The NETwork! Registry analysis supports the WHO 2017 classification in the first NET specific survival analysis for a complete population

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Background

- Descriptions of NET incidence and outcome use estimates of population denominator of variable quality.
- Generally, they do not measure NET specific survival.
- We describe a study of every NET diagnosed in a whole country population, to overcome such limitations.

Methods

- Data was collected from all patients diagnosed with a NET in New Zealand between 2008 and 2012, excluding pulmonary small cell carcinoma.
- Primary data source was the NZ Cancer Registry (73% of cases).
- Secondary data was obtained from searches of pathology records in every hospital in New Zealand.
- Clinical data was collated on each patient, including detailed pathology from individual medical records.
- Age adjusted incidence rates were calculated using Statistics New Zealand summary data for the total New Zealand population during each of the five years 2008-2012. These were adjusted against the WHO age distribution of a standard population (2001).
- Disease specific survival was ascertained by linking data to national records of date and cause of death.
- Reports of grade and differentiation were converted to WHO 2017 criteria where possible (42% and 88% respectively).

Results

Figure 1. Age adjusted incidence of NETs

1661 patients were diagnosed with NET, with age adjusted incidence increasing to 6.2 per 100,000 in 2012 (*p=0.06*).

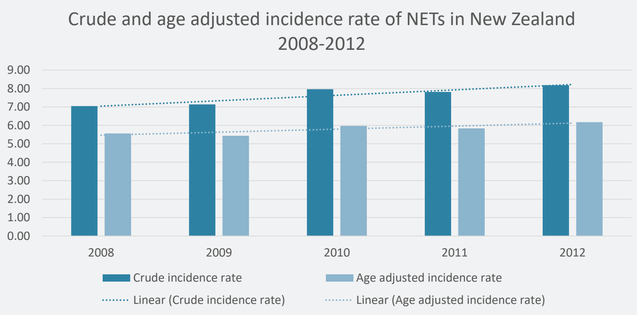


Table 1. NET Epidemiology

Previous epidemiological studies of NETs have focused on overall survival.

Author	Journal	Data set	Year	Analysis conducted
Chang et al	Cancer Medicine	Taiwan Cancer Registry	2018	OS
Desari et al	JAMA Oncology	SEER	2017	OS
Hallet et al	Cancer	ICES, Canada	2015	OS
Hauso et al	Cancer	SEER, Norway Registry of Cancer	2008	OS
Yao et al	J Clin Oncol	SEER	2008	OS

Figure 5. Disease specific survival by tumour differentiation

5 year disease specific survival for well differentiated NETs is significantly better than for poorly differentiated tumours (*p < .0001, HR=6.7 95% CI 5.7-8.1*).

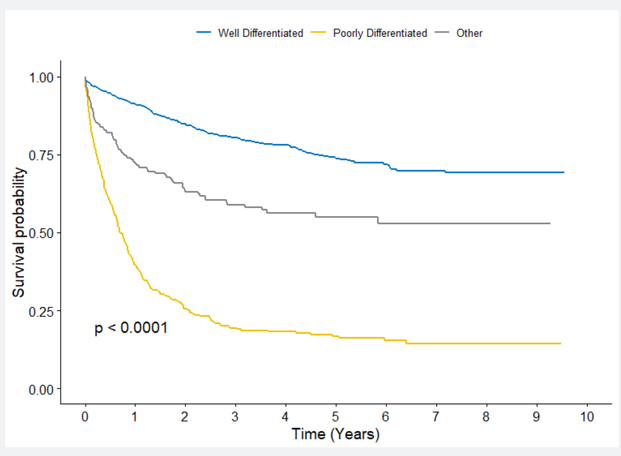


Figure 2. Disease specific vs. overall survival

Overall 5 year survival from NETs is around 50%, whilst NET-specific survival is around 60%, showing that while many patients die from their disease, a substantial proportion die from other causes.

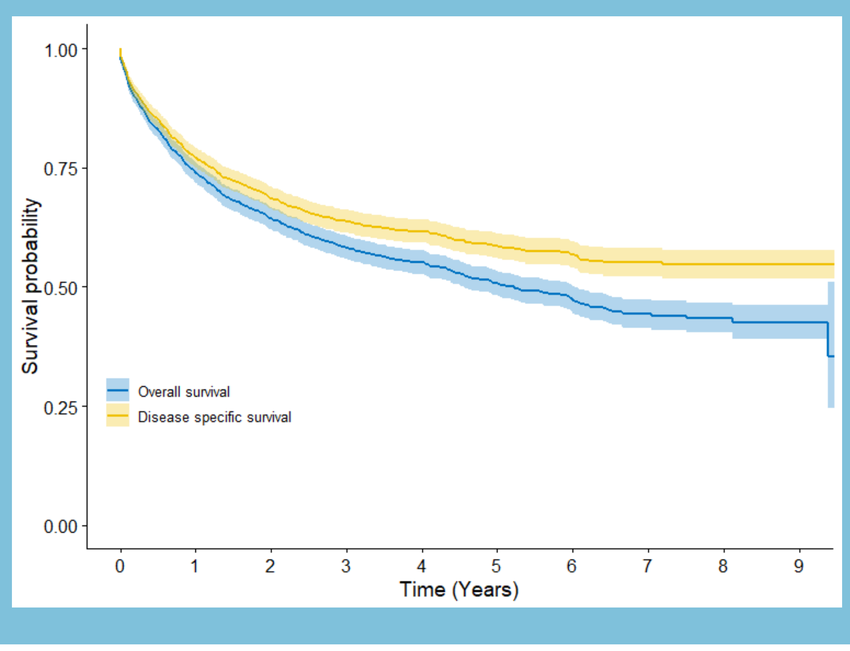


Figure 4. Disease specific survival by pathological classification

5-year disease specific survival differed significantly by WHO 2017 grade. *HR compared to G1: G2 = 1.4 (95% CI 1.0-2.0); G3 = 5.1 (95% CI 2.9-8.9); NEC = 10.6 (95% CI 7.5-15.1) (p < .0001).*

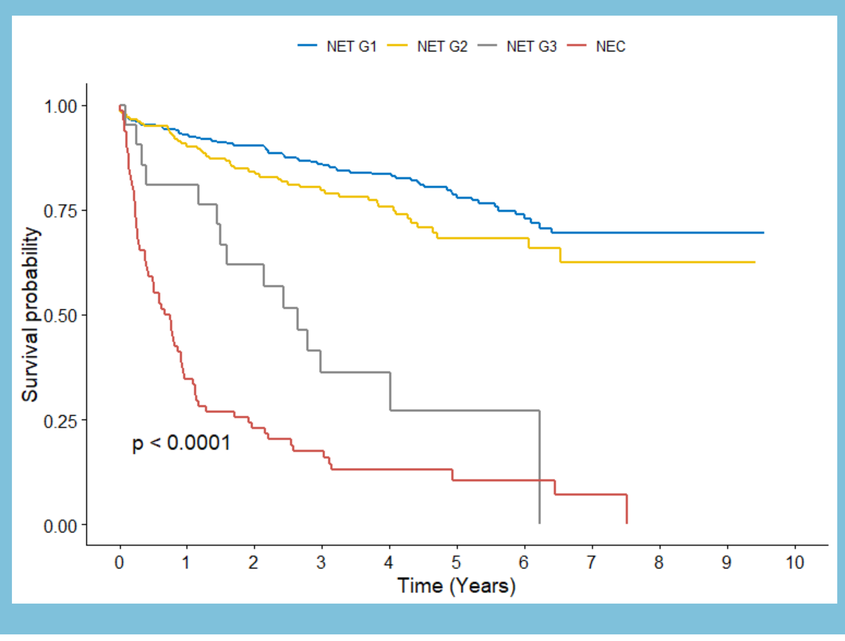
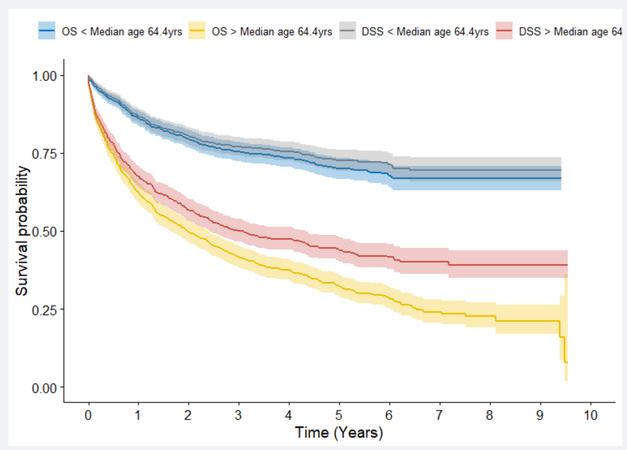


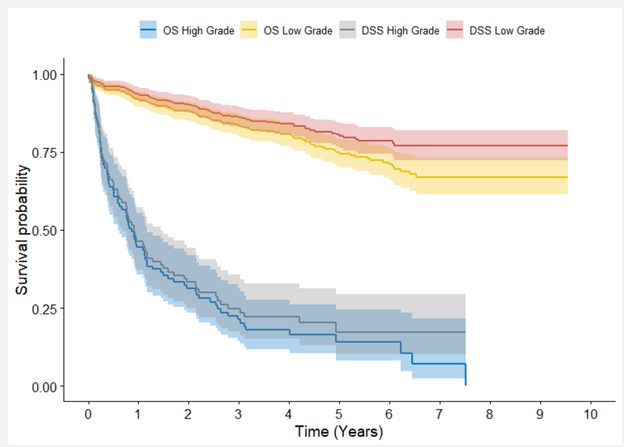
Figure 3. Survival by age and grade

Both overall and NET-specific 5 year survival were significantly worse for those patients aged above the median age (64.4 years) at diagnosis.

Disease specific survival was more favourable for older patients relative to overall survival, perhaps in keeping with death from other causes due to older age.



As expected, both overall and disease specific survival for combined low grade NETs (G1/2) was significantly better than high grade tumours (G3/NEC) (*p < .0001*). Interestingly, there was no difference between overall and disease specific survival in the low grade tumours.



When combined with the figure above, this suggests that the difference between overall and disease specific survival shown in Figure 2 is accounted for by higher age at diagnosis rather than lower tumour grade.

Conclusions

To the best of our knowledge, this study describes the first analysis of NET incidence and outcome calculated using a whole national population as the denominator, and the first to report five year disease specific survival.

This highly accurate dataset supports extrapolating WHO 2017 pancreas guidelines to NETs from other sites.

Although the majority of patients died of their NET, analysis of disease specific survival showed that this is not true in a proportion of older patients.

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