

Changes in Diabetes Mortality and Hospitalization Statewide and in the Upper Peninsula Data Request 4/7/2010

Diabetes-related hospitalizations in the adult diabetes population (18+)

	2001		2007		% Change
	Rate per 1,000	95% CI	Rate per 1,000	95% CI	
Statewide	378.6	(377.0, 380.3)	425.8	(424.3, 427.4)	+12%
Upper Peninsula	375.0	(365.6, 384.4)	344.5	(336.3, 352.7)	-8%
<i>Amputations</i>					
Statewide	5.6	(5.4, 5.8)	4.3	(4.1, 4.5)	-23%
Upper Peninsula	6.9	(5.6, 8.1)	3.1	(2.3, 3.9)	-55%
<i>Kidney Disease</i>					
Statewide	44.7	(44.1, 45.2)	127.8	(126.9, 128.7)	+186%
Upper Peninsula	46.3	(43.0, 49.6)	76.6	(72.7, 80.5)	+65%
<i>Eye Disease</i>					
Statewide	18.3	(17.9, 18.6)	18.7	(18.3, 19.0)	0
Upper Peninsula	24.8	(22.4, 27.3)	16.6	(14.8, 18.4)	-33%

The MDCH Bureau of Epidemiology does not report hospitalizations rates as age-adjusted.

Interpretation:

- The hospitalization rates for diabetes were similar for the state and the U.P. in 2001. Over time, the rates increased for the state, but decreased in the U.P.
- Rates of non-traumatic lower-limb amputations for people with diabetes were not significantly different in 2001, but decreased more in the U.P. over time
- Hospitalizations for kidney disease in people with diabetes were similar in 2001 and increased dramatically over time – nearly tripling in the state, but the U.P. did not see as dramatic an increase.
- Hospitalizations for eye disease in people with diabetes were higher in the U.P. in 2001, but lower in 2007 as the state rates stayed essentially the same.

Kidney and eye disease in hospitalization data are not meant to give a prevalence of the complication, but rather act as an indicator of diabetes control. Kidney disease included ICD codes 580-589. Eye disease included ICD codes 362.0, 364.42, 365.44, 366.41 and 369. Both were selected in conjunction with the ICD code for diabetes (250).

Hospitalization for diabetes includes all adults who have diabetes listed anywhere in their admission record.

Limitations:

- The data in the table represents snapshots in time. There are annual fluctuations, so the actual percent change may be more or less than what is given. A trendline from a regression of multiple years of data plotted would give a more accurate estimate of change over time.
- It is estimated that 40% of people with diabetes who are hospitalized do not have diabetes listed as a comorbid condition on their discharge record.
- Because hospital discharges and not individual persons, hospital discharge rates for diabetes-related diseases may not necessarily reflect rates per person; that is, persons who are hospitalized more than once in a year may be counted more than once.
- The diabetes population is estimated from the diabetes prevalence in the Michigan Behavior Risk Factor Survey and general population numbers from the Census. The statewide diabetes prevalence estimate was also used when estimating the number of diabetes with diabetes in the U.P. because it was not significantly different across regions.

Diabetes-related hospital length of stay and average cost per day in the adult diabetes population (18+)

	2001		2007		% Change
	Mean	95% CI	Mean	95% CI	
<i>Length of stay (days)</i>					
Statewide	6.06	(6.02, 6.09)	5.74	(5.71, 5.76)	-5%
Upper Peninsula	5.18	(5.04, 5.32)	4.53	(4.42, 4.64)	-13%
<i>Charge per day</i>					
Statewide	\$2,220.36	(\$2,170.50, \$2,270.22)	\$4,283.75	(\$4,098.62, \$4,468.87)	+93%
Upper Peninsula	\$2,867.38	(\$2,784.02, \$2,950.74)	\$2,642.01	(\$2,524.72, \$2,759.30)	-8%

Interpretation:

- The U.P. had a shorter length of stay for people with diabetes in 2001, and saw more of a decrease over time compare to the entire state.
- The U.P. had a somewhat higher average daily cost for a person hospitalized with diabetes in 2001 – but while the state nearly doubled the average cost in 7 years, the U.P. saw a decrease.
- The average daily cost for a person hospitalized with diabetes is nearly half that of the entire state in 2007.

Hospitalization for diabetes includes all adults who have diabetes listed anywhere in their discharge record.

Limitations:

- The data in the table represents snapshots in time. There are annual fluctuations, so the actual percent change may be more or less than what is given. A trendline from a regression of multiple years of data plotted would give a more accurate estimate of change over time.

- It is estimated that 40% of people with diabetes who are hospitalized do not have diabetes listed as a co-morbid condition on their discharge record.
- Because hospital discharges and not individual persons, hospital discharge rates for diabetes-related diseases may not necessarily reflect rates per person; that is, persons who are hospitalized more than once in a year may be counted more than once.

Age-adjusted diabetes-related mortality in the diabetes population

	2001		2007		% Change
	Rate per 100,000	95% CI	Rate per 100,000	95% CI	
Statewide	549.7	(537.5, 561.8)	524.5	(513.5, 535.6)	-5%
Upper Peninsula	677.5	(608.0, 747.0)	583.2	(525.0, 641.5)	-14%

Interpretation:

- The U.P. had significantly higher diabetes mortality compared to the entire state, although the gap is narrower in 2007.
- Over the 7-year time period, the U.P. saw a greater reduction in the rate of diabetes-related mortality in the population of people with diabetes.

Diabetes-related mortality includes all people who have diabetes listed on their death certificate as either the primary underlying cause or a contributing cause.

Limitations:

- The data in the table represents snapshots in time. There are annual fluctuations, so the actual percent change may be more or less than what is given. A trendline from a regression of multiple years of data plotted would give a more accurate estimate of change over time.
- It is estimated that 52-65% of people with diabetes who die do not have diabetes listed on their death certificate. This is likely due to the signing physician or medical examiner not having the decedent's medical record. Some regions may be better at making this information available than others.
- While mortality rates are typically reported as diabetes deaths in the general population, the denominator used here is the diabetes population. This is done to better see the trends by limiting the scope of the analysis to only those who are at-risk. The diabetes population is estimated from the diabetes prevalence in the Michigan Behavior Risk Factor Survey and general population numbers from the Census. The statewide diabetes prevalence estimate was also used when estimating the number of diabetes with diabetes in the U.P. because it was not significantly different across regions.