A population health analysis of statewide trends in lower extremity amputation secondary to diabetes and peripheral artery disease, 2016-2023

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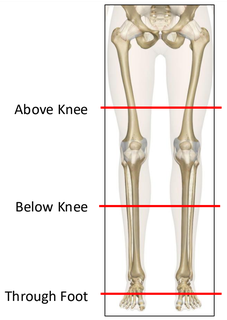
Background

- Lower extremity (LE) amputation is a devastating consequence of diabetes mellitus (DM) and peripheral artery disease (PAD)
- ~150,000 non-traumatic LE amputations occur annually in the U.S.
- Recent population-based trends in above knee (AK), below knee (BK), or through foot (TF) amputations have not been fully explored



LE amputation levels

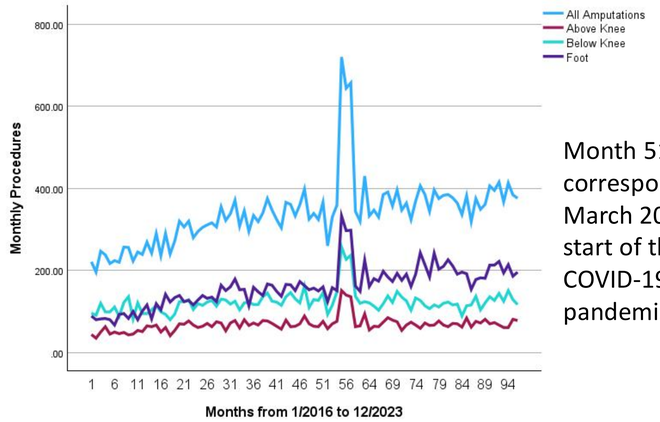
Research Objective

To analyze LE amputation rates and inpatient outcomes for Illinois residents from 2016 to 2023

Methods

- 2016-2023 hospital admissions for AK, BK, TF amputations identified from Illinois Hospital Association COMPdata database
- Patients < 34 years, with oncology or trauma-related diagnosis codes, or isolated toe amputations excluded
- Average annual amputation rates per 100,000 by age, sex, race and ethnicity, and zip code household poverty levels calculated using American Community Survey estimates

Figure 1. Monthly amputation procedures by level



Month 51 corresponds to March 2020, the start of the COVID-19 pandemic

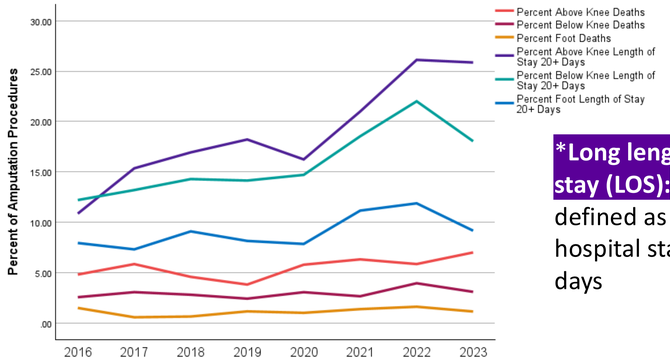
Results

- Steady increase in number of amputations over the study period
  - Largest increase over the study period was for TF, with more modest increases in major amputations (**Figure 1.**)
  - 30,834 amputation admissions from 193 Illinois hospitals, increasing 65% from 2016 to 2023
- Average annual amputation rate per 100,000 increased from 38.6 (2016) to 68.6 (2023) (**Table 1.**)
  - Largest rate per 100,000 increases: males (41.8) and non-Hispanic Black patients (45.1)
  - IL residents aged 65-74 had largest rate increase among age groups and major amputations were most common for older adults
- Mortality (2.5% overall) was stable, stays of > 20 days* increased from 10% to 14.0% in 2023 (**Figure 2.**)
- In 2016, 78.5% of amputation procedures also had DM diagnosis, increasing to 82.2% in 2023 (**Table 2.**)

Table 1. Differences in amputation rates per 100,000 IL residents

Populations	2016 Amputation Rate per 100,000	2023 Amputation Rate per 100,000	Change in rate
All IL Residents			
Age 35+	38.6	63.6	25.0
Age 35-64	27.9	46.4	18.5
Age 65-74	62.7	105.1	**42.4**
Age 75+	65.6	103.8	**38.2**
Sex			
Males	54.9	96.7	**41.8**
Females	23.3	32.7	9.4
Race/Ethnicity			
Non-Hispanic White	33.2	50.2	17.0
Non-Hispanic Black	77.0	122.1	**45.1**
Hispanic	29.8	59.5	29.7
Other/Unknown	44.2	112.8	68.6
Percent Below Poverty Level			
Low poverty (5% or less)	24.3	41.1	16.8
Medium poverty (5-10%)	36.6	61.3	24.7
Medium-high poverty (10-20%)	51.4	83.6	32.3
Very high poverty (20% or more)	83.0	130.6	**47.6**

Figure 2. % of LOS* and deaths by amputation level



***Long length of stay (LOS):** defined as length of hospital stay > 20 days

Table 2. Diabetes prevalence in IL residents undergoing LE amputation

Year	Diabetes Prevalence (% of all amputees)
2016	78.5
2017	80.1
2018	82.1
2019	82.3
2020	82.6
2021	82.0
2022	80.7
2023	82.2

Limitations

- Dataset represents amputation procedures, not specific patients
- Unable to distinguish patients undergoing primary amputation vs. failed revascularization procedures
- Procedures at VA hospitals not included in dataset

Conclusions

- Racial, socioeconomic and gender disparities in amputation rates are increasing despite therapeutic improvements and reduced smoking rates, reflecting increasing DM and PAD prevalence
- Health systems and community partners should emphasize aggressive prevention including screening, early diagnosis and intensive DM and PAD risk factor management