

INTRODUCTION

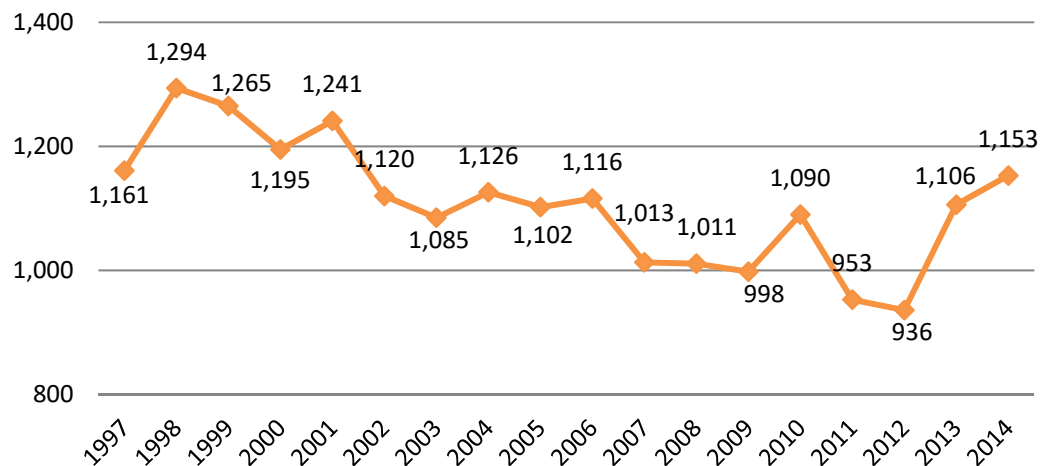
Currently, 1.9 million people are living with limb loss in the United States, with an average of 507 people continuing to lose a limb every day. This results in an estimated 185,000 amputations per year (1), and this number is expected to double by the year 2050 due to increasing rates of diabetes and vascular disease (1). Among those living with limb loss, the major causes of their amputations are vascular disease (54%) – including diabetes and peripheral arterial disease – trauma (45%) and cancer (less than 2%) (2). The most common causes of pediatric amputations, however, are lawn mower accidents (3). Non-whites comprise about 42% of the limb loss population in the U.S. (1). In 2008, the diabetes related amputation rate among African Americans was nearly four times that of whites (4).

A total of 1,153 amputations were performed in Iowa hospitals in 2014. These amputations were performed for a variety of reasons, including diabetes and peripheral arterial disease complications. The following information details the trends and most current rates of amputation and diabetes in Iowa.

1. AMPUTATION TRENDS OVER TIME

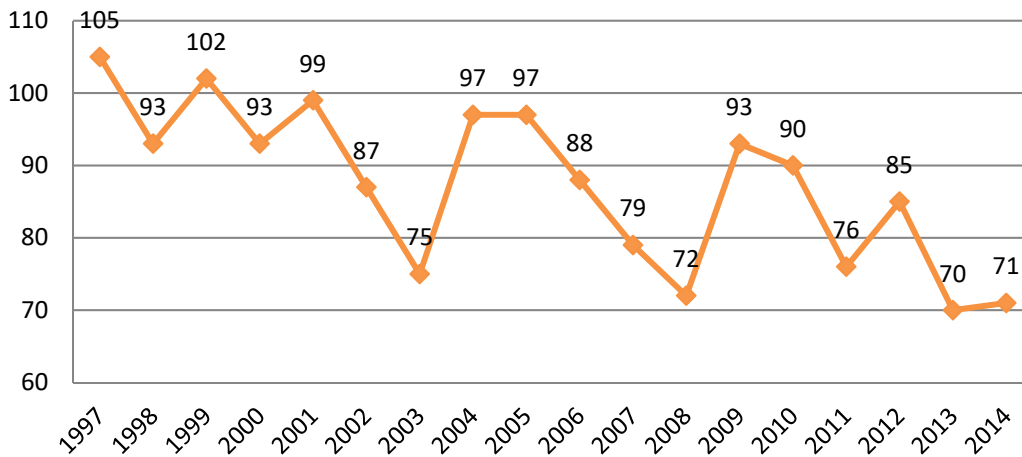
**1.1: Amputation Trends,
Iowa (1997-2014)**

According to hospital discharge data, the number of total amputations performed in Iowa was at a low in 2011 (953) and a high in 1998 (1,294). This overall time period represents a 0.68% decrease. A total of 19,965 amputations were performed in this time period. (See Graph 1.1)



Source: Healthcare Cost and Utilization Project HCUPnet database <http://hcupnet.ahrq.gov/>

1.2: Upper-Extremity Amputation Trends, Iowa (1997-2014)

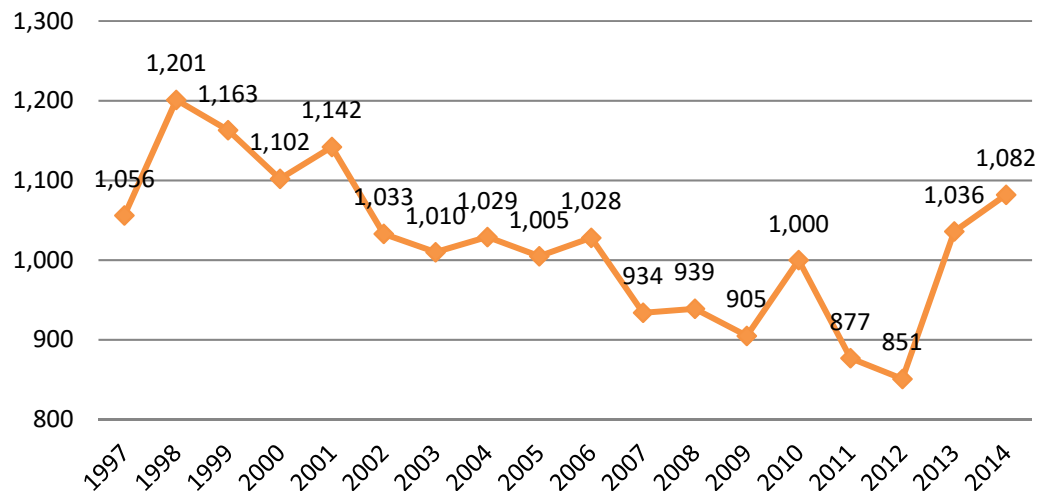


In Iowa, the total number of upper-extremity amputations performed from 1997 to 2014 was 1,572. The year 1997 saw the most of these types of amputations (105), while the lowest incidence (70) occurred in 2013. There is a 32.38% decrease in this time period. (See Graph 1.2)

Source: Healthcare Cost and Utilization Project HCUPnet database <http://hcupnet.ahrq.gov/>

1.3: Lower-Extremity Amputation Trends, Iowa (1997-2014)

A total of 18,393 of lower-extremity amputations were performed from 1997 to 2014. The incidences of these amputations spiked to 1,201 in 1998 and were at their lowest at 851 in 2012. This represents a 2.46% decrease in the number of lower-extremity amputations from 1997 to 2014. (See Graph 1.3)

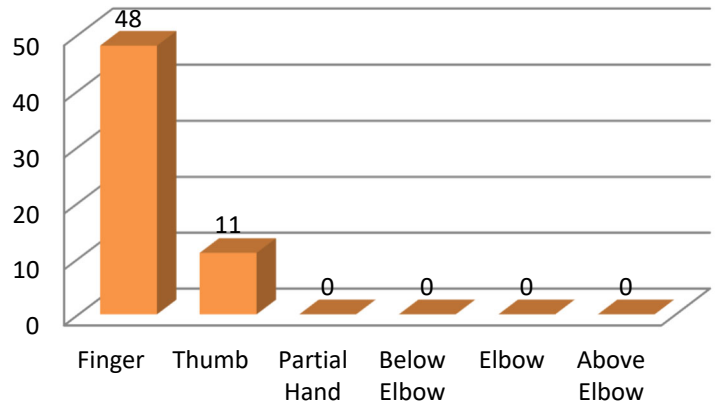


Source: Healthcare Cost and Utilization Project HCUPnet database <http://hcupnet.ahrq.gov/>

2. TYPES OF AMPUTATIONS PERFORMED

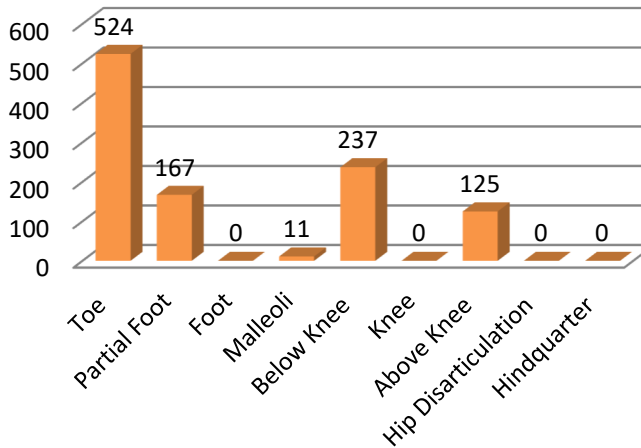
59 upper-extremity amputations were reported in 2014. The most common minor upper-extremity amputation was of the fingers (48) and no major upper extremity amputations were reported (See Graph 2.1)

2.1: Upper-Extremity Amputations, Iowa (2014)



Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>

2.2: Lower-Extremity Amputations, Iowa (2014)



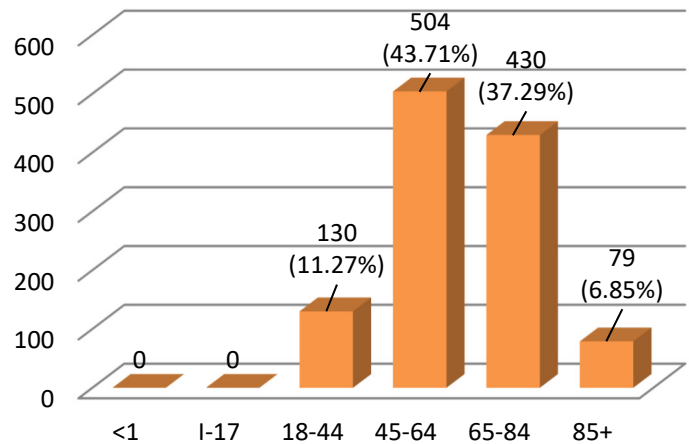
1,064 lower-extremity amputations were performed in 2014. In terms of minor lower-extremity amputations, toes (524) were amputated more often than part of the foot (167). For major lower-extremity amputations, below-knee (237) amputation was the most common procedure, followed by above-knee (125) procedures. (See Graph 2.2)

Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>

3. WHO LOSES A LIMB?

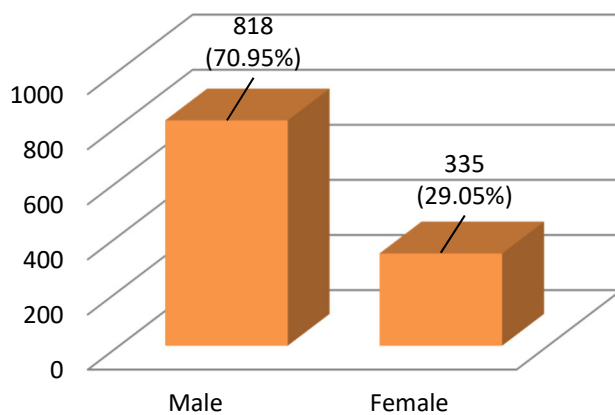
In 2014, most amputations were performed on individuals aged 45-64 years old, closely followed by the age group of 65-84 year olds (See Graph 3.1).

3.1: Amputations by Age Group, Iowa (2014)



Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>

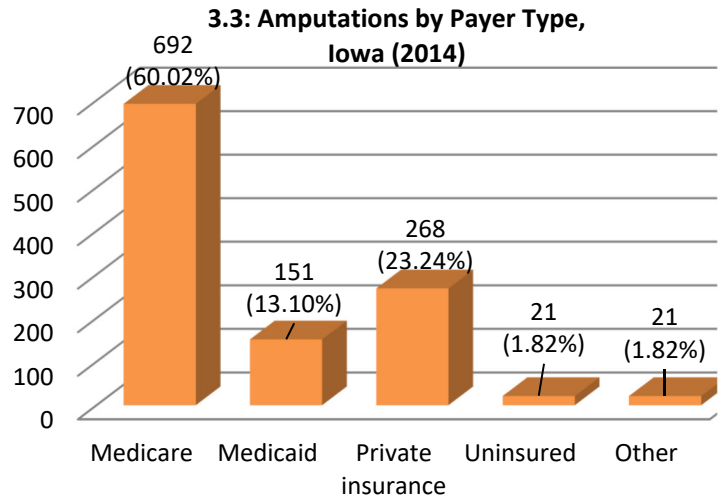
3.2: Amputations by Sex, Iowa (2014)



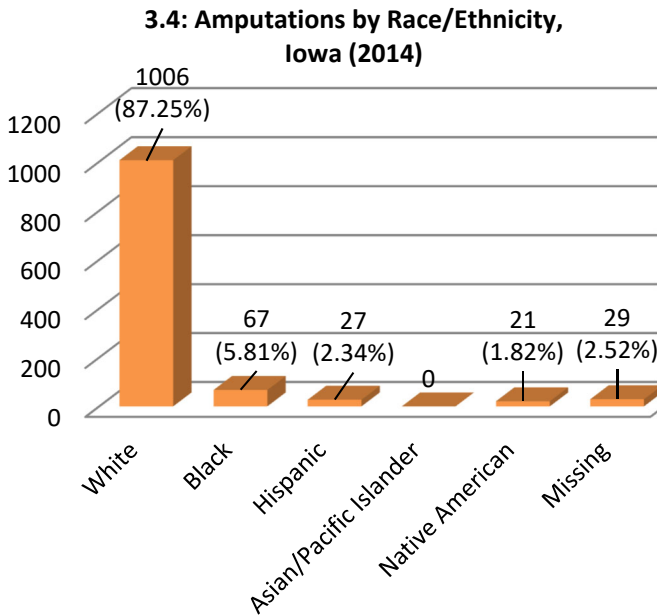
There were roughly 2.5 times more amputations performed on male patients in Iowa than on female patients (See Graph 3.2).

Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>

Medicare recipients ranked as the most common group to have an amputation procedure (See Graph 3.3).



Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>



We can see that the African American population of Iowa bears the heaviest burden of amputation (0.075% of the African American population underwent amputations). This is evident when compared with the percentage of the white population that underwent amputations (0.036%), and with amputations in the state's population as a whole (0.037%). (See Graph 3.4)

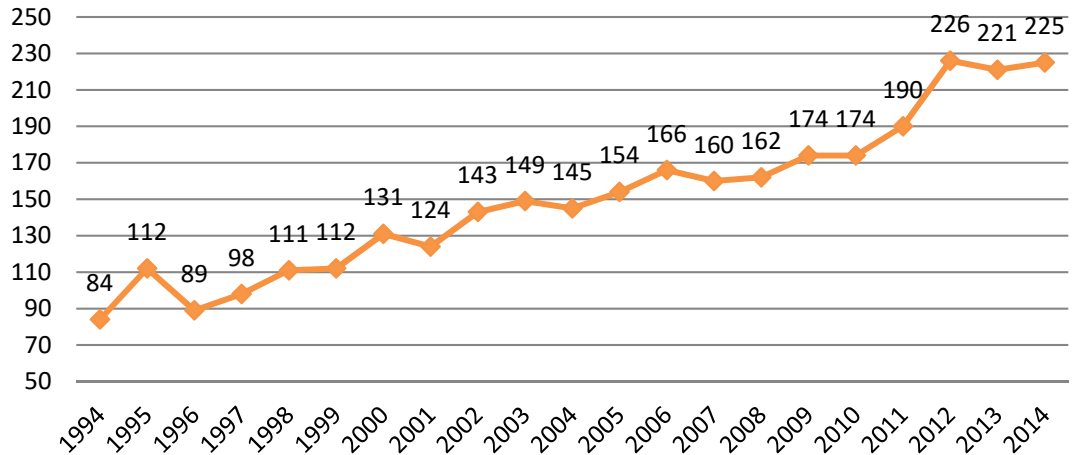
Source: Healthcare Cost and Utilization Project HCUPnet database
<http://hcupnet.ahrq.gov/>

* According to Census Bureau estimation data (<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>), the population of Iowa in 2010 was about 3,046,355 and was made up of about 2,781,561 white residents and 89,148 African American residents.

4. DIABETES TRENDS

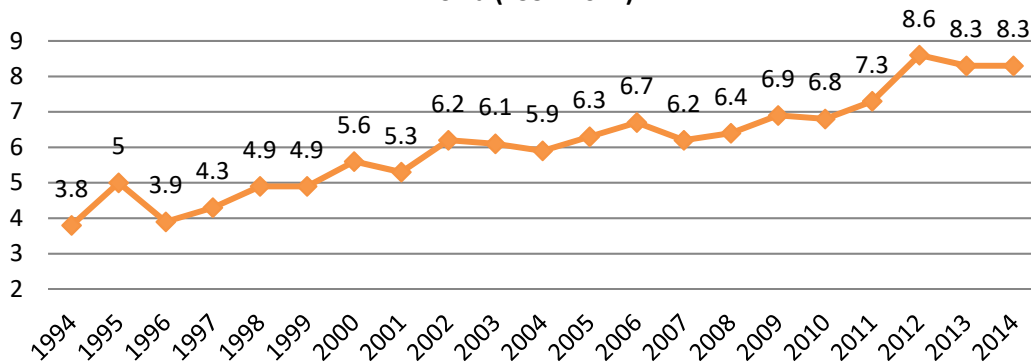
4.1: Diabetes Cases (in thousands; 18+), Iowa (1994-2014)

In 2014, a total of 225,365 Iowa residents indicated that they had been diagnosed with diabetes at some point in their lives. The prevalence of diabetes in the adult population of Iowa increased 167.9% from 1994 to 2014. (See Graph 4.1)



Source: CDC Behavioral Risk Factor Surveillance System <https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html>

4.2: Existing Diabetes Cases per 100 Adults (18+), Iowa (1994-2014)



The annual rate of existing cases of diabetes among adults in Iowa increased 118.4% from 1994 to 2014. (See Graph 4.2)

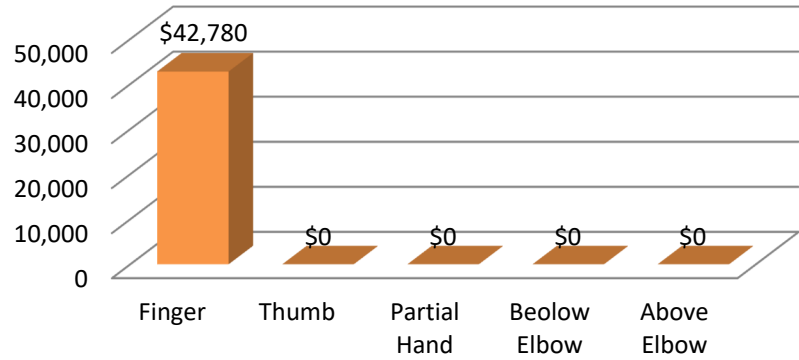
Source: CDC Behavioral Risk Factor Surveillance System <https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html>

5. HEALTHCARE COSTS

For persons with a unilateral lower-extremity amputation, the two year healthcare costs, including initial hospitalization, inpatient rehabilitation, outpatient physical therapy, and purchase and maintenance of a prosthetic device, is estimated to be \$91,106. The lifetime healthcare cost for persons with a unilateral lower extremity amputation is estimated to be more than \$500,000 (5). It is anticipated that these healthcare costs would be higher for a person with a proximal amputation level and bilateral amputation status, due to higher prosthetic costs.

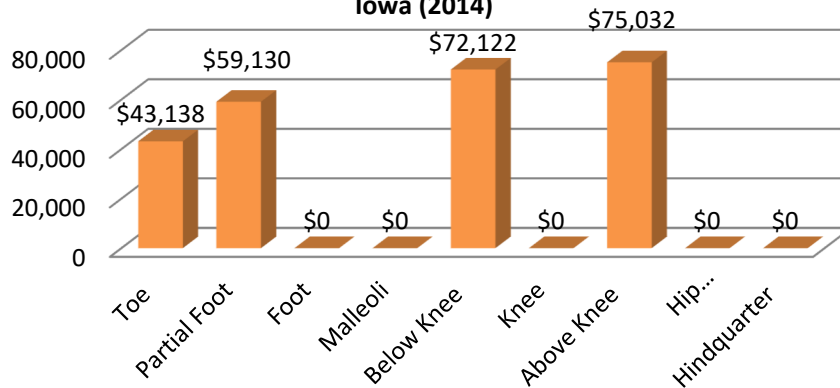
Charges represent what the hospital billed for the case, and may not represent all discharges for amputations. (See graph 5.1)

5.1: Overall Hospital Charges for Upper-Extremity Amputations, Iowa (2014)



Source: Healthcare Cost and Utilization Project HCUPnet database <http://hcupnet.ahrq.gov/>

5.2: Overall Hospital Charges for Lower-Extremity Amputations, Iowa (2014)



Charges represent what the hospital billed for the case, and may not represent all discharges for amputations. (See graph 5.2)

Source: Healthcare Cost and Utilization Project HCUPnet database <http://hcupnet.ahrq.gov/>

6. REFERENCES

1. Ziegler-Graham K, MacKenzie EJ, Ephraim PL, Travison TG, Brookmeyer R. Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050. *Archives of Physical Medicine and Rehabilitation* 2008;89(3):422-9.
2. Coalition LLTFA. Recommendations from the 2012 Limb Loss Task Force: Roadmap for Preventing Limb Loss in America. [White Paper]. 2012 February 9-12.
3. Bryant PR, Pandian G. Acquired limb deficiencies. 1. Acquired limb deficiencies in children and young adults. *Archives of Physical Medicine and Rehabilitation* 2001;82(3B):00s3-s8.
4. Li Y, Burrows NR, Gregg EW, Albright A, Geiss LS. Declining Rates of Hospitalization for Nontraumatic Lower-Extremity Amputation in the Diabetic Population Aged 40 Years or Older: U.S., 1988-2008. *Diabetes Care* 2012;35(2):273-7.
5. MacKenzie EJ. Health-Care Costs Associated with Amputation or Reconstruction of a Limb-Threatening Injury. *The Journal of Bone and Joint Surgery (American)* 2007;89(8):1685.