive free or reduced-priced lunch (another proxy measure for income) report having seriously considered suicide in the past year, compared to 10.6 percent of 9th graders who do not receive free or reduced-priced lunch (Figure 12).

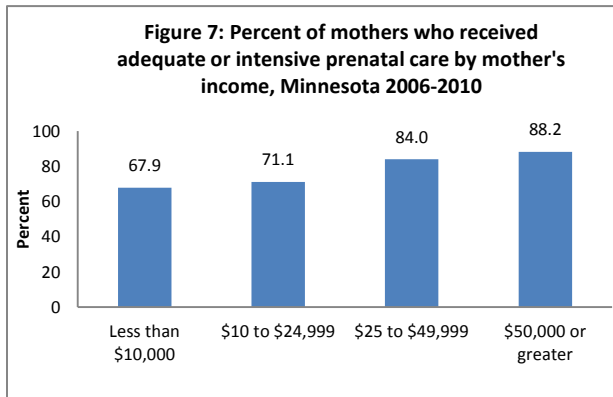
## Selected Health and Income Figures†



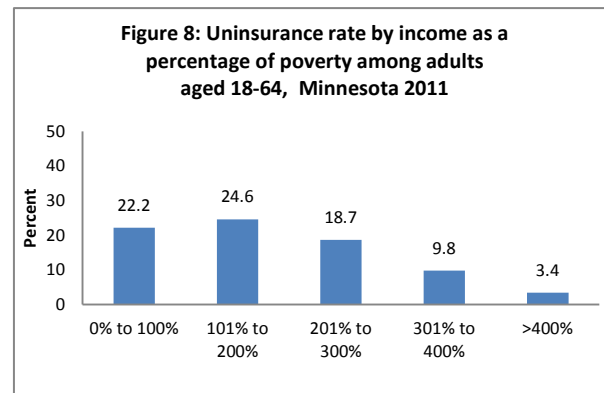
Source: The unequal distribution of health in the Twin Cities, Wilder Research [www.wilderresearch.org](http://www.wilderresearch.org). Analyses were conducted by Wilder Research using 1998-2002 mortality data from the Minnesota Department of Health and data from the U.S. Census Bureau (population, median household income, and poverty rate by ZIP code).



Source: St. Louis County Health Status Report, St. Louis County Public Health and Human Services. Analyses were conducted by St. Louis County staff using 1999-2008 mortality data from the Minnesota Department of Health and data from the U.S. Census Bureau (population, median household income, and poverty rate by ZIP code).

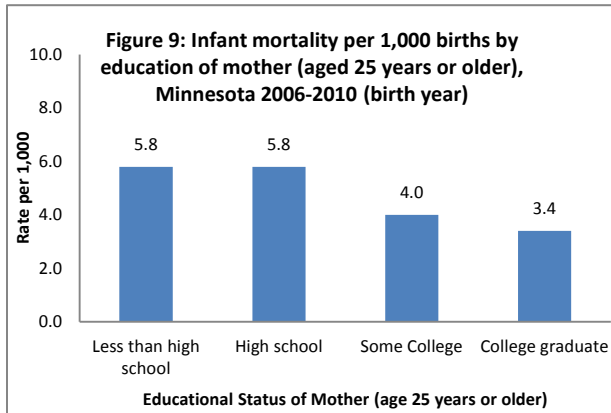


Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health. This data was made possible by grant number IU01DP003117-01 from the Centers for Disease Control and Prevention. Adequacy of prenatal care is measured by GINDEX.

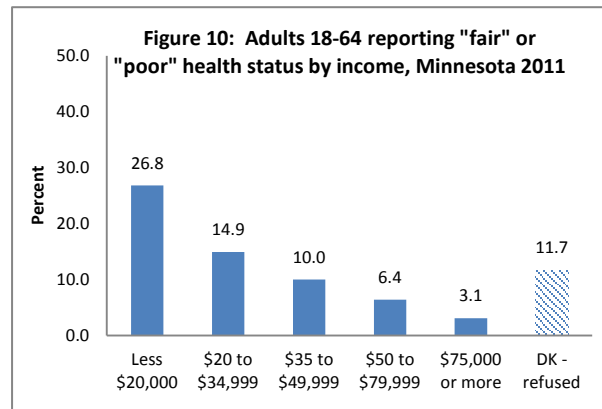


Source: MDH Health Economics Program and University of Minnesota School of Public Health, Minnesota Health Access Surveys.

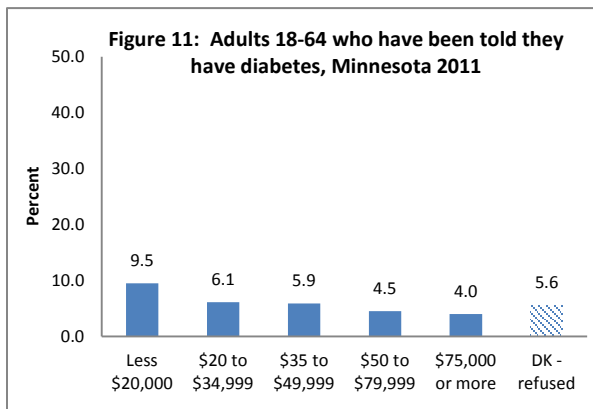
† Each figure in this section shows statistically significant differences in health by income (chi-square tests,  $p < .05$ ).



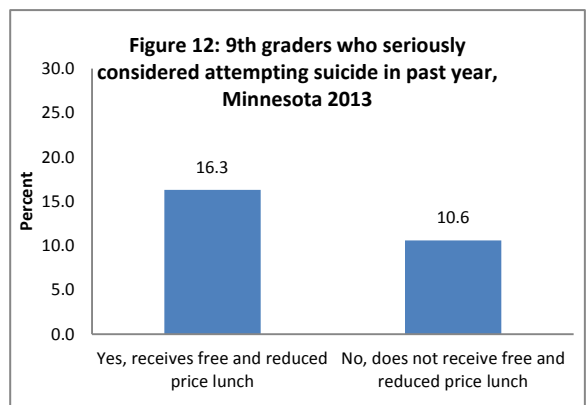
Source: MDH, Center for Health Statistics, Linked Birth/Infant Death Records



Source: 2011 Behavioral Risk Factor Surveillance System



Source: 2011 Behavioral Risk Factor Surveillance System



Source: 2013 Minnesota Student Survey

The gradient pattern frequently seen in the data illustrates that each successive step of higher income is associated with better health outcomes. As other research has found, however (McDonough P 1997) (House JS 1994), the relationship is not necessarily linear; the magnitude of improvement in health varies for each step increase in income. An analysis of selected outcomes from the Minnesota BRFS found that the difference in health between the lowest and the second lowest income groups is often larger than the difference between other adjacent income groups. For example, Figure 8 illustrates that 9.5 percent of those in the lowest income group and 6.1 percent in the next highest income group had been told that they had diabetes – a 35.8 percent decrease between groups. From the second lowest income group, successive percent changes between adjacent income groups are 3.3 percent, 23.7 percent, and 11.1 percent, respectively – all smaller than the percent change between the lowest two income groups.

## 5. Conclusion

Numerous studies document a strong relationship between income and health. Consistent with national and international studies, Minnesota data also indicate that income is closely related to health. Furthermore, the relationship between income and health occurs in a stepwise gradient pattern where lower income is closely related to poor health (i.e., the lower the income, the poorer the health) and conversely higher incomes are related to positive health outcomes (i.e., higher income equals better health). In addition, low incomes in Minnesota are more concentrated among populations of color and American Indians, persons with less education, those living in rural counties, families with children, and female-headed households.

The association of lower income with poorer health suggests policies that contribute to increasing income levels, especially among the lowest income groups where improvements in health are most evident in this review, would be expected to have a positive impact on the health of these groups. In addition, any discussion of the relationship between income and health must acknowledge that income is not only strongly associated with health, but also is associated with other factors that create the opportunity to be healthy, such as employment opportunities, transportation options, and quality of housing – all of which deserve consideration by policy makers as we seek to create a Minnesota where the opportunity to be healthy is available everywhere and to everyone.

## Bibliography

- Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. "Socioeconomic disparities in health in the United States: what patterns tell us." *Am J Public Health* 100, no. Suppl 1 (2010): S186-S196.
- California Newsreel. *Backgrounders from the unnatural causes health equity database*. 2008. <http://unnaturalcauses.org/assets/uploads/file/primers.pdf>.
- Cohen, S, Janicki-Deverts, D, Chen E, Matthews, KA. "Childhood socioeconomic status and adult health." *Annals of the New York Academy of Science* 1186 (2010): 37-55.
- Cooper, K, Stewart K. "Does money affect children's outcomes?" *Joseph Rowntree Foundation*. October 2013. [www.jrf.org.uk](http://www.jrf.org.uk) (accessed February 21, 2014).
- Eilers. *What percent of Working Families in Minnesota do not earn sufficient income to meet basic needs?* St. Paul: Research and Policy Director of Growth and Justice, 2006.
- Finch, BK. "Early origins of the gradient: the relationship between socioeconomic status and infant mortality in the United States." *Demography* 12 (2003): 675-699.
- Hahn, RA, Eaker ED, Barker ND, Teutsch, SM, Sosniak WA, Krieger, M. "Poverty and Death in the United States." *Intl Jnl Health Svcs* 26 (1996): 673-690.
- House JS, Lepkowski JM, Kinney AM, Mero RP, Kessler RC, Herzog AR. "The social stratification of aging and health." *J Health Soc Behav* 35 (1994): 231-234.
- Kanjilal S, Gregg EW, Cheng YJ et al. "Socioeconomic status and trends in disparities in four major risk factors for cardiovascular disease among US adults, 1971-2002." *Arch Intern Med* 166, no. 21 (2006): 2348-2355.
- Kaplan GA, Haan MN, Syme SL, Minkler M, Winkleby M. "Socioeconomic status in health." In *Closing the gap: the burden of unnecessary illness*, by Dull HB Amler RW, 125-129. New York: Oxford University Press, 1987.
- Kaplan, GA. *The Poor Pay Moor - Poverty's High Cost to Health*. Robert Wood Johnson Foundation, 2009.
- Kawachi I, Kennedy BP, Glass R. "Social capital and self-rated health: a contextual analysis." *Am J Public Health* 12, no. 8 (1999): 1187-1193.
- Kitagawa EM, Hauser PM. *Differential mortality in the United States: a study in socio-economic epidemiology*. Cambridge: Harvard University Press, 1973.
- Krieger N, Fee E. "Measuring social inequalities in health in the United States: a historical review." *Int J Health Serv.* 26, no. 3 (1996): 391-418.



- Marmot M, Wilkinson RG. "Education and debate. Psychosocial and material pathways in the relation between income and health: a response to Lynch et al." *Br Med J* 12 (2001): 1233-1236.
- Marmot MG, Davey Smith G, Stansfeld SA, Patel C, North F, Head J, et al. "Health inequalities among British civil servants: the Whitehall II study." *Lancet*, 1991: 1387-1393.
- McDonough P, Duncan GJ, Williams D, House J. "Income dynamics and adult mortality in the United States, 1972 through 1989." *Am J Public Health*, 1997: 1476-83.
- MDH Office of Performance Improvement. "Social Connectedness: Evaluating the Healthy People 2020 Framework, the Minnesota Project." July 2010.  
[http://www.health.state.mn.us/divs/opi/resources/db/docs/1007socialconnectedness\\_report.pdf](http://www.health.state.mn.us/divs/opi/resources/db/docs/1007socialconnectedness_report.pdf) (accessed 2 24, 2014).
- Minkler M, Fuller-Thomson E, Guralnik JM. "Gradient of disability across the socioeconomic spectrum in the United States." *N Engl J Med* 355, no. 7 (2006): 695-703.
- National Bureau of Economic Research. "Health, Income, and Inequality: Research Summary." 2003.  
[www.nber.org/reporter/spring03/health.html](http://www.nber.org/reporter/spring03/health.html) (accessed February 5, 2014).
- Pappas G, Queen S, Hadden W, Fisher G. "The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986." *N Engl J Med* [Erratum, *N Engl J Med* 1993;329:1129] (1993): 103-109.
- Robert Wood Johnson Foundation Commission to Build a Healthier America. "RWJF." *RWJF*. 2011.  
[www.rwjf.org/content/dam/farm/reports/issue\\_briefs/2011/rwjf70448](http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2011/rwjf70448) (accessed February 1, 2014).
- Santa Clara County Public Health. "Santa Clara County Public Health." *Health and Social Equity in Santa Clara County*. 2011. [http://www.sccgov.org/sites/sccphd/en-us/Partners/Data/Documents/SHIP%20Report\\_Final.pdf](http://www.sccgov.org/sites/sccphd/en-us/Partners/Data/Documents/SHIP%20Report_Final.pdf) (accessed February 5, 2014).
- Seeman, T, Epel, E, Gruenewald, T, Karlamangla A, McEwen, BS. "Socio-economic differential in peripheral biology: Cumulative allostatic load." *Annal of the New York Academy of Science* 1186 (2010): 223-239.
- Smith, JP. "Healthy Bodies and Thick Wallets: The Dual Relationship between Health and Socioeconomic Status." *Jrnl of Econ Perspectives* Spring (1999): 145-166.
- St. Louis County Public Health and Human Services. *St. Louis County Health Status Report*. Duluth: St. Louis County, 2014.
- United Health Foundation. *America's Health Rankings, Median Household Income*. 2013.  
[www.americashealthrankings.org](http://www.americashealthrankings.org) (accessed February 21, 2014).
- Wilder Research. *Health Inequities in the Twin Cities*. St. Paul: Wilder Research, 2012.

Yen, I, Bhatia R. "How increasing the minimum wage might affect the health status of San Francisco residents: A discussion of the links between income and health, Working Paper." 2002.

## Appendix I: Guide to Measures of Low Income and Poverty

Poverty is a concept primarily but not only associated with low income. Measures of poverty frequently vary across data source; proxy measures are sometimes used when income data are not available.

Below are some of the commonly used measures of poverty and low income:

- Annual earnings. Different data sources use different levels for comparison. For example:
  - Low income = less than \$10,000/year vs. \$50,000 or more/year
  - Low income = less than \$20,000/year vs. \$75,000 or more/year
- Federal poverty guidelines.
  - Poverty = income at or below 200 percent of federal poverty guidelines, compared to income above 400 percent of federal poverty guidelines
- Free or reduced-price lunches.
  - Poverty = students who receive free or reduced-priced lunch vs. those who do not receive free or reduced-priced lunch
- Education as a proxy for income.
  - Low income = persons with no more than a high school education vs. persons with a college education.
- Geographic indicators of income.
  - These measures look at the geographic distribution of income using median household incomes calculated for defined geographic areas, such as zip codes

## Appendix II: Data Tables and Figures

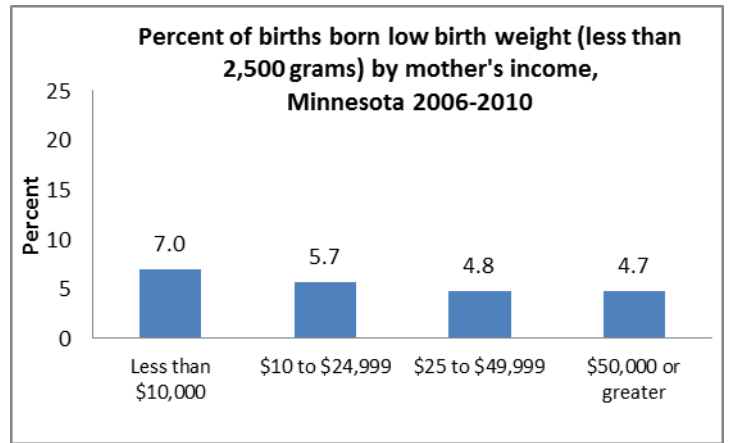
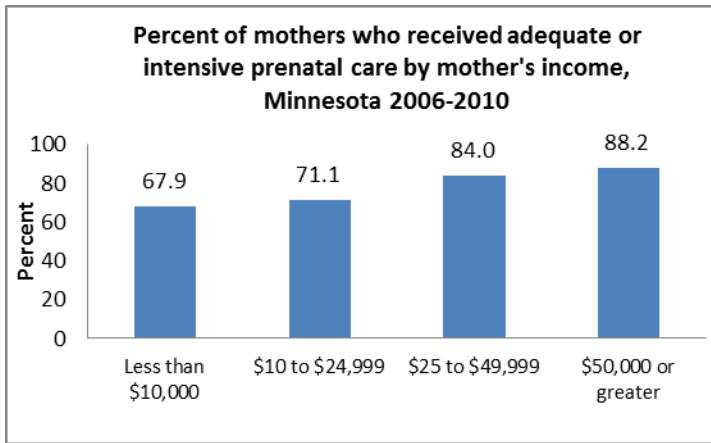
This appendix contains additional tables and figures depicting the relationship between income and health, organized by life stage.

The indicators of health shown illustrate the different dimensions of health, including mortality, general health status, disability, mental health, chronic health conditions and health risk behaviors. This appendix does not show results for *all* of the possible health indicators in each data source; those shown were selected to represent the different topic areas covered by each source.

Income is usually measured by categories of actual household income or by income as a percent of poverty; proxy measures of income such as mother's education or receipt of free or reduced-price lunch are used as a substitute for household income when it is not directly measured in the data set.

It should be noted that the charts and tables in this report are simple descriptions of the relationship between income and health. These relatively simple analyses are only the first step in truly understanding the complex relationship between health and income.

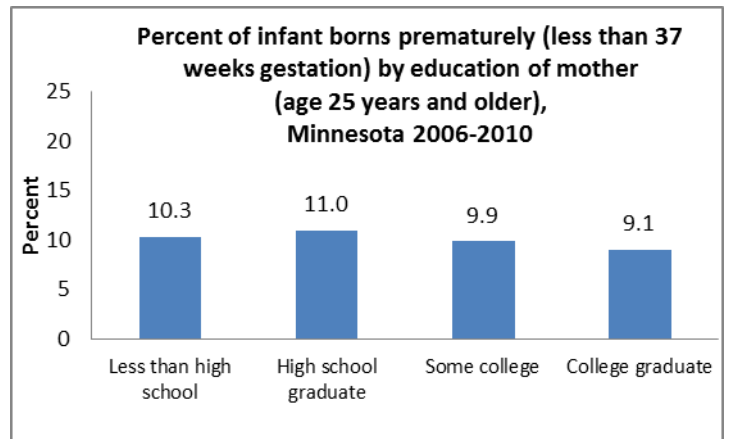
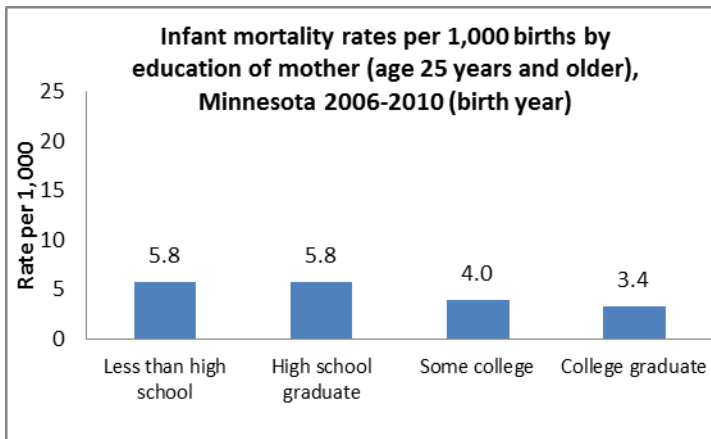
**Infants**  
**Selected Health-Related Indicators by Income Status**  
**(as measured by mother's income)**



Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health. This data was made possible by grant number IU01DP003117-01 from the Centers for Disease Control and Prevention.

Adequacy of prenatal care is measured by GINDEX.

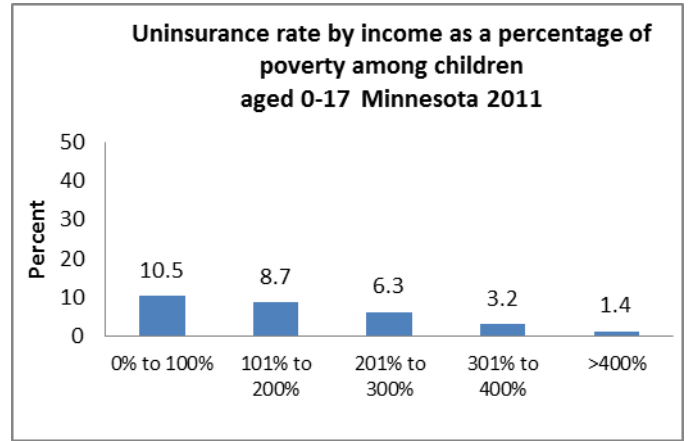
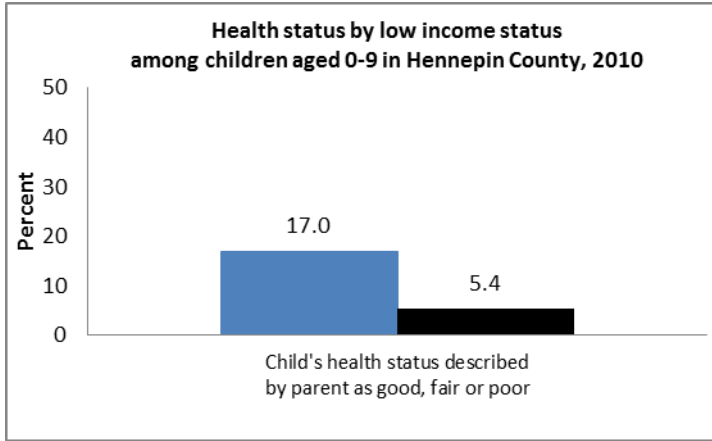
**Selected Health-Related Indicators by Income Status**  
**(as measured by educational status of mothers 25 years old and older)**



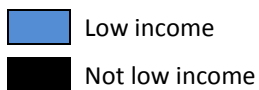
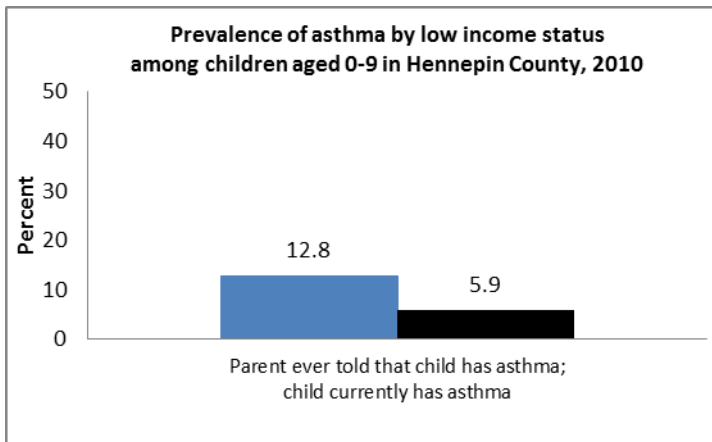
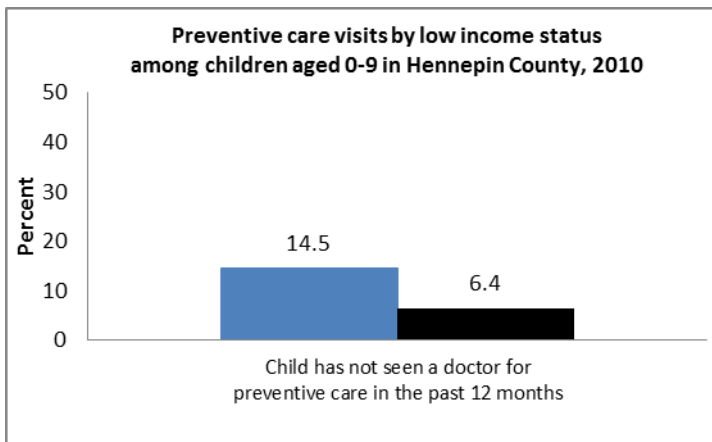
Sources: MDH, Linked birth and infant death records and birth records.  
 College graduates include those who also post college educations.

## Children

### Selected Health-Related Indicators by Income Status



Source: 2011 Minnesota Health Access Survey



Source: Hennepin County SHAPE 2010-Child Survey  
 These income groupings were created by using survey responses to questions about participation in eligibility-based programs and other income-sensitive items.

**Adolescents**  
**Selected Health-Related Indicators by Income Status**  
**(as measured by receipt of free/reduced-price school lunch)**

**Data Table 1: 2013 Minnesota Student Survey indicators by free/reduced-price lunch, 9<sup>th</sup> graders**

<b>Indicator</b>	<b>Free/reduced-price school lunch</b>	
	<b>Receives</b>	<b>Does not receive</b>
Health status reported as good, fair, or poor	43.4	28.1
Have ever been told you have asthma	19.2	16.5
Have ever been told you have diabetes or pre-diabetes	2.9	1.6
Have physical disability or long-term health problem lasting six months or more	17.6	14.7
Have long-term mental health, emotional or behavioral problem lasting six months or more	16.7	11.0
Last saw dentist more than one year ago or never	32.2	12.8
Last saw doctor for a check-up more than one year ago or never	37.4	35.3
Seriously considered attempting suicide in the past year	16.3	10.6
Actually attempted suicide in the past year	6.2	3.2
Has ever had sexual intercourse	23.1	12.1
Overweight OR obese	30.4	19.9
Obese	14.0	7.4
Physically active for at least 60 minutes on fewer than five of the past seven days	58.3	45.5
Drank one or more glasses of pop or soda yesterday	53.3	42.3
Drank one or more glasses of sports drinks yesterday	33.3	34.4
Drank one or more glasses of energy drinks yesterday	16.0	7.9
Drank one or more glasses of other sugary beverages yesterday	60.2	54.4
Smoked cigarettes in the past 30 days	12.3	5.8
Used ANY tobacco products in the past 30 days	15.1	8.7
Number of students	11,606	30,134

Source: 2013 Minnesota Student Survey

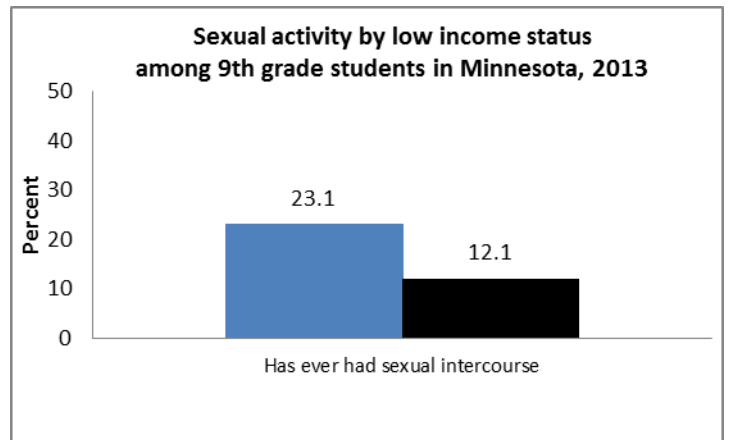
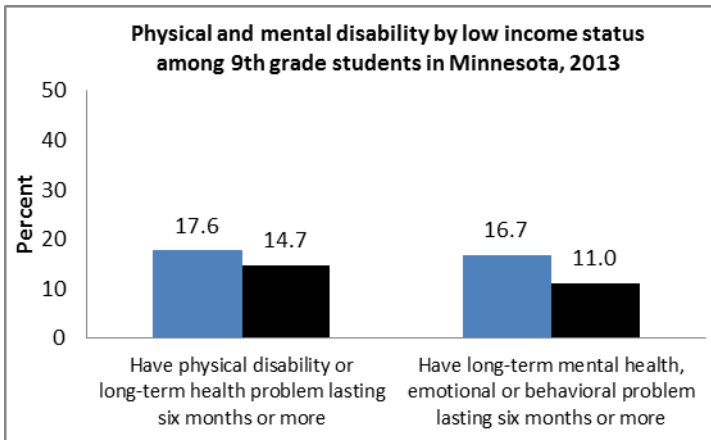
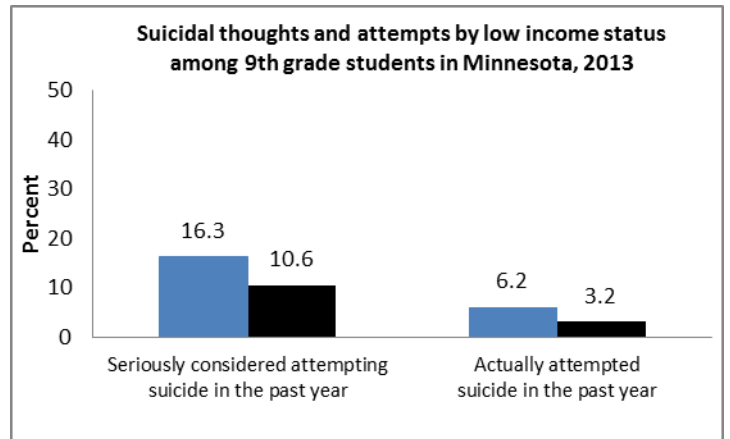
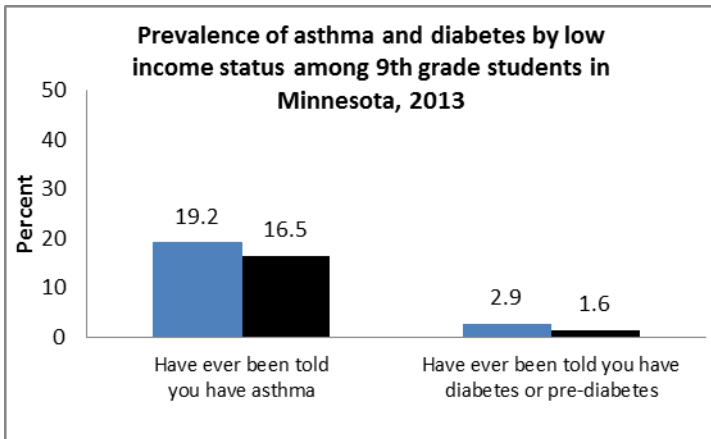
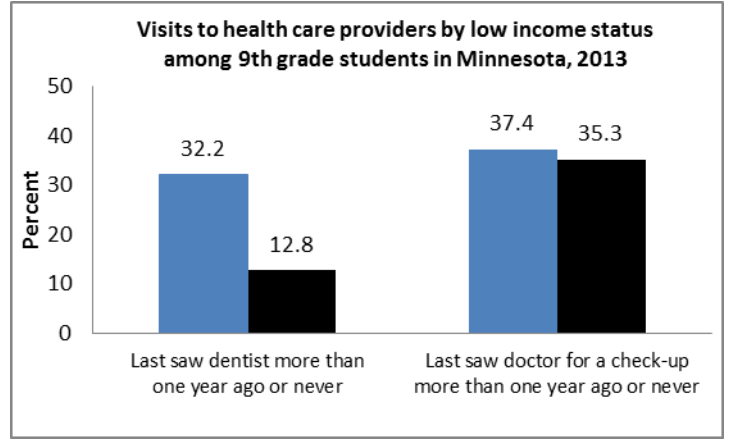
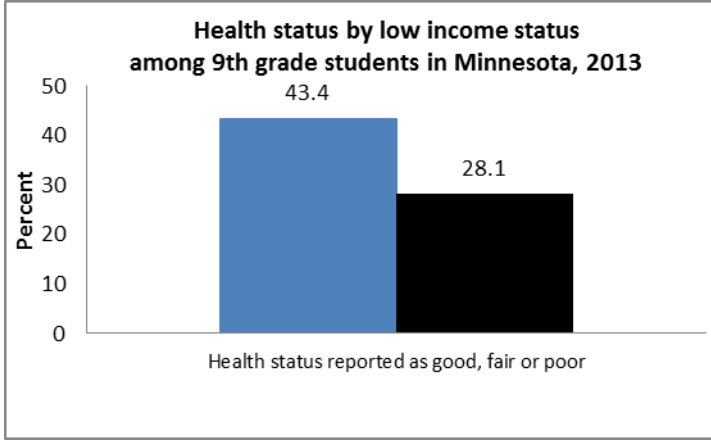
**Data Table 2: 2013 Minnesota Student Survey indicators by free/reduced-price lunch, 9<sup>th</sup> graders (continued)**


<b>Indicator</b>	<b>Free/reduced-price school lunch</b>	
	<b>Receives</b>	<b>Does not receive</b>
Any alcohol use in the past 30 days	18.5	13.4
Binge drinking in the past 30 days	9.6	5.9
Used marijuana in the past 30 days	14.4	7.6
Used prescription drugs not prescribed for you in the past 30 days	8.2	4.6
Lives with anyone who drinks too much alcohol	15.4	9.3
Lives with anyone who uses illegal drugs or abuses Rx drugs	10.7	4.5
Parent/other adult regularly swears at, insults or puts down	21.7	12.6
Parent/other adult has ever physically abused	19.3	10.7
Parents/other adults have ever physically abused each other	13.5	5.1
Has ever been sexually abused by someone outside the family	6.8	2.8
Has ever been sexually abused by family member	4.6	1.7
Has been homeless in the past 12 months	9.6	4.0
Has ever had or currently has a parent/guardian in jail or prison	35.0	10.1
I feel safe going to and from school: disagree or strongly disagree	7.5	4.0
I feel safe at school: disagree or strongly disagree	11.5	7.0
I feel safe in my neighborhood: disagree or strongly disagree	9.4	3.5
I feel safe at home: disagree or strongly disagree	5.4	2.6
<b>Number of students</b>	<b>11,606</b>	<b>30,134</b>


Source: 2013 Minnesota Student Survey



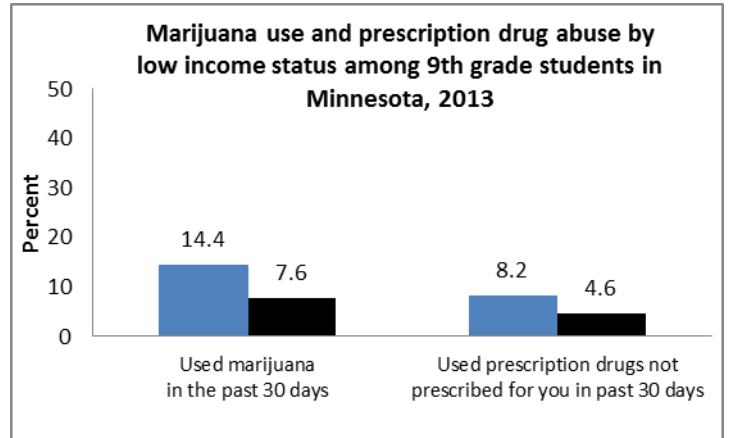
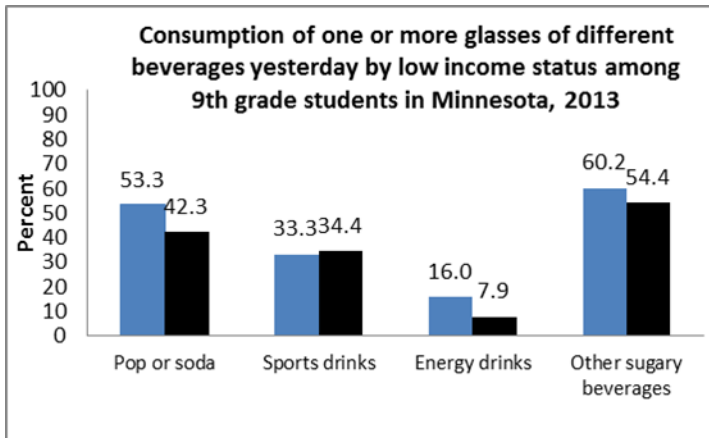
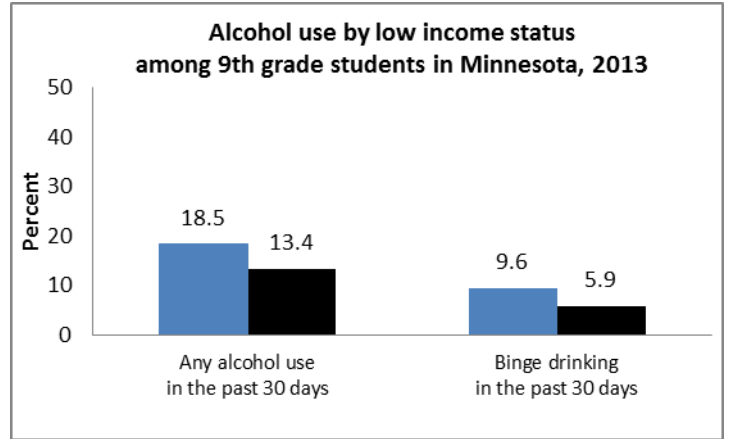
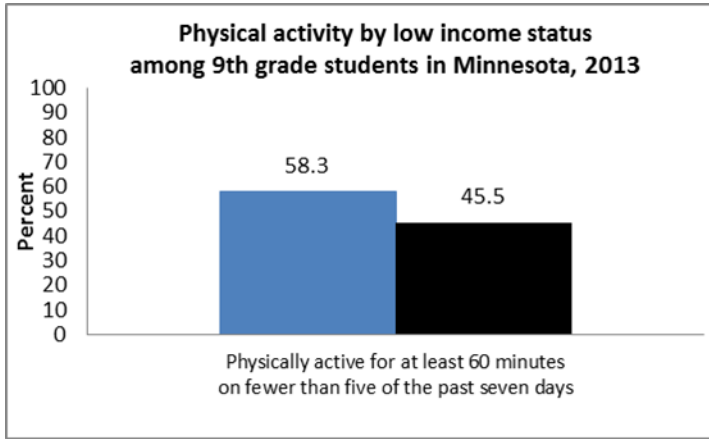
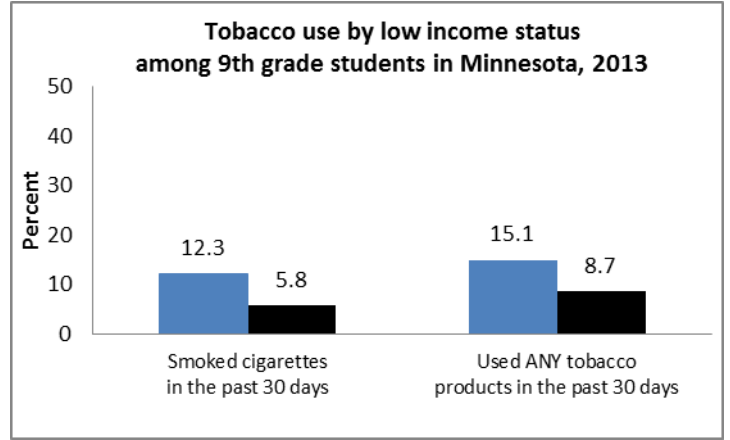
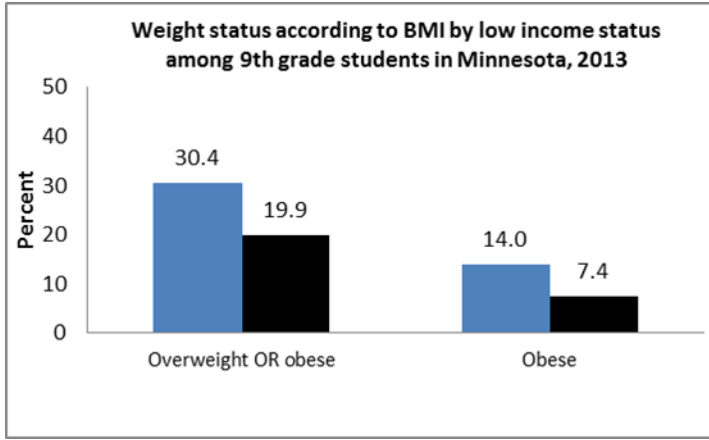
**Adolescents**  
**Selected Health-Related Indicators by Income Status**  
 (as measured by receipt of free/reduced-price school lunch)



 Receives free/reduced-price lunch  
 Source: 2013 Minnesota Student Survey

 Does not receive free/reduced-price lunch

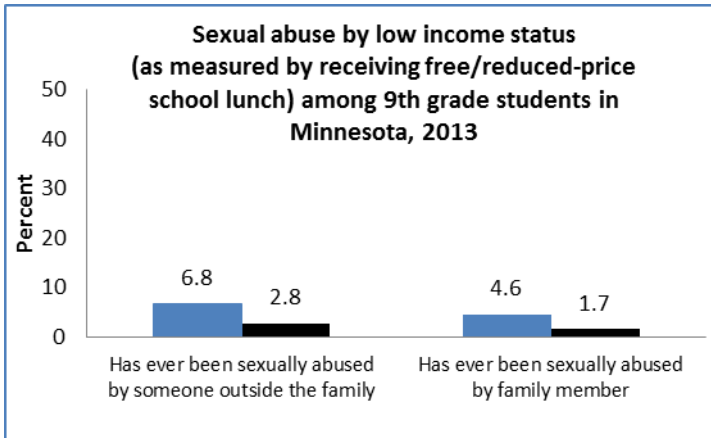
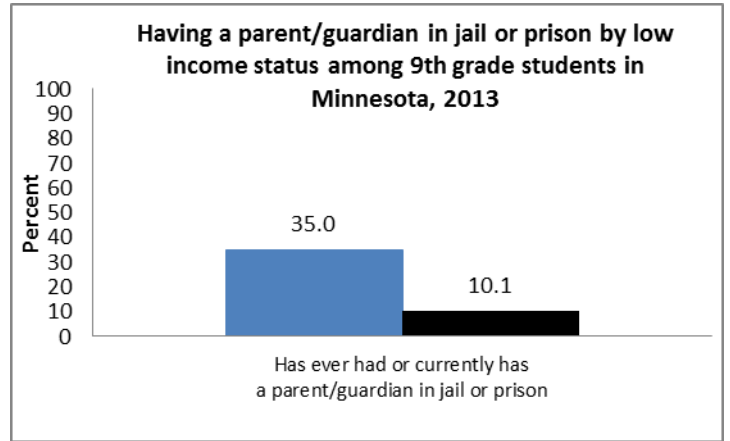
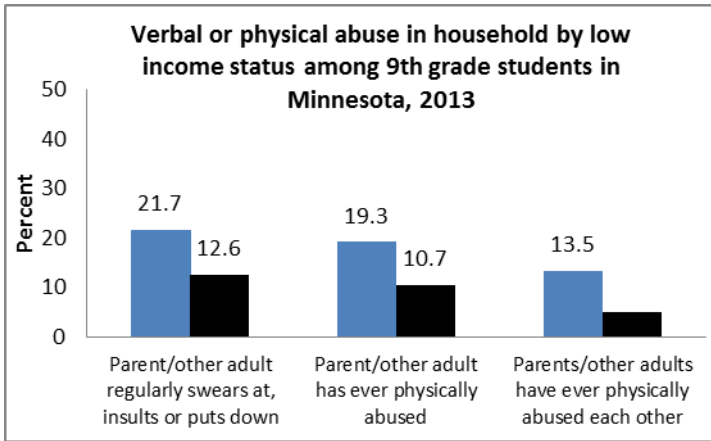
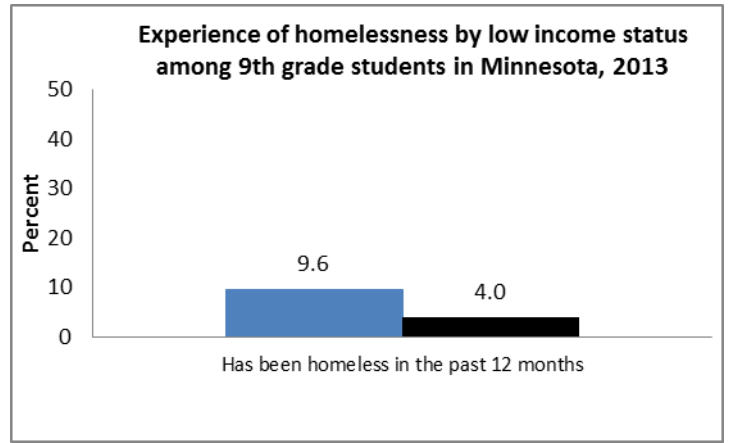
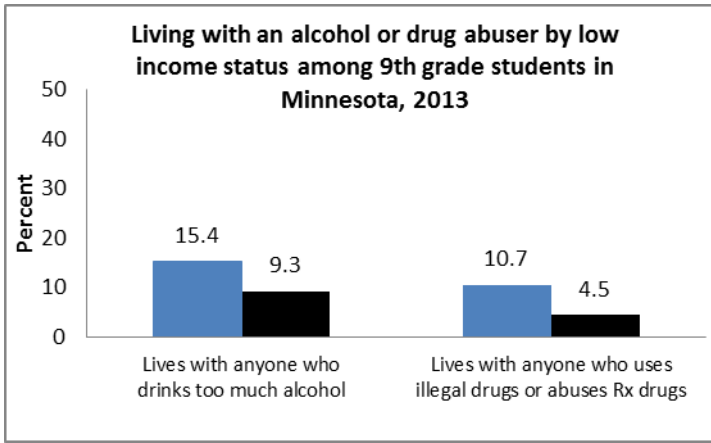
**Adolescents**  
**Selected Health-Related Indicators by Income Status**  
 (as measured by receipt of free/reduced-price school lunch)



Receives free/reduced-price lunch
                 
 
 Does not receive free/reduced-price lunch

Source: 2013 Minnesota Student Survey

**Adolescents**  
**Selected Health-Related Indicators by Income Status**  
 (as measured by receipt of free/reduced-price school lunch)



Receives free/reduced-price lunch
     
 
 Does not receive free/reduced-price lunch

Source: 2013 Minnesota Student Survey

**Adults Aged 18-64**  
**Selected Health-Related Indicators by Household Income**

**Data Table 3: 2011 Behavioral Risk Factor Surveillance Survey Results by Income**

Indicators	Income Categories					
	Less than \$20,000	\$20 to \$34,999	\$35 to \$49,999	\$50 to \$74,999	\$75,000 or more	Don't know or refused
<b>Adults 18-64:</b>						
Who reported "fair" or "poor" health status	26.8%	14.9%	10.0%	6.4%	3.1%	11.7%
Whose physical health was "not good" on 10 or more of the past 30 days	22.0%	13.9%	9.2%	5.2%	4.8%	9.7%
Whose mental health was "not good" on 10 or more of the past 30 days	28.4%	16.6%	13.3%	10.3%	6.9%	15.0%
Whose poor health kept them from doing usual activities on 10 or more of the past 30 days	20.2%	9.9%	4.6%	3.7%	2.5%	6.3%
Who are limited in some activities due to health problems	32.7%	20.9%	20.9%	15.1%	11.8%	16.2%
Who have current health problem that requires special equipment	9.0%	5.3%	4.1%	2.4%	1.6%	3.7%
Who have ever been told that they have asthma	19.4%	13.0%	11.4%	9.4%	8.7%	11.8%
Who have been told they have diabetes	9.5%	6.1%	5.9%	4.5%	4.0%	5.6%
Who have been diagnosed by a doctor with arthritis	22.4%	14.4%	20.0%	13.3%	11.8%	13.5%
Who have been diagnosed with a heart attack, coronary heart disease or stroke	8.5%	3.9%	3.4%	2.5%	2.4%	2.2%
Who have been diagnosed with chronic obstructive pulmonary disease	7.3%	5.1%	2.5%	1.9%	1.5%	2.8%
Who have been told they have vision or eye problems	18.0%	12.4%	14.1%	10.8%	8.3%	13.1%
Who have been diagnosed with cancer except for skin cancer	6.6%	3.8%	3.4%	3.5%	3.8%	2.2%
Who have been diagnosed with skin cancer	1.5%	1.6%	2.7%	2.5%	3.5%	1.5%
Who have ever been told they have a depressive disorder	29.6%	20.5%	16.2%	14.5%	10.4%	16.9%
Who have been diagnosed with high blood pressure	23.9%	20.7%	22.3%	22.0%	15.7%	17.7%

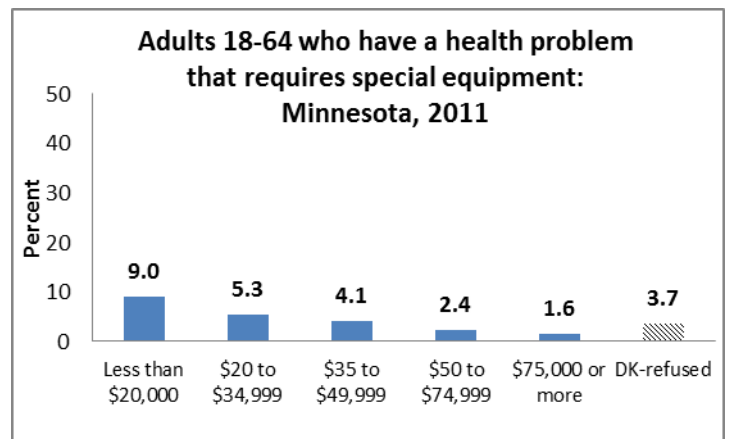
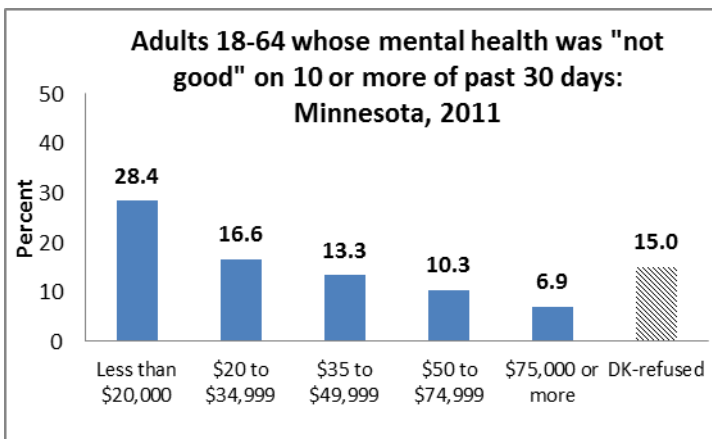
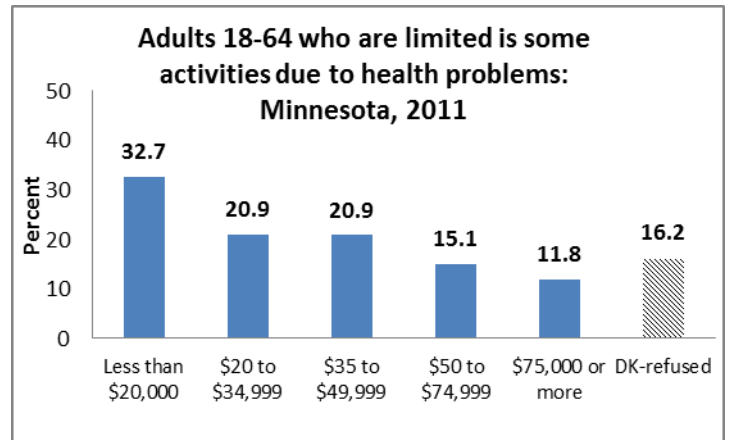
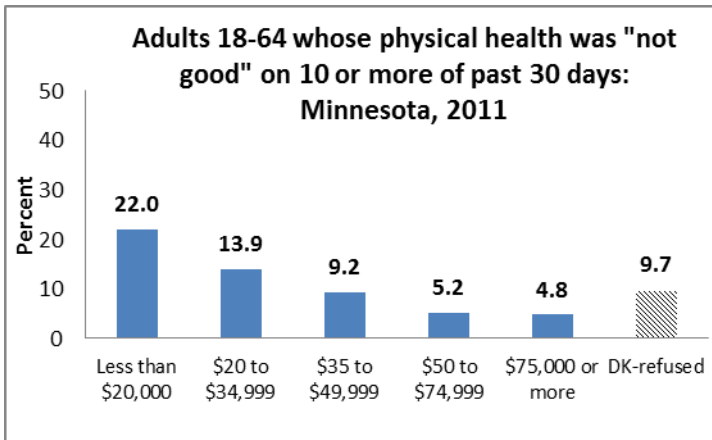
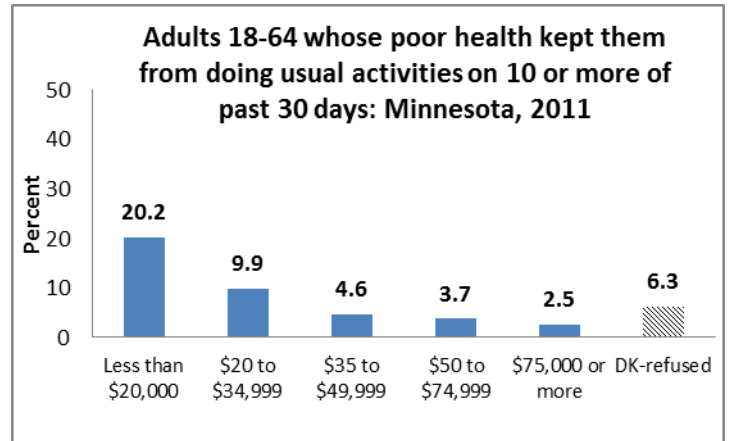
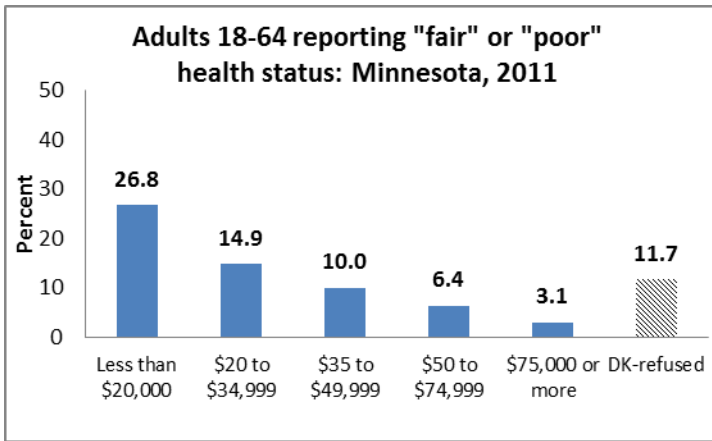
Source: 2011 Minnesota Behavior Risk Factor Surveillance System

**Table 4: 2011 Behavioral Risk Factor Surveillance Survey Results by Income (continued)**

Indicators	Income Categories					
	Less than \$20,000	\$20 to \$34,999	\$35 to \$49,999	\$50 to \$74,999	\$75,000 or more	Don't know or refused
<b>Adults 18-64:</b>						
Whose last routine medical check-up was more than two years ago	20.8%	23.8%	19.8%	19.0%	15.3%	23.4%
Who have never had blood cholesterol checked	41.0%	31.4%	20.2%	17.5%	11.1%	37.2%
Who could not see doctor when needed because of cost	25.4%	20.4%	14.2%	11.0%	3.9%	12.0%
Who are overweight or obese	54.8%	64.7%	67.6%	66.2%	60.6%	54.6%
Who are obese	25.0%	31.0%	29.9%	29.0%	21.8%	24.2%
Who reported no physical activity in past 30 days	25.6%	28.1%	23.6%	19.1%	12.6%	20.8%
Who got recommended amount of aerobic activity	52.1%	47.5%	50.6%	54.0%	60.3%	51.8%
Who got recommended amount of muscle strengthening activity	29.0%	28.9%	26.6%	29.5%	35.9%	29.4%
Who are current cigarette smokers	36.5%	33.8%	21.2%	19.3%	10.4%	21.8%
Who drank an alcoholic beverage in the past 30 days	47.4%	58.8%	63.6%	73.2%	77.4%	57.1%
Who are heavy drinkers	9.5%	9.7%	8.0%	10.0%	7.8%	8.1%
Who engaged in binge drinking in the past 30 days	21.0%	28.7%	25.4%	27.6%	27.2%	21.5%

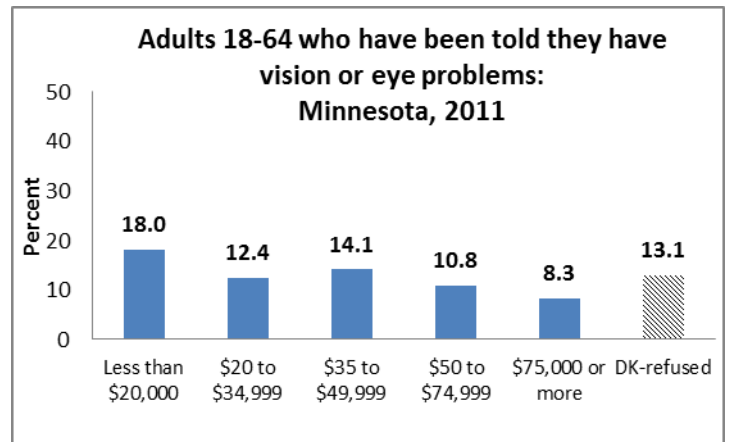
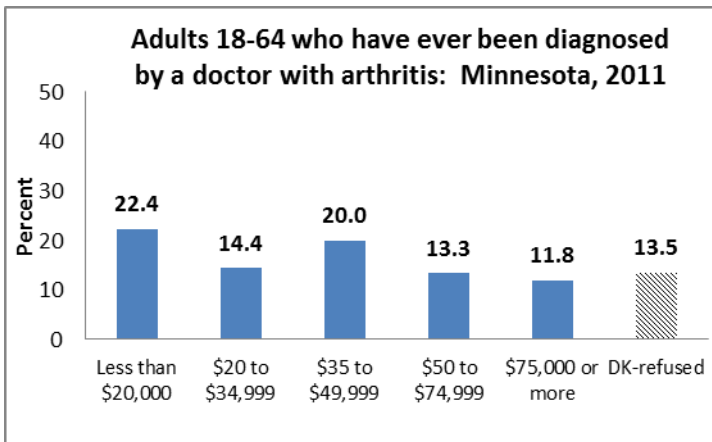
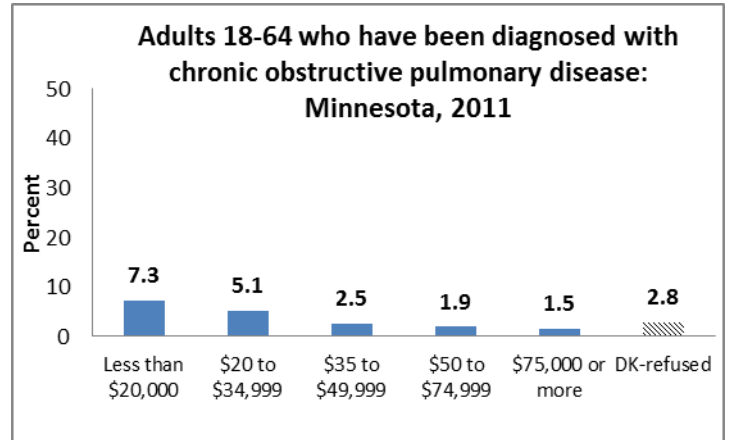
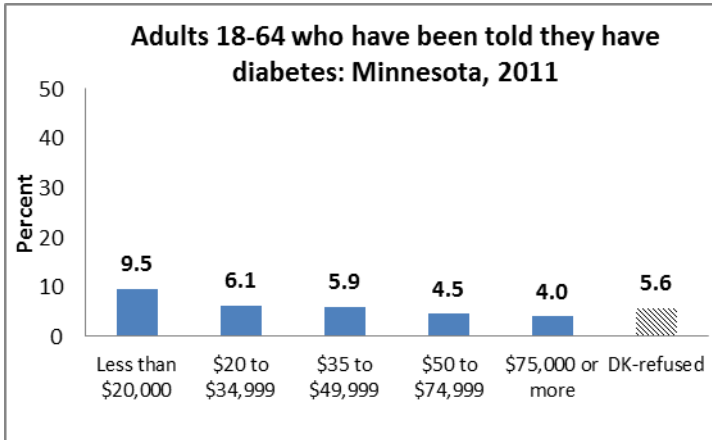
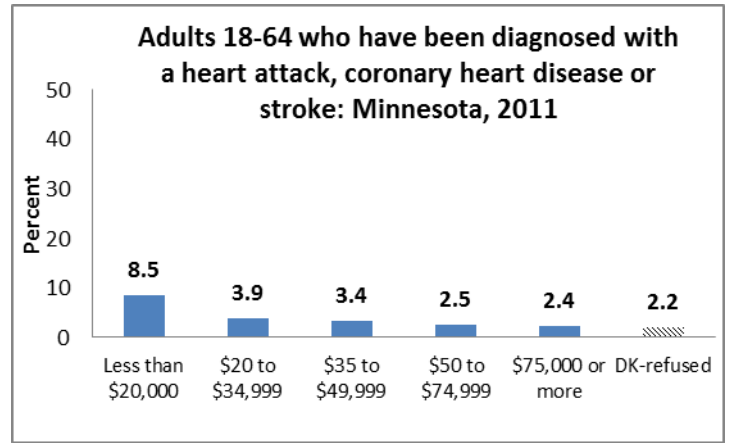
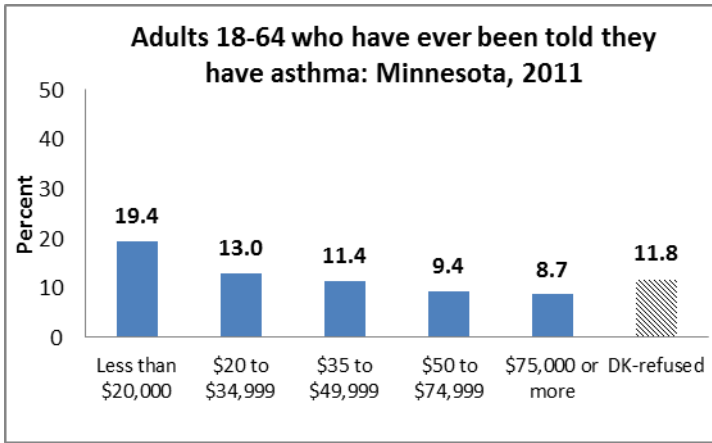
Source: 2011 Minnesota Behavior Risk Factor Surveillance System

**Adults Aged 18-64  
Selected Health-Related Indicators by Household Income**



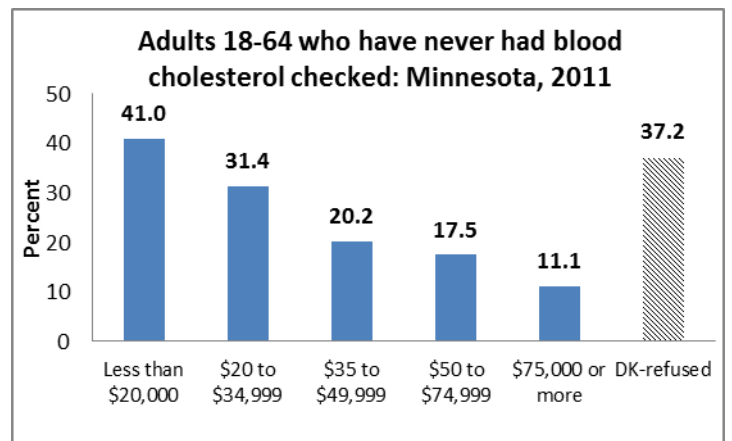
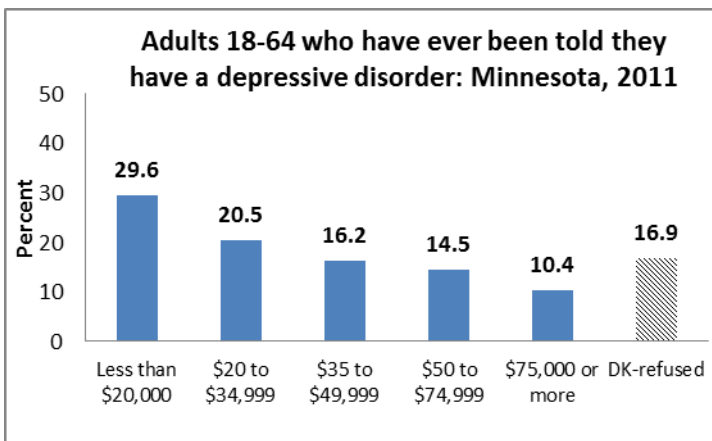
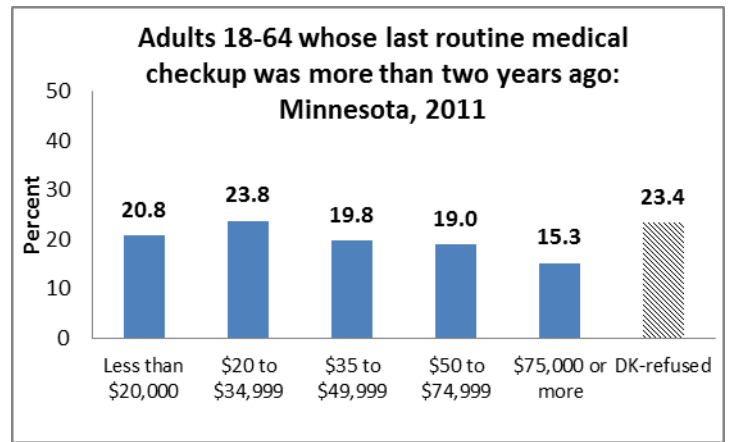
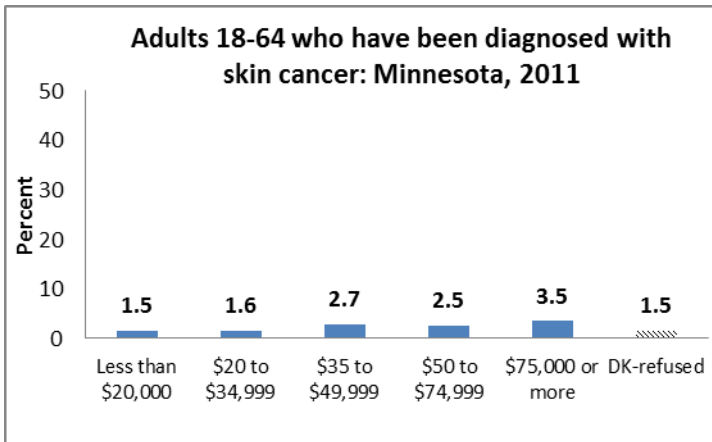
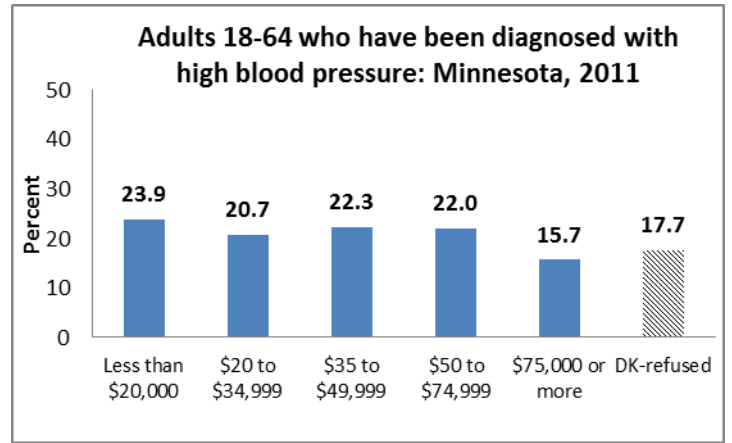
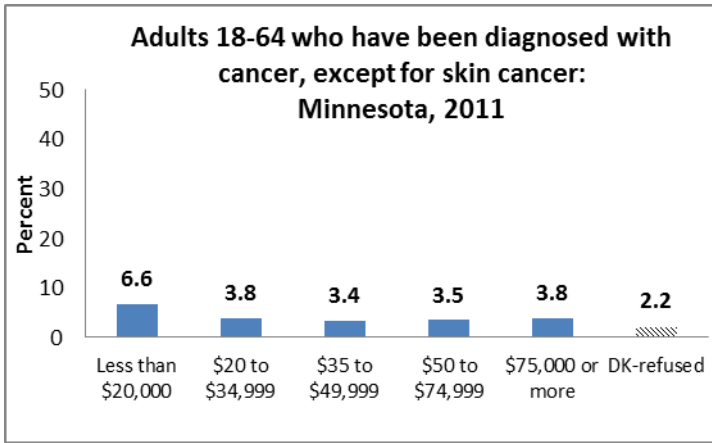
Source: 2011 Minnesota Behavior Risk Factor Surveillance System

**Adults Aged 18-64**  
**Selected Health-Related Indicators by Household Income**



Source: 2011 Minnesota Behavior Risk Factor Surveillance System

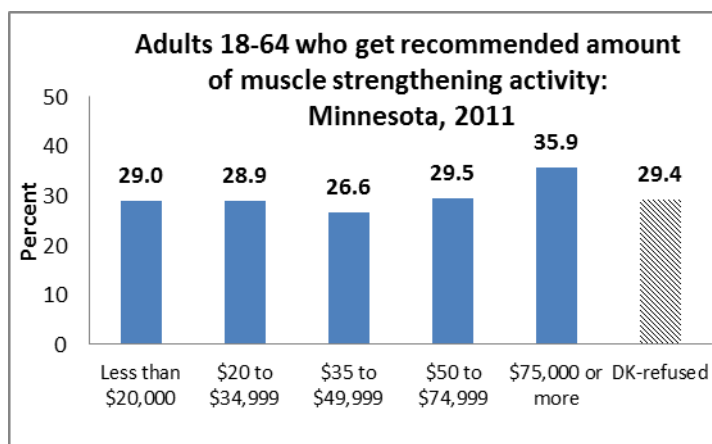
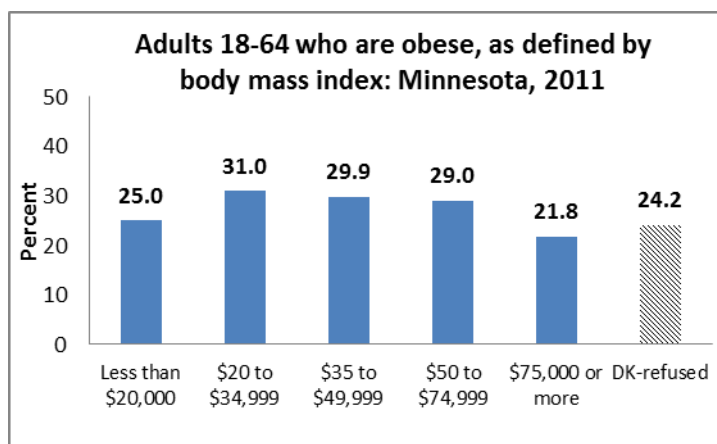
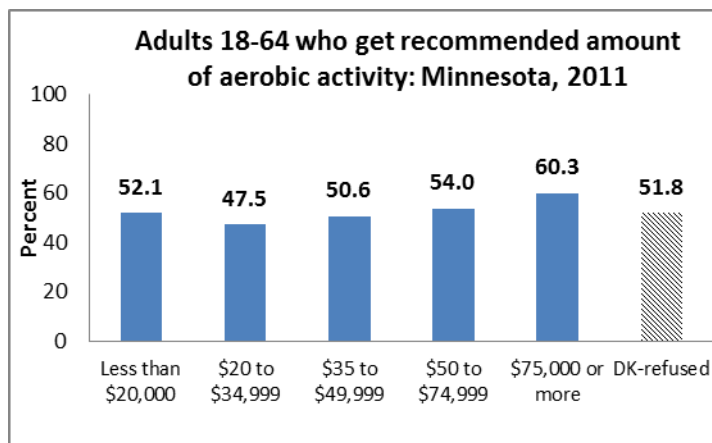
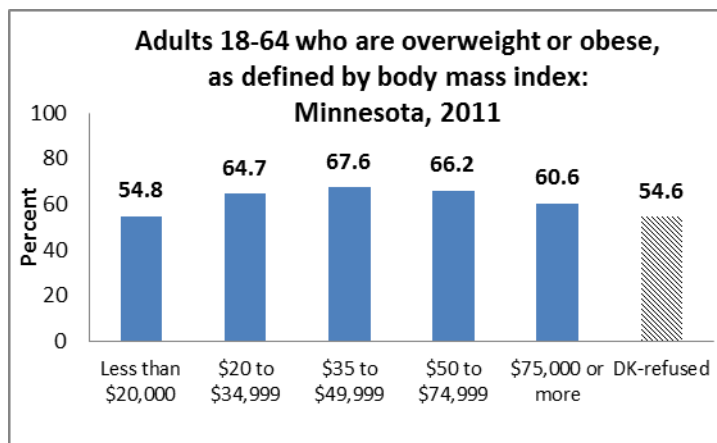
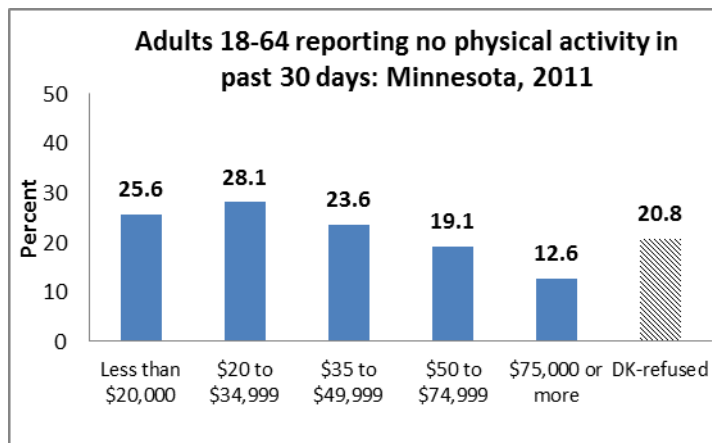
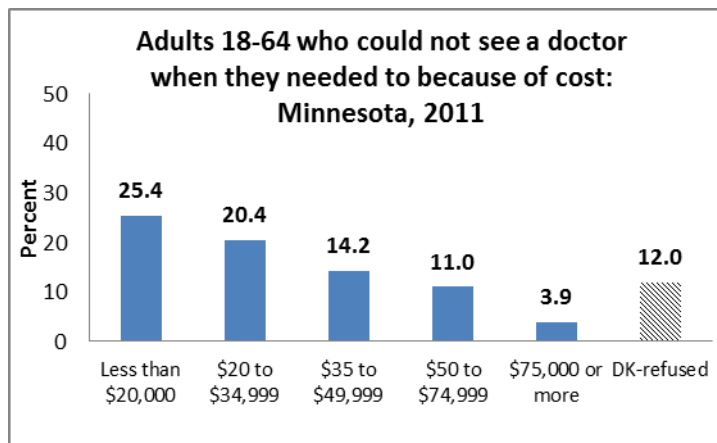
**Adults Aged 18-64**  
**Selected Health-Related Indicators by Household Income**



Source: 2011 Minnesota Behavior Risk Factor Surveillance System

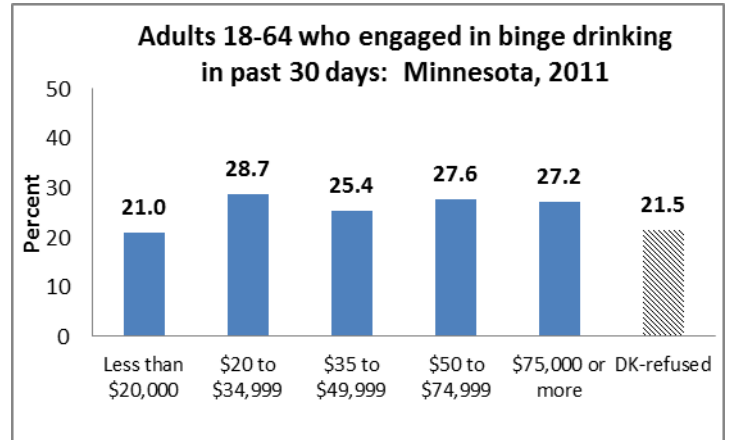
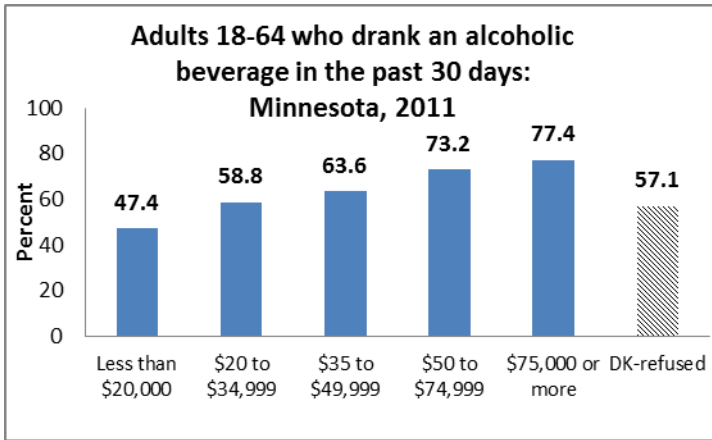
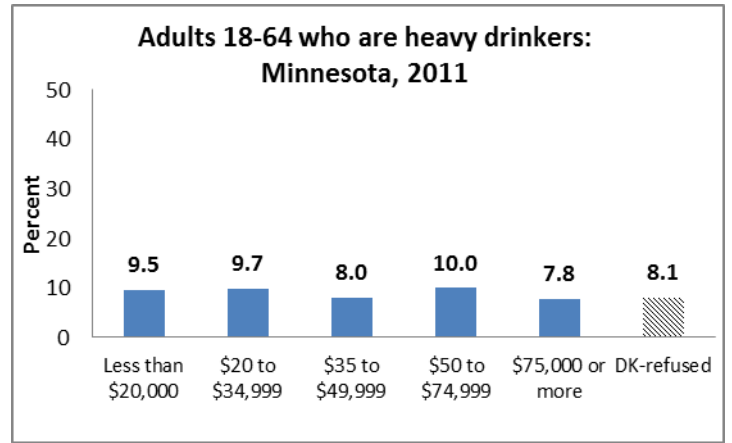
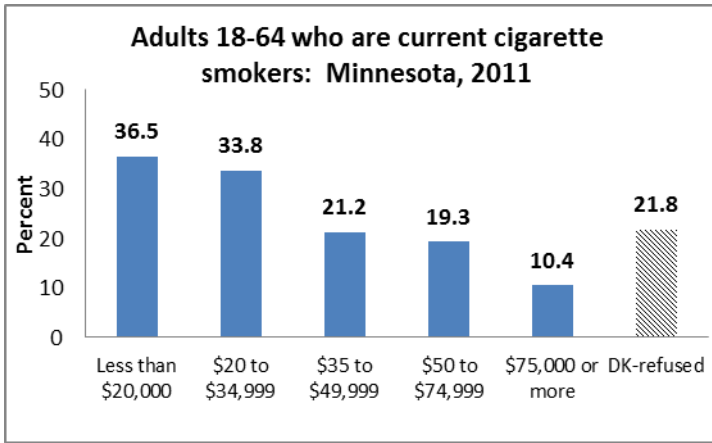


## Adults Aged 18-64 Selected Health-Related Indicators by Household Income



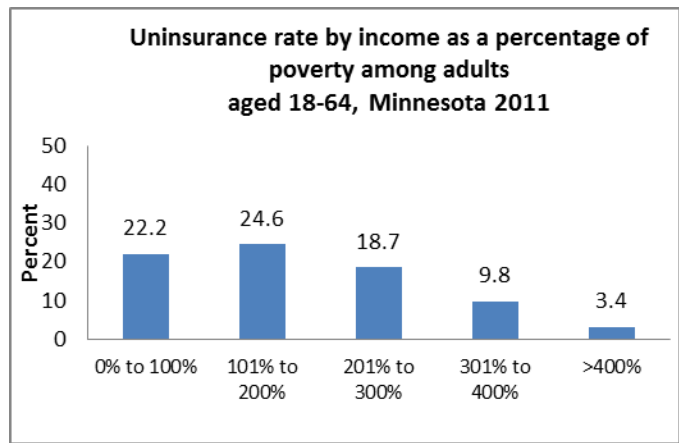
Source: 2011 Minnesota Behavior Risk Factor Surveillance System

**Adults Aged 18-64  
Selected Health-Related Indicators by Household Income**



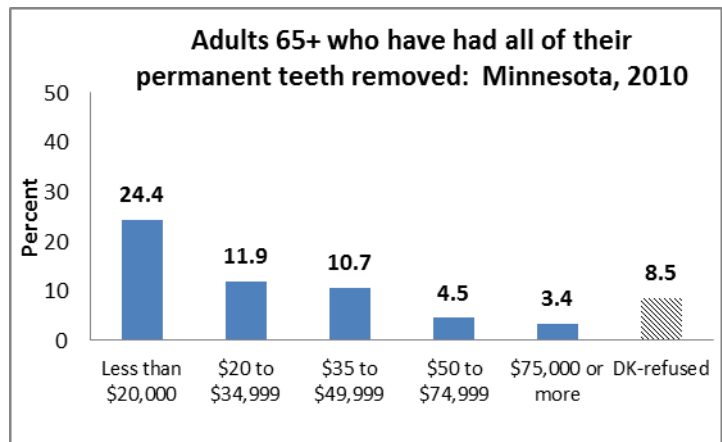
Source: 2011 Minnesota Behavior Risk Factor Surveillance System

**Adults Aged 18-64**  
**Selected Health-Related Indicators by Household Income**



Source: 2011 Minnesota Health Access Survey

**Adults Aged 65+**  
**Selected Health-Related Indicators by Household Income**



Source: 2010 Minnesota Behavior Risk Factor Surveillance System

## Poverty by County

Data Table 5: Poverty status in the past 12 months, Minnesota 2008-2012 ACS 5-year estimates

County	Percent	MOE	County	Percent	MOE
Aitkin	12.6	+/-1.5	Marshall	7.9	+/-1.2
Anoka	7.1	+/-0.5	Martin	10.6	+/-1.8
Becker	11.8	+/-1.2	Meeker	10.6	+/-1.5
Beltrami	20.7	+/-2.0	Mille Lacs	14	+/-1.5
Benton	14.6	+/-1.8	Morrison	13.2	+/-1.2
Big Stone	12.9	+/-2.3	Mower	15.8	+/-2.0
Blue Earth	19.4	+/-1.3	Murray	10.1	+/-1.9
Brown	9	+/-1.3	Nicollet	11	+/-1.6
Carlton	11.9	+/-1.5	Nobles	17.2	+/-2.4
Carver	5.2	+/-1.0	Norman	11.3	+/-1.6
Cass	16.5	+/-1.6	Olmsted	8.5	+/-0.7
Chippewa	9.4	+/-2.1	Otter Tail	12.2	+/-0.8
Chisago	7.6	+/-1.2	Pennington	10.6	+/-1.9
Clay	12.5	+/-1.2	Pine	14.8	+/-1.4
Clearwater	15.1	+/-1.5	Pipestone	10.1	+/-1.9
Cook	9.8	+/-2.2	Polk	12.2	+/-1.5
Cottonwood	12.7	+/-2.4	Pope	8.7	+/-1.5
Crow Wing	13.4	+/-1.0	Ramsey	16.8	+/-0.7
Dakota	6.4	+/-0.4	Red Lake	11.2	+/-2.2
Dodge	7.3	+/-1.4	Redwood	10.5	+/-1.5
Douglas	10.3	+/-1.2	Renville	11.1	+/-1.7
Faribault	12.4	+/-1.8	Rice	11	+/-1.4
Fillmore	12.9	+/-1.4	Rock	11.9	+/-2.1
Freeborn	11.8	+/-1.7	Roseau	10.4	+/-1.8
Goodhue	8.7	+/-1.3	St. Louis	16.1	+/-0.7
Grant	9.9	+/-1.6	Scott	5.2	+/-0.7
Hennepin	12.6	+/-0.3	Sherburne	8	+/-1.1
Houston	9.8	+/-1.3	Sibley	12.7	+/-2.0
Hubbard	12.1	+/-1.3	Stearns	12.7	+/-0.8
Isanti	8.1	+/-1.5	Steele	8.6	+/-1.2
Itasca	12.5	+/-1.5	Stevens	14.3	+/-2.3
Jackson	11.5	+/-2.0	Swift	10.1	+/-1.8
Kanabec	13.1	+/-1.8	Todd	15.9	+/-1.7
Kandiyohi	12.9	+/-1.2	Traverse	9.2	+/-1.9
Kittson	9.2	+/-1.7	Wabasha	7.8	+/-1.3
Koochiching	12	+/-2.3	Wadena	18.4	+/-2.8
Lac qui Parle	7.1	+/-1.3	Waseca	8.8	+/-1.8
Lake	13.1	+/-2.9	Washington	5.6	+/-0.5
Lake of the Woods	17.7	+/-5.4	Watonwan	11.7	+/-2.6
Le Sueur	9.1	+/-1.4	Wilkin	7	+/-2.4
Lincoln	7.4	+/-1.2	Winona	15.9	+/-1.5
Lyon	14	+/-1.9	Wright	6.1	+/-0.7
McLeod	7.7	+/-1.2	Yellow Medicine	11.6	+/-1.9
Mahnomen	27.2	+/-3.2			

Source: 2008-2012 American Community Survey (ACS), Table S1701

MOE – Margin of error