



HIDI HealthStats

Statistics and Analysis From the Hospital Industry Data Institute

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A STUDY OF 22,000 MISSOURIANS DIAGNOSED WITH MORBID OBESITY IN 2008

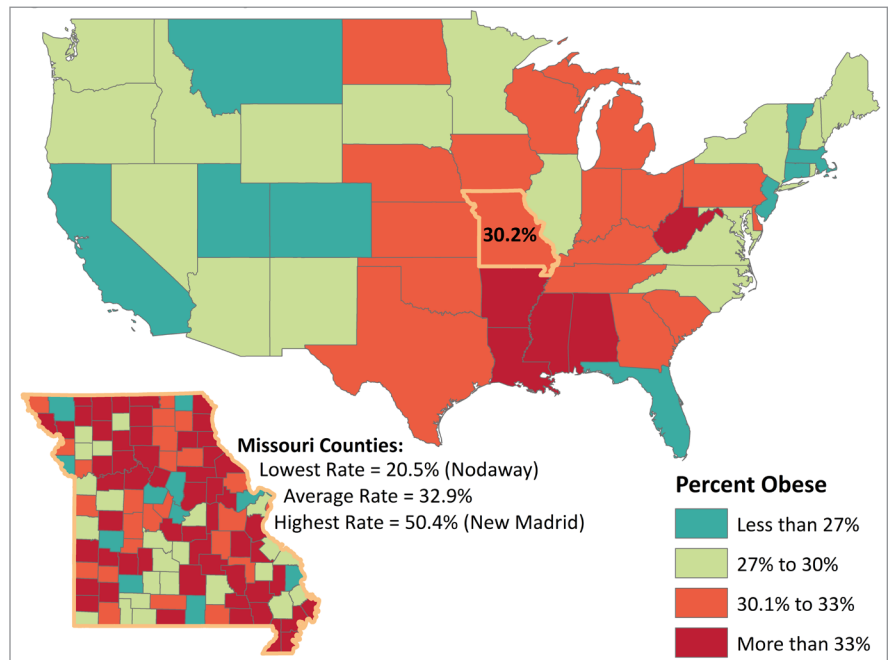
- In 2014, Missouri was ranked among the top 20 most obese states in the country.
- At the county level, adult obesity ranges from 20.5 percent in Nodaway to 50.4 percent in New Madrid.
- Individuals with obesity are 10 times more likely to develop heart disease.
- Fifteen percent of Missourians diagnosed with morbid obesity in 2008 expired in a hospital by June 2015, and 82 percent developed one or more serious chronic diseases.

Background

With an estimated annual price tag of \$117 billion and severe health consequences, obesity is a growing problem in the U.S. and Missouri.ⁱ In 1990, fewer than 15 percent of adults in the U.S. were obese.ⁱⁱ Recent research estimates that today more than 1 in 3 adults in the U.S. were obese, as signaled by a body mass index of 30 or higher.ⁱⁱⁱ This trend signals a 133 percent relative increase in the percent of adults in the U.S. living with obesity during the last 25 years.

According to self-reported data collected by the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, the rates of adult obesity are higher in the Midwest than any other region in the country.^{iv} According to the survey, last year Missouri was ranked among the top 20 states for the prevalence of adults with obesity (30.2 percent). Evaluating obesity data available at the county level in Missouri reveals a large degree of county-by-county variation with a range of 20.5 percent in Nodaway County to more than 50 percent of adults self-reporting obesity status in New Madrid County (Figure 1).

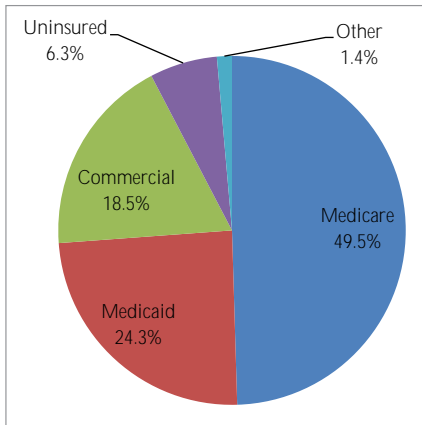
Figure 1: Adult Obesity Rates in the U.S. and Missouri Counties



Sources: U.S. Centers for Disease Control and Prevention, 2014 BRFSS (state-level rates).
Missouri Department of Health & Senior Services, 2011 County-Level Study (county-level rates).

Obesity-related health disparities for certain race, ethnicity and socio-economic levels are well documented. Nearly 48 percent of African Americans and 43 percent of Hispanic Americans are obese, compared to 32.6 percent of non-Hispanic whites.^{iv} Individuals living near or below the poverty level also are more likely to be obese, a relationship that is more pronounced among women.^v

Figure 2: 2008 Morbid Obesity Cohort Visits by Payer, 2008-2015



The adverse health effects of obesity are well-documented. Aside from causing an estimated 300,000 premature deaths every year in the U.S., obesity also reduces overall quality of life by placing those individuals at much higher risk of developing other serious medical conditions.^{vi} Individuals with obesity are 10 times more likely to develop heart disease compared to individuals with a BMI below 30. People with obesity also are at higher risk of developing diabetes, hypertension, joint and bone problems, metabolic syndrome, and certain types of cancer.^{vi}

Health Outcomes for People With Morbid Obesity Throughout Time

To evaluate health outcomes for individuals with obesity, the Hospital Industry Data Institute tracked hospital encounters for the 21,920 Missourians diagnosed with morbid obesity (BMI of 40 or higher) in 2008 through June 30, 2015.^{vii} The outcomes evaluated include the presence of diagnosed comorbid chronic conditions, hospital utilization, spending and deaths.

Table 1 summarizes information for the study cohort in the baseline period through the end of the 7 ½ year study

period. Of the original 21,920 patients included in the study cohort, only 7,724 remained in the sample during 2015, which indicates a 59 percent attrition rate after excluding patient deaths. This suggests the calculated mortality rate of 14.8 percent may be significantly understated as a result of deaths occurring outside of a hospital which are undetectable by the data used in this analysis. The patients included in the study were 53 years old on average, predominantly female, and the distribution by race reflected the overall population in Missouri.

Table 1: Cohort Characteristics at the Beginning and End of the Study Period

	2008 Only	Through June 2015
Number of Patients	21,920	7,724
Number of Deaths	907	3,251
Average Number of Visits	3.6	14.8
Average Charges	\$68,291	\$231,998
Average Age	52.9	55.1
Percent Female	66.9%	70.5%
Percent White	81.3%	77.2%
Percent Black	16.8%	21.3%
Percent Other Race	1.8%	1.5%
Hypertension	73.8%	85.1%
Heart Disease	56.9%	75.5%
Diabetes	56.3%	67.7%
Arthritis/Joint Disease	34.9%	58.6%
COPD	26.5%	44.9%
Kidney Disease	16.6%	30.8%
Asthma	19.4%	30.7%
Liver Disease	7.1%	18.6%
Cancer	10.6%	18.5%
Atherosclerosis	7.5%	16.7%
Stroke	6.7%	15.5%
Psychiatric Disorder	6.0%	14.6%

Aside from 3,251 deaths occurring among patients diagnosed with morbid obesity in 2008, the data also revealed significant increases in the utilization of health care services and the deterioration of the individuals' health status as signaled by the presence of chronic comorbid conditions. During the baseline period, patients diagnosed with morbid obesity had an average of 3.6 hospital encounters (inpatient or emergency department) amounting to \$68,291 in total charges for the year. By the end of the study period, these patients had 14.8 hospital encounters on average and total hospital charges near \$232,000. The prevalence of all chronic conditions evaluated increased substantially during the study period. Nearly three-quarters of the individuals included in the study cohort were covered by Medicare and Medicaid — 18.5 percent had commercial insurance and 6.3 percent were uninsured (Figure 2).

Figure 3 shows the prevalence of comorbid chronic conditions for the study cohort compared to all hospital patients in 2014. Compared to the broader patient population, individuals diagnosed with morbid obesity in 2008 have significantly higher rates of each chronic condition evaluated in this analysis. The largest disparity observed was for kidney disease where the prevalence for individuals with morbid obesity of 31 percent was 8.8 times higher than the prevalence for all patients. The study cohort also had rates of heart disease, diabetes and chronic obstructive pulmonary disease that were 3.8, 5.4 and 6.7 times higher, respectively, than the prevalence for all patients.

Figure 4 shows the percent of patients who were diagnosed with chronic diseases or expired during the study period. In 2008, 18 percent of the

Figure 3: Prevalence of Chronic Conditions for the Morbid Obesity Cohort Compared to All Hospital Patients in 2014 (n = 2.82 million)

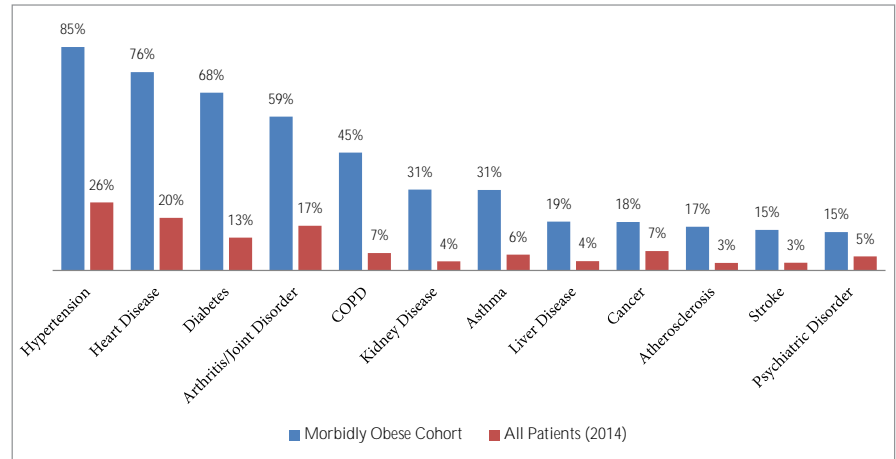
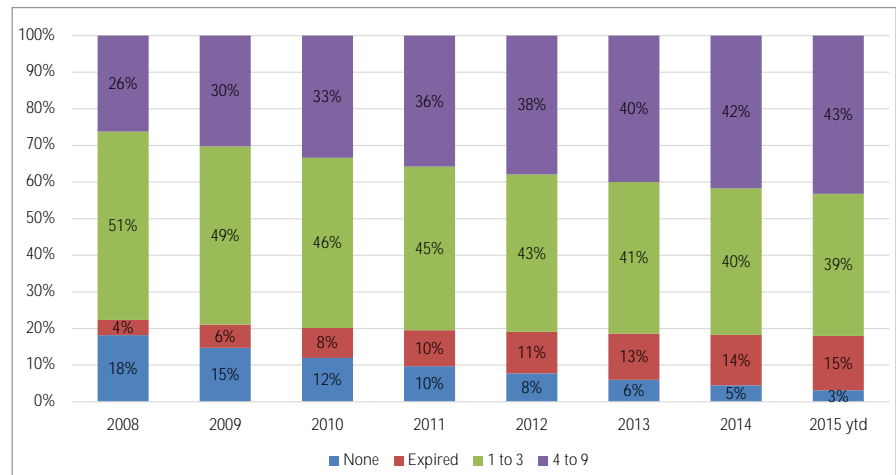


Figure 4: Mortality and Chronic Comorbidities Throughout Time for the Morbid Obesity Cohort



21,920 patients with morbid obesity experienced no adverse outcomes in terms of developing comorbidities or death. By the end of June 2015, only 3 percent had experienced no adverse outcomes, 82 percent had developed a serious comorbid chronic condition — including 43 percent who had developed four or more — and 15 percent had passed away.

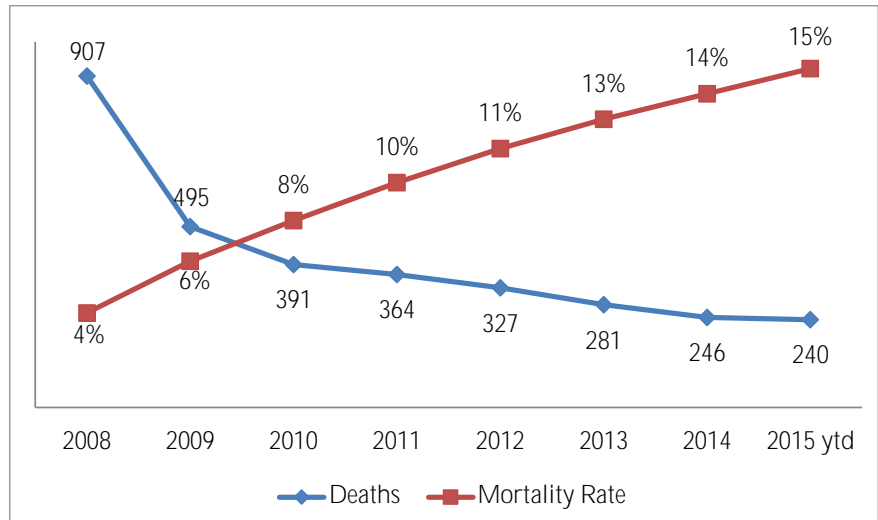
The overall number of deaths diminished in each year evaluated and the majority of deaths occurred during the first three years of the study period. More than 25 percent (907) occurred during the first year, 43.1 percent had occurred by the end of 2009, and 55 percent (1,793) of all deaths in the study cohort had occurred by the end of the third year (Figure 5).

Suggested Citation

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For the entire study period, a mortality rate of 15 percent for patients diagnosed with morbid obesity was very high. By comparison, slightly more than .5 percent of all hospital patients expired during 2014. This would imply a 7 ½ year mortality rate for the broader hospital patient population of 4.6 percent — less than one-third the mortality rate for patients with morbid obesity.

Figure 5: Number of Deaths and Mortality Rate for the Morbid Obesity Cohort During the Study Period



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 P.O. Box 60
 Jefferson City, MO 65102-0060

ⁱ Datagraphic. Focus on obesity. (2015). *Health Affairs*, 34(11), 1808-1809.

ⁱⁱ The Nutrition Source. An epidemic of obesity: U.S. obesity trends. Harvard T.H. Chan School of Public Health. Retrieved from <http://www.hsph.harvard.edu/nutritionsource/an-epidemic-of-obesity/>

ⁱⁱⁱ Ogden, C., Carroll, M., Kit, B. & Flegal, K. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*, 311(8), 806-814. doi:10.1001/jama.2014.732

^{iv} U.S. Centers for Disease Control and Prevention. Division of Nutrition, Physical Activity, and Obesity. Data, Trends and Maps. Retrieved from <http://www.cdc.gov/obesity/data/prevalence-maps.html>

^v Ogden, C., Lamb, M., Carroll, M. & Flegal, K. (2010, December). Obesity and socioeconomic status in adults: United States, 2005-2008. *NCHS Data Brief, No. 50*. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db50.pdf>

^{vi} Stanford Health Care. Obesity. Retrieved from <https://stanfordhealthcare.org/medical-conditions/healthy-living/obesity.html>

^{vii} All data are from the Hospital Industry Data Institute inpatient and outpatient discharge databases. Morbid obesity was identified with an ICD 9-CM code of 27801 appearing anywhere on the discharge record for inpatient hospitalizations and emergency department visits between fiscal years 2008 and 2015, year-to-date (Oct. 1, 2011, through June 30, 2015).