

Epidemiology of Neuroendocrine Tumours in Ontario: A 15-year Population-based Study

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Background

- A recent study of the SEER database in the United States showed a 5-fold increase in neuroendocrine tumours (NETs) over the last 30 years
- An increasing incidence has also been reported in Norway, Sweden, England, Holland, Switzerland, Italy and Japan, but interestingly not in the Netherlands
- The anatomic distribution is not consistent worldwide
- In Canada, Ontario represents the largest and most populated province (13,372,996 in 2011), with 39% of all the new cases and deaths for cancer in the country; no NETS epidemiological data has been published to date

Objective

- The objective of our study is to describe the incidence and anatomical distribution of NETs in Ontario over the last 15 years

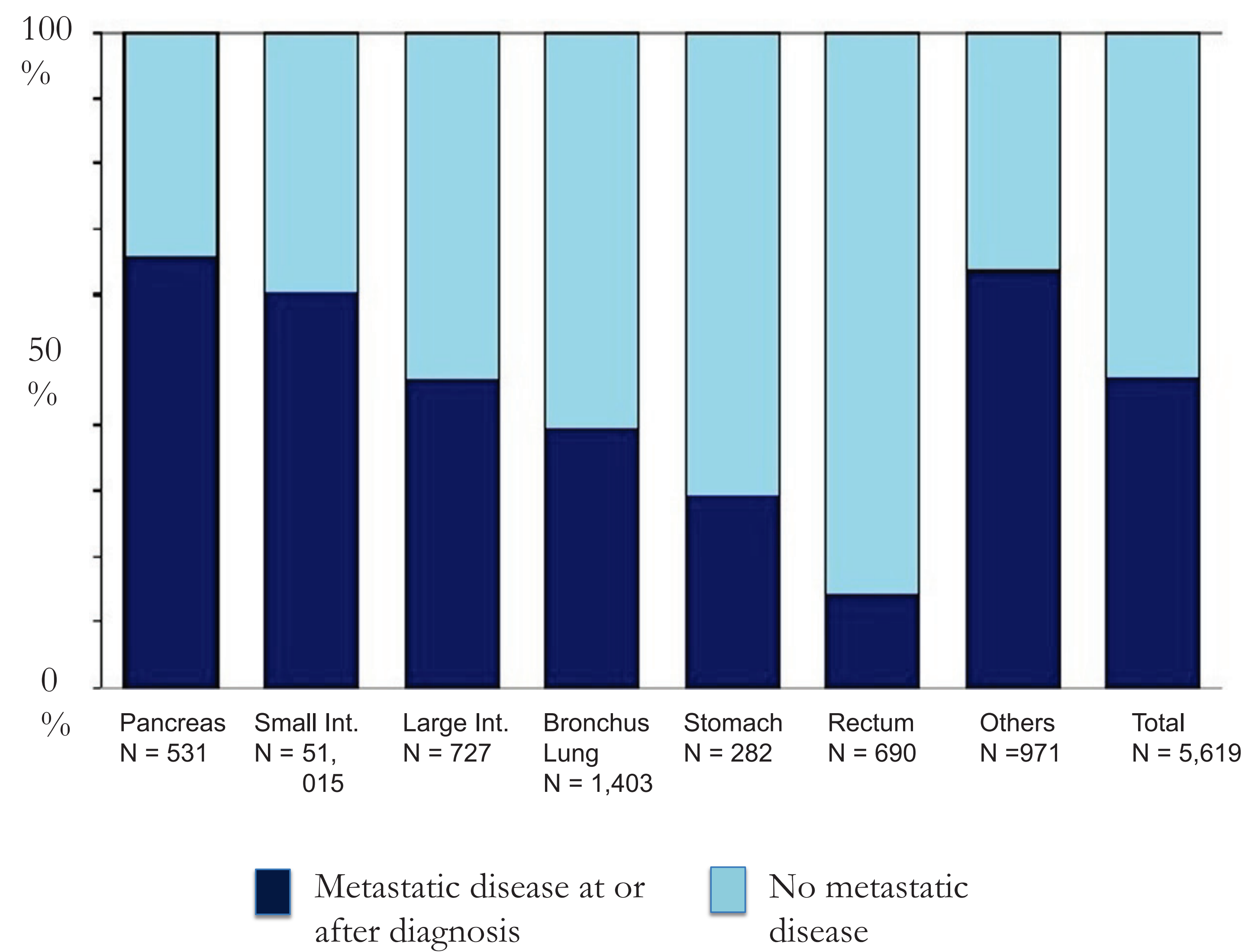
Methods

- A population-based study was performed using the Ontario Cancer Registry (OCR), a population-based cancer registry, with computerized systematic collection of data on all residents of province of Ontario
- All NETs diagnosed between January 1994 and December 2009 were collected using ICD-9 diagnostic codes and ICD-O histology codes
- The statistical analysis was performed using Statistical Analysis System, Version 9.2 (SAS Institute Inc., USA)

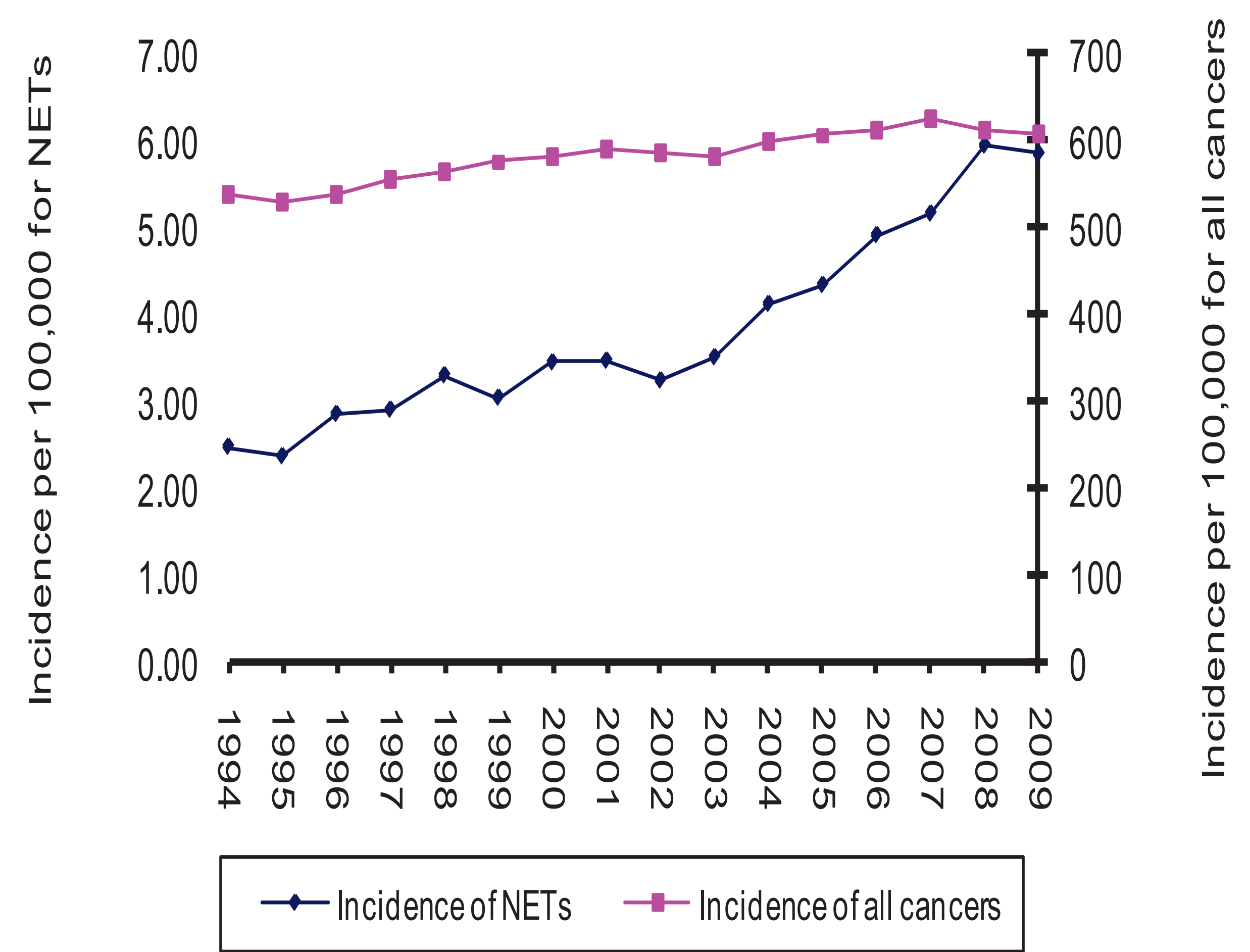
Results

- N = 5619 cases. The median age was 62 with 50.5% females
- The incidence rate increased from 2.46 per 100,000 (95% CI, 2.13-2.83) in 1994 to 5.86 per 100,000 (95% CI, 5.40 – 6.35) in 2009
- For 2009, bronchopulmonary NETs were the most common (22%), followed by jejunum/ileum (17%) and rectal (16%)
- The absolute increase was most pronounced for pNETs (6-fold), rectal (5-fold) and gastric (5-fold) NETs
- Metastatic disease was documented in 47% of the cases; 26% at diagnosis and 21% during follow-up

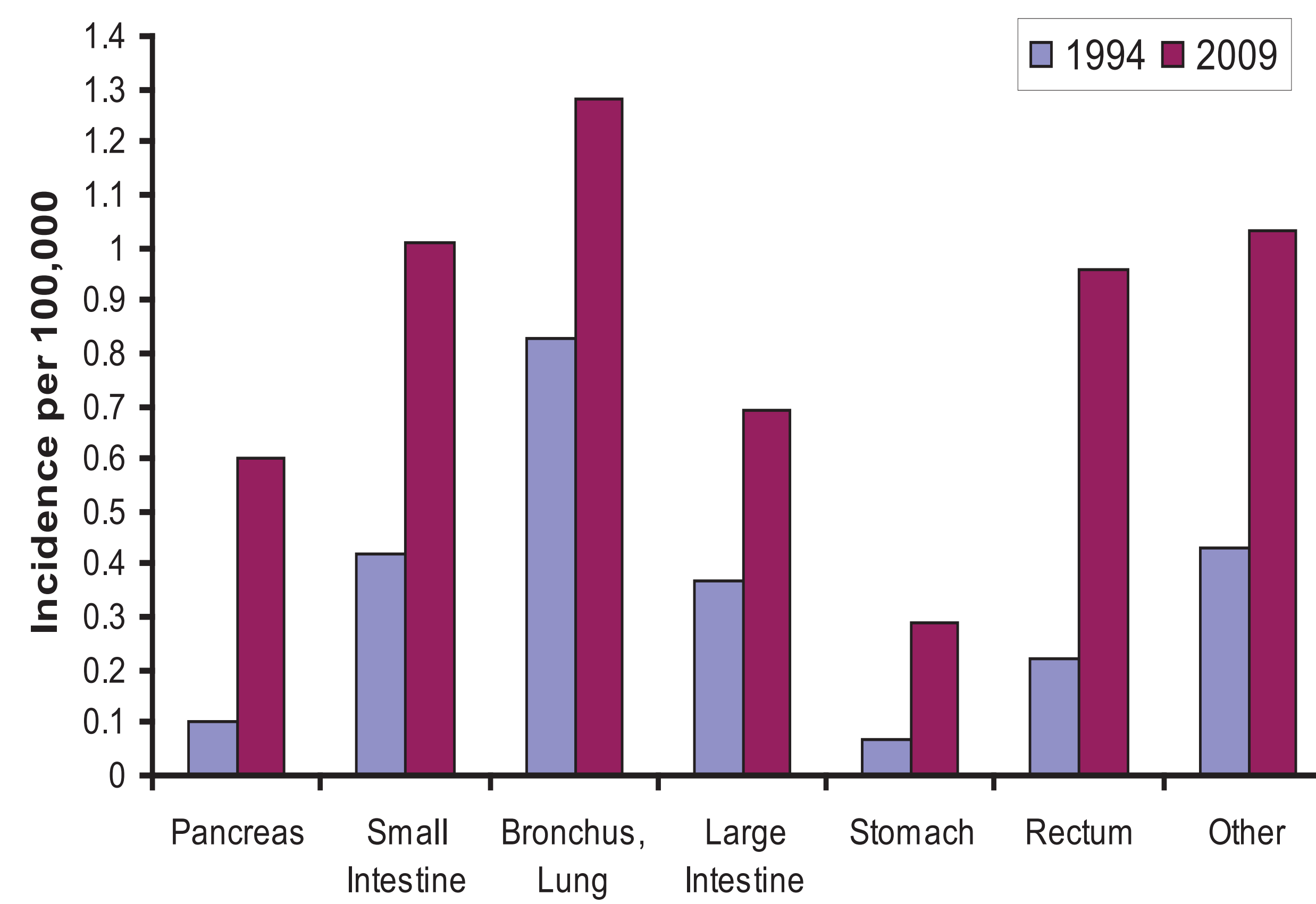
Metastatic disease among NETs in Ontario during 1994-2009, by cancer site



Comparison between incidence of NETs and Incidence of all cancers among population aged ≥ 19 in Ontario, 1994-2009.



Comparison of incidence rates of NETs 1994-2009, by cancer site



Incidence of NETs among Ontario population (per 100,000)

Year of diagnosis	ON population*	NETs cases	Incidence rate (95%CI)
1994	8054030	198	2.46 (2.13-2.83)
1995	8155003	192	2.35 (2.03-2.71)
1996	8252329	234	2.84 (2.48-3.22)
1997	8372865	242	2.89 (2.54-3.28)
1998	8485284	279	3.29 (2.91-3.70)
1999	8608055	261	3.03 (2.68-3.42)
2000	8762064	301	3.44 (3.06-3.85)
2001	8943510	309	3.46 (3.08-3.86)
2002	9124679	295	3.23 (2.87-3.62)
2003	9278897	325	3.50 (3.13-3.90)
2004	9431591	389	4.12 (3.72-4.56)
2005	9572668	415	4.34 (3.93-4.77)
2006	9712534	478	4.92 (4.49-5.38)
2007	9852572	509	5.17 (4.73-5.64)
2008	10004048	596	5.96 (5.49-6.46)
2009	10168834	596	5.86 (5.40-6.35)

*ON population aged 19 and above. The projected population was used for the year of 2009

Discussion

- The analysis of the OCR clearly reveals an overall trend of increasing incidence of NETs. This finding is consistent with the majority of the data that have been reported from United States and Europe
- In Canada and United States the bronchopulmonary NETs remain the most frequently diagnosed NETs, whereas in Europe the midgut NETs are predominant
- The absolute increase in the study period was most pronounced for pancreatic, rectal and gastric NETs. This is probably due to several factors: better classification systems and diagnostic tools, more awareness among the physicians, the increased use of proton pump inhibitors (gastric NETs) and that cancer detection campaigns for colorectal cancer (colonoscopy) likely contributed to the increase of rectal NETs

Conclusions

- There is significant increase of reported cases of NETs in Ontario, particularly pancreatic, rectal and gastric
- This requires further research in order to understand the impact of this cancer previously perceived to be rare but showing a rising international trend