

# A retrospective audit of diabetes-related lower limb amputations (DRLLA) in metro Auckland July 2015 - June 2016

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## Background/ Introduction

In New Zealand diabetes is the leading cause of lower limb amputations [1]. Inequalities are known to exist here particularly for Māori where the diabetes related lower limb amputation (DRLLA) rate is significantly higher than all other ethnicities [2, 3]. The majority of DRLLAs are preceded by a foot ulcer. Some authors suggest that the outcomes for diabetes related ulcers and amputations are worse than for many types of cancer with high 5 year mortality and morbidity rates [4, 5]. Well organised evidence based diabetic foot management that supports targeted preventative care and rapid referral for assessment of active foot problems can significantly improve outcomes [6].

## Aim

To understand the demographics and causes of diabetes related amputations in the metro-Auckland population and identify potential improvements to health care delivery that may reduce the numbers of DRLLAs.

## Methods

People who underwent a DRLLA, July 2013 to June 2016 inclusive, were identified from the national minimum dataset (NMDS). Information on DRLLAs, hospital admissions and demographics were also obtained from the NMDS. More detailed clinical data and information on podiatry services utilisation was obtained from hospital clinical records for those with an amputation July 2015 to June 2016.

Population numbers used to calculate resident and diabetic population amputation rates were obtained from Statistics NZ DHB projected population data and from the Virtual Diabetes Register 2016 respectively.

## Discussion

Our findings of higher rates of DRLLAs in males, for Māori and a high prevalence of comorbidities are in keeping with other New Zealand and international studies [2, 7].

Recording critical event accurately can be important looking at funding pathways such as ACC and also guide prevention. Less than half of cases that had trauma noted as an underlying cause had an ACC flag. This may mean patients and organisations are not accessing rehabilitation support and funding that they are entitled to. Audit participation has already led some diabetic high risk foot services to improve documentation of the critical event.

Only a third of admissions were seen by the diabetes high risk foot service prior to amputation. Some of the remainder may have been by other secondary and primary care services but this finding indicates referral behaviors that differ from the recommended referral pathways. In the UK time to first expert assessment is used as a quality of care indicator. Longer times to first expert assessment are associated with more severe ulcers, poor healing rates and more hospital admissions, revascularization and amputations[8].

## Conclusion

This audit adds to local knowledge regarding amputations in Metro Auckland. Our findings of differing rates of DRLLAs by ethnicity and gender is consistent with other studies and reinforces the need for further research to establish reasons and solutions to combat these health inequities. It demonstrates that local referral pathways need to be further embedded to expedite access to expert care and support rapid timely referral for acute diabetic foot problems. Future work is planned to refine the audit tool and build a quality improvement programme based on a critical event analysis approach to major DRLLAs.

## Results

### Admissions

Between July 1<sup>st</sup> 2013 and June 30<sup>th</sup> 2016 there were 523 admissions for a total of 723 DRLLAs in 404 people with diabetes in the Metro Auckland region.

In the 2015/16 financial year cohort there were 193 admissions:

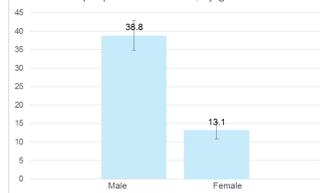
- 55 Waitemata DHB
- 57 Auckland DHB
- 81 Counties Manukau DHB

The majority of procedures were toe amputations. In total 25% were major amputations (above or below knee amputations).

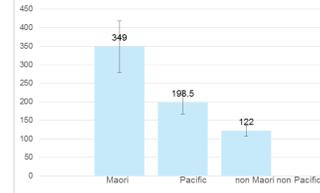
### Amputation Rates

- The age standardized rate (ASR) for DRLLA admissions in metro Auckland was 24.9 (95%CI 22.7 to 27.0) per 100,000 resident population aged 35 years and over, 2013 – 2016.
- The ASR of admissions for DRLLAs was 186.3 (95% CI: 170.8 – 201.8) per 100,000 people with diabetes aged 35 years and over, 2013 – 2016.
- Rates were significantly higher in males compared with females and Māori and Pacific compared with non-Māori non-Pacific in both resident and diabetic populations.

Rate of admission for a DRLLA per 100,000 people with diabetes, by gender



Rate of admission for a DRLLA per 100,000 people with diabetes, by ethnicity

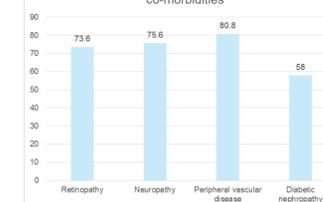


### Co morbidities, Causes and Critical Events

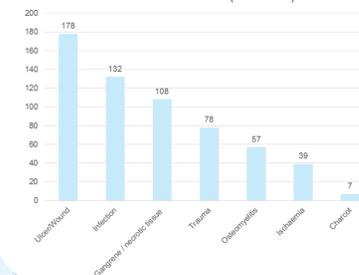
The prevalence of co-morbidities was high (see figure below).

Most amputations were multifactorial in cause, with underlying wounds/ulcers and infection present in the majority of cases. An ACC flag was present in 28 cases. The specific type of trauma or critical event leading to wounds /ulcers was generally poorly documented in the clinical records. Some examples of underlying critical events that were identified are listed below.

Proportion of 2015/16 Cohort with selected co-morbidities



Cause of DRLLAs (numbers)



Selected Critical events

Selected Critical events	Number
Non healing amputation site	14
Knocked toe	10
Footwear	9
Pressure injury	8
Abscess	5
IGTN / cutting toenails	4
Burns	4
Foreign body / penetrating injury	4
Broken / cracked skin	3
Fall	3
Fracture	3

### Foot care service utilisation

In 64/193 admissions the patient was seen by secondary diabetic foot care services prior to amputation. It was unclear from hospital clinical records how many were under community podiatry care.

### References

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