

# Post-mortem and toxicology review of sudden unexpected death in epilepsy (SUDEP) in New Zealand 2007-2016

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## Background/ Introduction

Sudden unexpected death in epilepsy (SUDEP) is well recognised and widely reported but remains poorly understood<sup>1,2</sup>. It is the leading cause of death in many epilepsy populations<sup>2</sup>.

SUDEP in young adults (aged 20-45) is 27 times more common than sudden death in control populations<sup>1</sup>. The rate of SUDEP is thought to be highest in young adult populations but SUDEP may be under reported in older population<sup>2</sup>.

The risk of SUDEP in epilepsy clinic populations ranges from 1.1 - 5.9 per 1000 people and the pooled estimate from meta-analysis suggests there are 1.2 cases of SUDEP per 1000 people with epilepsy per year<sup>1</sup>. The incidence of SUDEP in New Zealand is not known but using this figure it is estimated that approximately 40 people with epilepsy in New Zealand die from SUDEP every year.

SUDEP has not been systematically studied in New Zealand.

## Aim

The post-mortem reports and post-mortem toxicology analysis were reviewed to establish if risk factors thought to be associated with SUDEP such as antiepileptic medication non compliance or alcohol and drug abuse<sup>1,2,3</sup> were associated with SUDEP in New Zealand.

## Methods

Epilepsy is consistently under documented on death certificates<sup>1</sup> and identifying all deaths in people with epilepsy is difficult. The Coroner's office retrospectively identified all probable cases of SUDEP in New Zealand from 2007-2016 (n=190).

The post mortem reports were reviewed to categorise each case as definite SUDEP (n= 125), definite SUDEP plus (n=41), probable SUDEP (n=3,) or not SUDEP (n=21) using published criteria<sup>2</sup>. Toxicology results taken around the time of the post-mortem were reviewed.

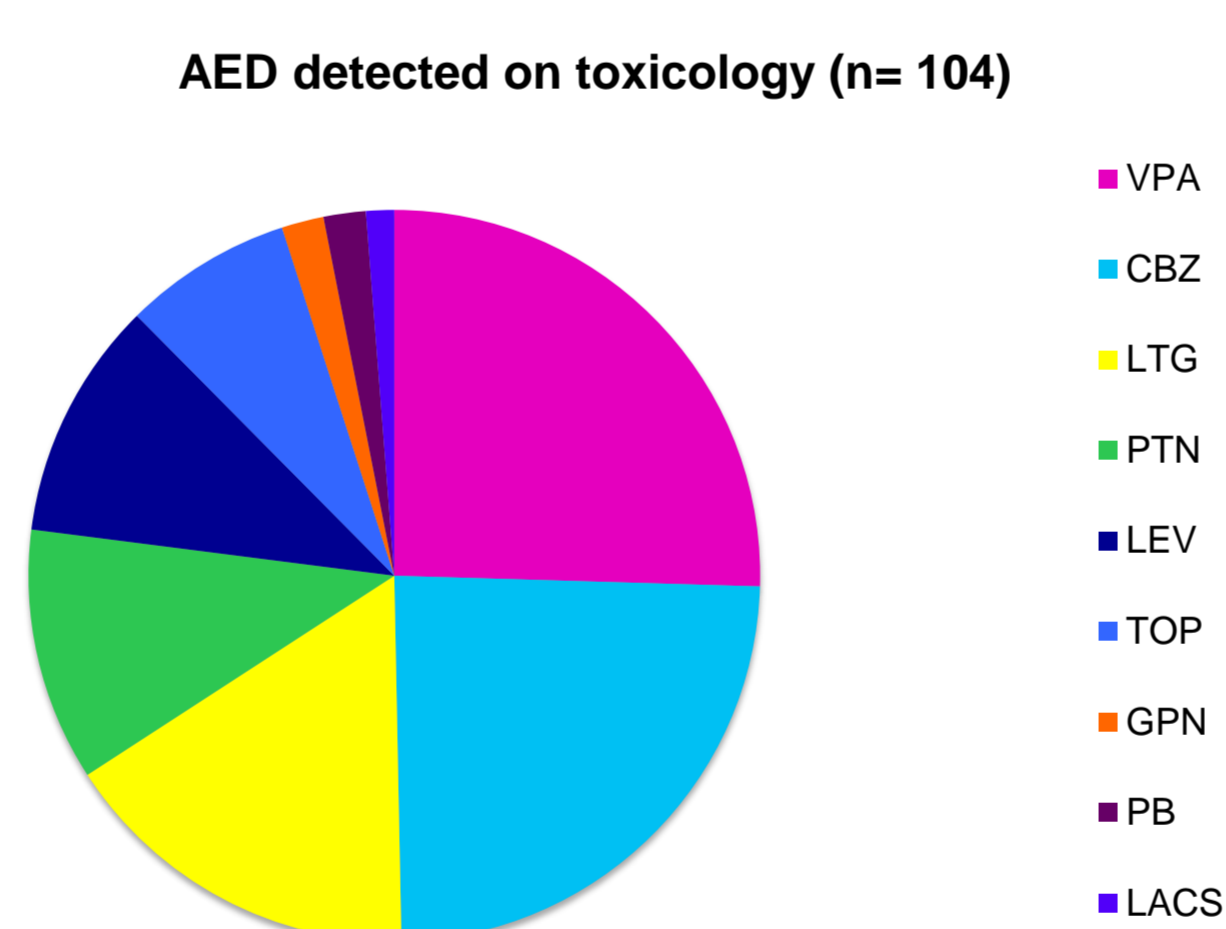
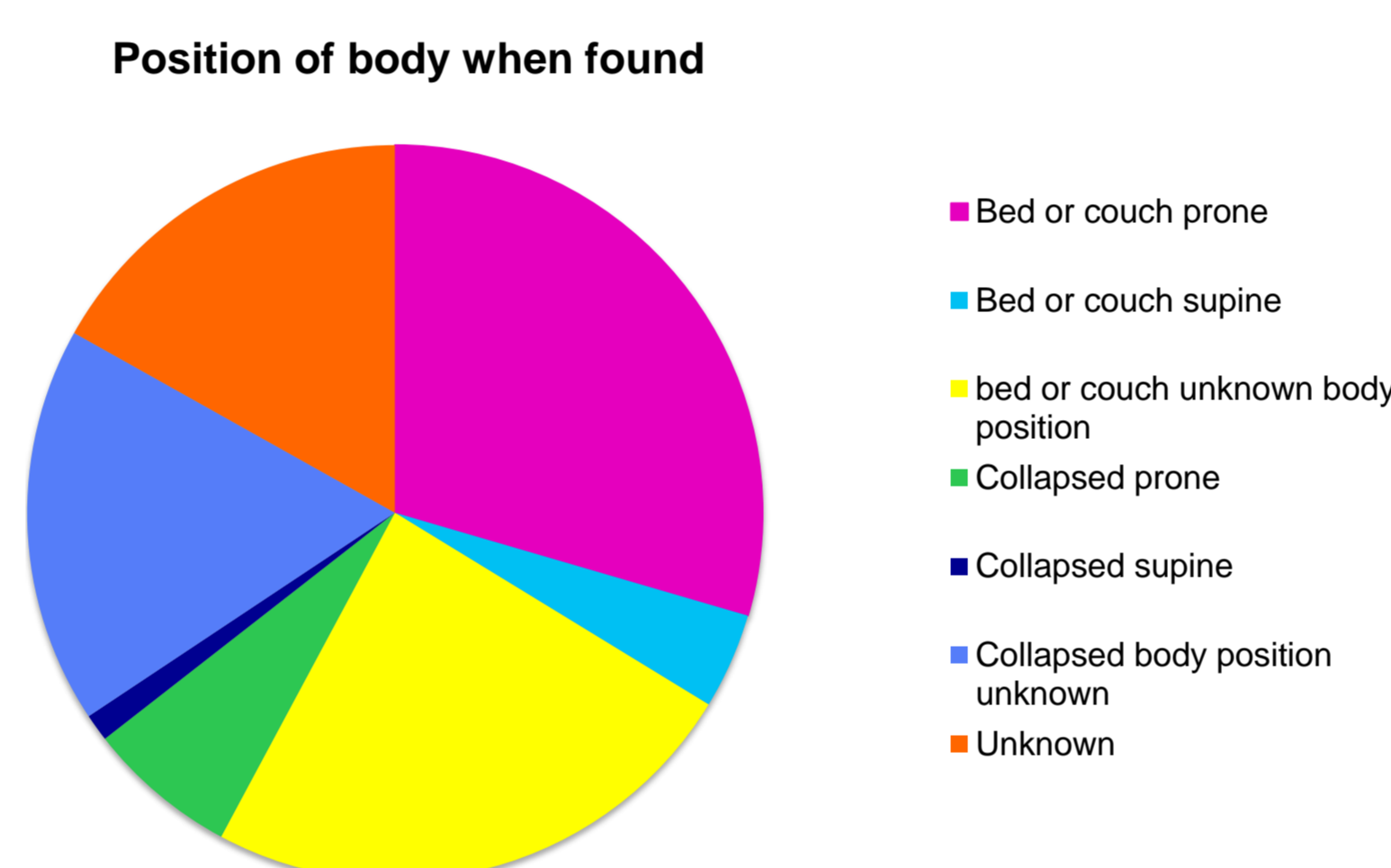
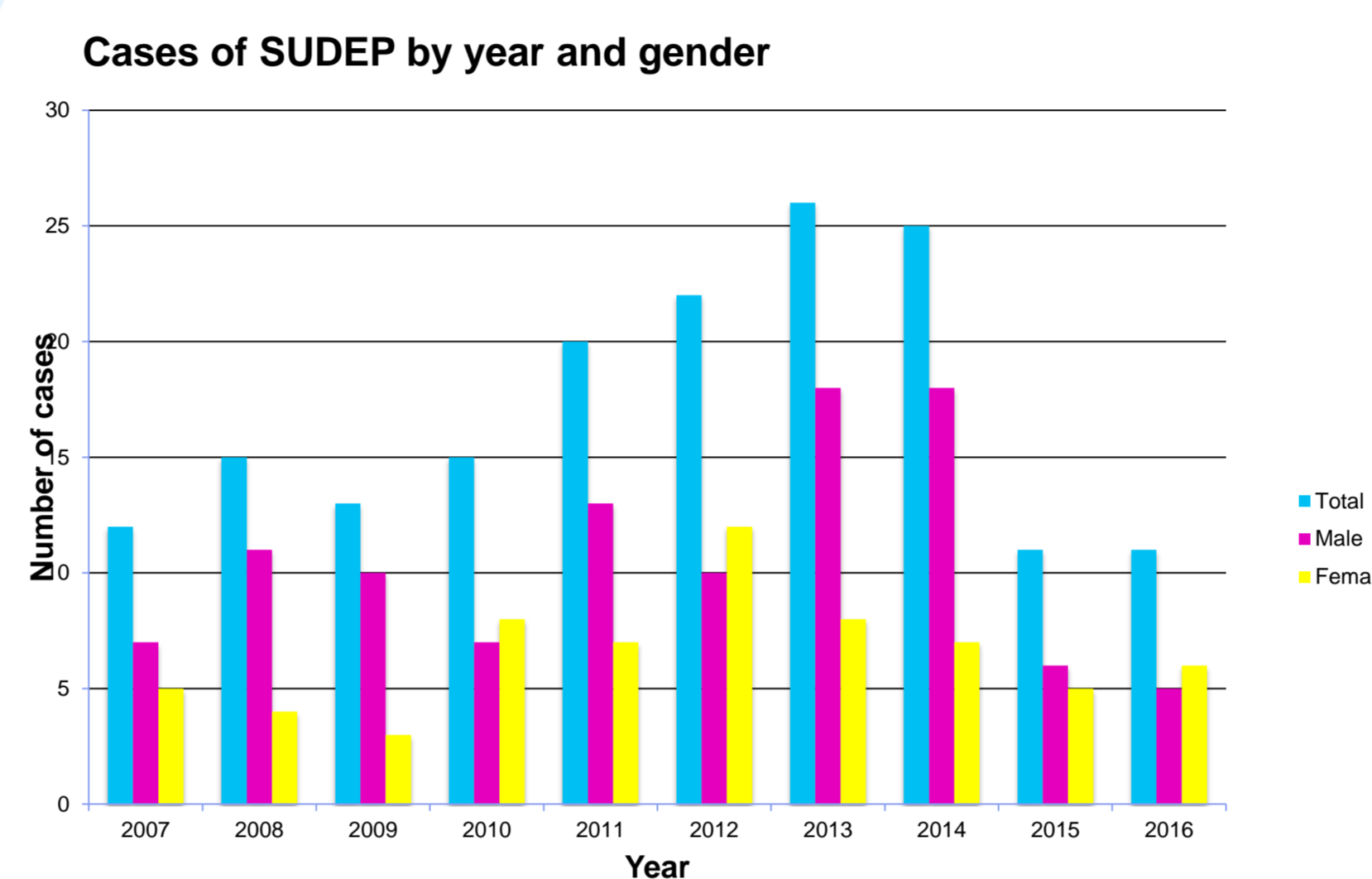
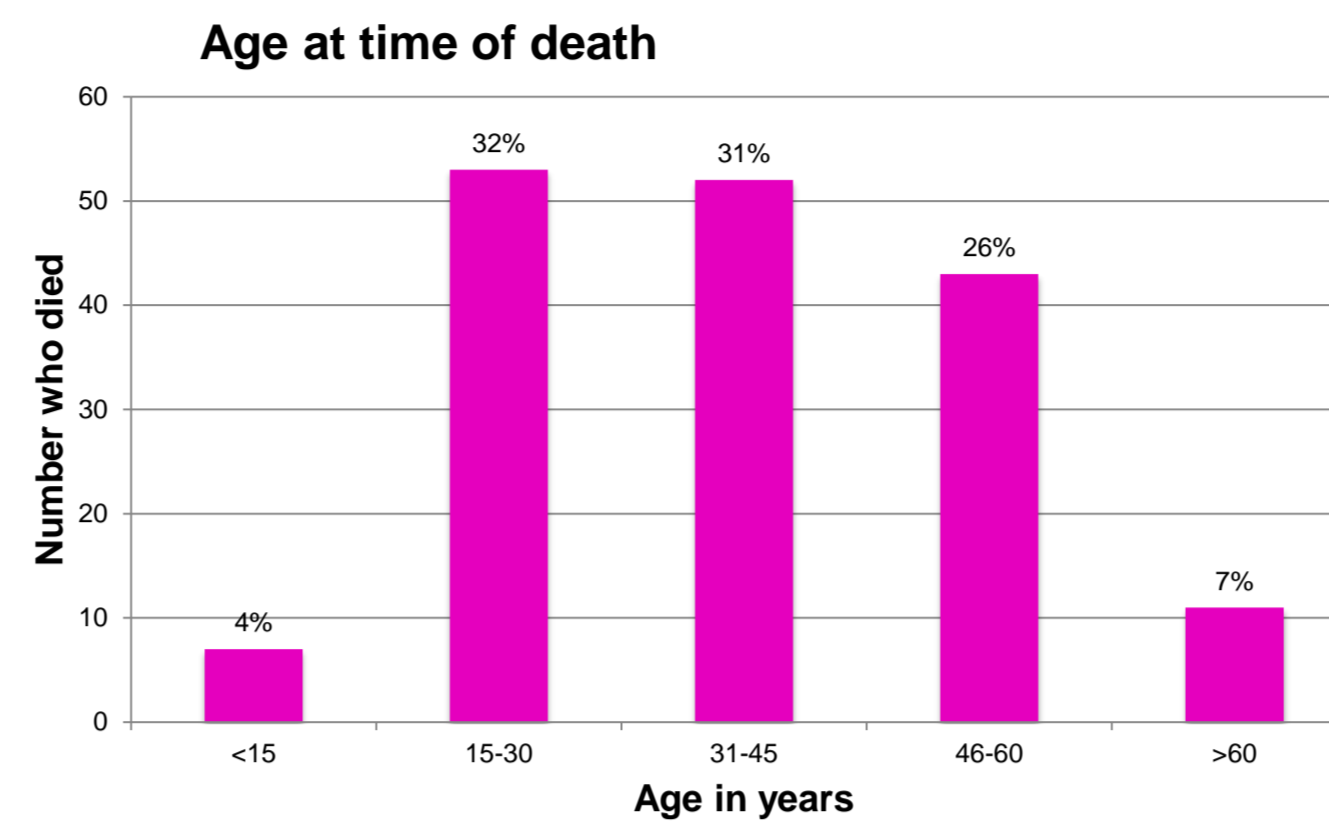
## Discussion

Each case of SUDEP represents a tragic premature loss of life. 67% of this cohort were younger than 46 years old at the time of death. Better understanding of who is at risk of SUDEP may allow strategies to be developed that will reduce premature mortality in epilepsy. Post-mortem cohorts may be a means of identifying associations. However the range of information that is recorded at post-mortem is often inconsistent.

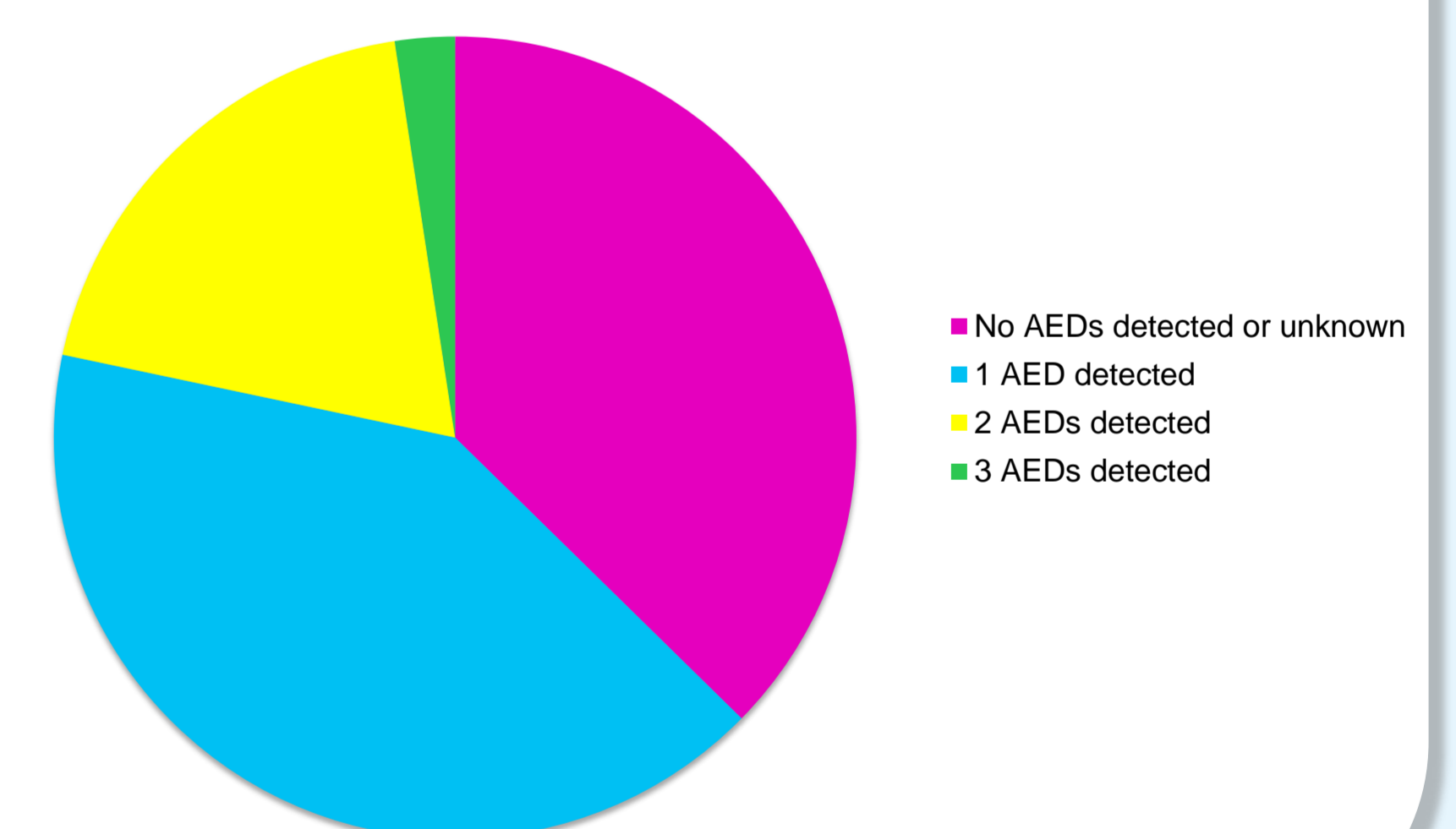
## Conclusion

This cohort of Coroner identified cases of SUDEP has characteristics that are similar to other SUDEP cohorts but it is likely that some cases have been missed particularly in older people. This cohort does not support previous studies which have suggested SUDEP may be linked to AED non-compliance as in the majority of people at least one AED was present on toxicology analysis at the time of death. There is a suggestion of social disadvantage/isolation with only 30% working or retired at the time of death.

Standardisation of post-mortem documentation would increase the yield of this type of review<sup>3</sup>. If post-mortem information was documented in a more systematic manner more detailed analysis of risk factors that are associated with sudden death may be possible with the ultimate aim of identifying interventions to reduce premature deaths in epilepsy populations.



Number of AEDs at the time of death detected by toxicology



### References

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3. Middleton O, Atherton D, Burdock E et al (2018) National Association of medical examiners position paper: Recommendations for the investigation and certification of deaths in people with epilepsy. *Epilepsia* 59:3 530-44