Epidemiology of Neuroendocrine Tumors (NET) of the Lung in the US: Analysis of 2 Large Insurance Claims Databases

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BACKGROUND

- U.S. incidence of all neuroendocrine tumors (NET) increased from 10.9 cases per million person-years (PMPY) in 1973 to 52.5 PMPY in 2004 as reported in SEER.[1]
- Prevalence was reported as 350 per million/year for all NET.
  - Bronchopulmonary or lung NETs represent approximately 20%-25% of primary NETs.[2]
- Incidence and prevalence may have continued to increase since 2004, but no published studies exist.

METHODS

- Retrospective, cross-sectional study using 2010-2014 data from 2 U.S. commercial claims databases: Truven Health Analytics MarketScan and IMS PharMetrics.

Inclusion Criteria:

- Age ≥ 18, AND
- ≥ 1 inpatient or ≥ 2 outpatient claims for lung NET (ICD-9-CM: 209.21 [Malignant carcinoid tumors of bronchus and lung], 209.61 [Benign carcinoid tumors of bronchus and lung]) in a given calendar year

Study Measures:

- Prevalence was number of lung NET patients divided by number of enrollees/year.
  - One year of continuous enrollment in the year of diagnosis was required
- Incidence was number of patients with a first observed NET diagnosis who were disease-free for 2 years prior, divided by number of enrollees.
  - Three years of continuous enrollment (year of diagnosis and two years prior) was required

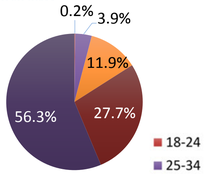
RESULTS

From 2010 to 2014,

- Prevalence **(Table 1; Figures 1-3)**
  - Increased from 19.0 to 30.4 per million per year in MarketScan
  - Increased from 18.9 to 26.2 per million per year in PharMetrics
  - Was highest in 55-64 year olds (from 45.0 to 79.0 depending on year and data source)
    - Approximately half of prevalent cases were in patients between 55 and 64 years of age
  - Was greater in females (from 22.6 to 39.3) than in males (from 13.8 to 20.6)
    - Women represented two-thirds of prevalent cases on average.
- Incidence **(Table 2; Figure 4)**
  - Increased from 15.9 to 19.2 PMPY in MarketScan
  - Increased from 13.1 to 16.0 PMPY in PharMetrics
  - Approximately two-thirds of incident cases were female
  - Between half to two-thirds of all incident cases were among those between 55 and 64 years, depending on the year and data source

Figure 1: 2014 Prevalent Cases by Age

1A: MarketScan



1B: PharMetrics

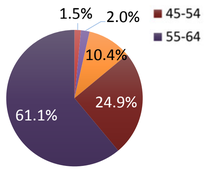
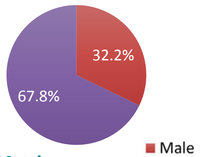


Figure 2: 2014 Prevalent Cases by Gender

2A: MarketScan



2B: PharMetrics

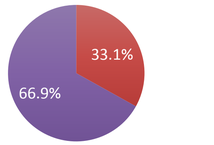


Table 1: Lung NET Prevalence by Demographic Groups

A: MarketScan		Prevalence: No. Of Cases Per Million Per Year[a]					B: PharMetrics		Prevalence: No. Of Cases Per Million Per Year[a]				
Gender	Age, years	2010	2011	2012	2013	2014	Gender	Age, years	2010	2011	2012	2013	2014
Female		23.6	28.5	33.7	37.6	39.3	**Female**		22.6	25.5	30.3	35.7	34.5
Male		13.8	16.0	18.1	16.5	20.6	**Male**		15.0	15.5	15.4	17.3	17.6
Both	18-24	2.6	1.6	2.7	2.5	0.4	**Both**	18-24	1.9	2.4	3.6	2.6	2.8
	25-34	6.6	4.9	7.9	7.2	7.1		25-34	3.4	5.7	3.3	6.7	3.0
	35-44	8.6	12.1	12.0	14.2	16.9		35-44	11.6	8.5	10.8	15.4	13.4
	45-54	20.6	24.3	29.4	30.1	33.8		45-54	19.7	21.6	26.3	26.4	26.8
	55-64	46.3	57.9	67.2	70.9	79.0		55-64	45.0	52.2	56.7	66.8	69.0
All Patients		**19.0**	**22.6**	**26.3**	**27.6**	**30.4**	**All Patients**		**18.9**	**20.7**	**23.1**	**26.7**	**26.2**

[a] Values represent the number of prevalent cases in each demographic group divided by all members of the same demographic group with a full year enrollment in that year.

Table 2: Lung NET Incidence by Demographic Groups

A: MarketScan		Incidence: No. Of Cases Per Million Person-Years[a]				B: PharMetrics		Incidence: No. Of Cases Per Million Person-Years[a]			
Gender	Age, years	2011	2012	2013	2014	Gender	Age, years	2011	2012	2013	2014
Female		20.0	20.3	23.2	23.8	**Female**		14.2	20.0	22.9	21.3
Male		11.4	12.6	12.5	14.0	**Male**		11.9	10.2	10.4	10.6
Both	18-24	0.8	1.3	1.2	0.0	**Both**	18-24	1.8	2.5	1.2	1.5
	25-34	3.8	3.6	4.3	1.5		25-34	4.0	3.0	1.8	1.5
	35-44	8.1	6.9	9.2	9.7		35-44	3.8	6.1	8.3	8.4
	45-54	14.1	18.9	21.0	22.7		45-54	10.2	15.5	16.0	14.0
	55-64	38.2	37.2	38.9	43.5		55-64	33.4	34.7	40.0	39.5
All Patients		**15.9**	**16.7**	**18.1**	**19.2**	**All Patients**		**13.1**	**15.3**	**16.8**	**16.0**

[a] Values represent the number of incident cases in each demographic group divided by all members of the same demographic group with a full year enrolment in that year and two years prior.

Figure 3: Prevalence

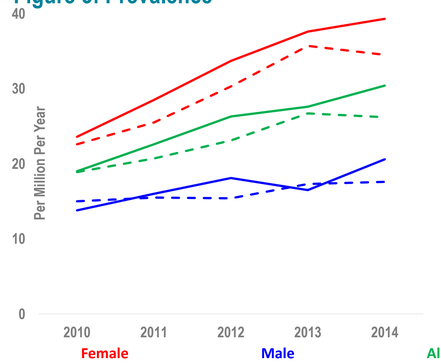
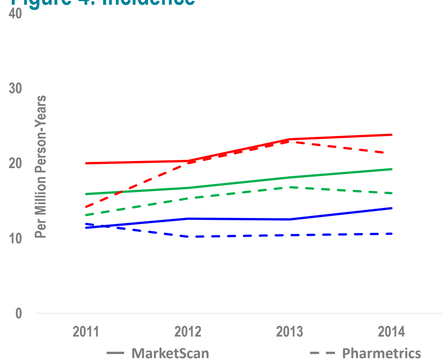


Figure 4: Incidence



CONCLUSIONS

- In both databases, the incidence and prevalence of lung NET have increased considerably from 2010 to 2014. In 2014, the highest prevalence was seen in MarketScan at 30.4 cases per million per year, a 60.0% increase from 2010; and the highest incidence was seen in MarketScan at 19.2 PMPY, a 21.7% increase from 2011.
- The increased incidence may be due to better diagnostic methods, greater awareness of NET among clinicians and pathologists, and/or an actual increase in disease occurrence in the U.S. population.
- Increased prevalence likely results from longer survival and increasing incidence.[3]
- In order for physicians and health plans to appropriately manage this larger population, it may be necessary to improve awareness of safe and effective treatment options.
- Further, with only one FDA approved treatment for lung NET (everolimus, approved Feb 2016), the development of additional treatment options for these patients is needed.

LIMITATIONS

- These results only reflect patients with commercial insurance and do not include those with Medicaid, Medicare or uninsured individuals. Results may not be nationally representative.
- Study patients were identified using ICD-9-CM codes; pathologic diagnosis could not be confirmed in this administrative database.

References

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[3] Shen C, Dasari A, Zhao B, Zhou S, Halperin D, Xu Y, et al. Incidence and Prevalence of Neuroendocrine Tumors in the United States 1973-2012. Poster session presented at: NANETS 2016; Sept 30 – Oct 1; Jackson, Wyoming.

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