The objective of this study is to describe the real-world treatment patterns of lung NET patients.  

**METHODS**

- Retrospective cohort study using 2009-2014 data from 2 US claims databases: Truven Health Analytics MarketScan and IMS PharMetrics.
  - Inclusion Criteria:
    - Age ≥18 years
    - ≥1 outpatient or ≥2 inpatient claims for lung NET (ICD-9-CM 209.21, 209.61) within the study ID period 7/1/2009-6/30/2014
  - Evidence of pharmacologic treatments after the first lung NET diagnosis
  - Exclusion Criteria:
    - Lack of at least six months’ enrollment before the index date (baseline) with no prior treatment
    - Variable follow up: until end of enrollment or 12/31/14, whichever occurred first.
  - Outcome measures included:
    - Pharmacotherapy: 
      - Cytoxic chemotherapies (CC) – carboplatin, cisplatin, etoposide, temozolomide, streptozocin, doxorubicin, liposomal doxorubicin, fluorouracil, capetabine, dacarbazine, oxaliplatin, and thalidomide
      - Somatostatin analogues (SSA) – octreotide SA, octreotide LAR, and lanreotide
      - Targeted therapies (TT) – erlotinib, and sunitinib – and interferon (IF)
    - First-line therapy defined as the treatment regimen observed on or within 90 days of the index date.
    - Second-line therapy defined as switch from one category of pharmacotherapy to another (e.g., from SSA alone to CC alone), or the addition of a new category of treatment (e.g., from SSA alone to CC plus CC).
  - Statistical Analysis:
    - Kaplan-Meier failure plot and graphical analyses using GRAPHX™, which uses multi-colored line segments to represent various treatments and plots them over time.

**RESULTS**

- 785 newly pharmacologically treated lung NET patients were identified (Figure 1).
  - Mean (SD) age of 58.6 (9.1) years, 54.0% female, and 52.5% of the patients between 55 and 64 years (Table 1).
  - 78.2% started first-line therapy with CC, 18.1% with SSA, and 1.1% received TT (Table 2).
  - Mean duration of first-line therapy was 397 days for SSAs, 142 for CC, 135 for TT.
  - Half of the patients discontinued first-line therapy (SSA 480 days, 1.26 years) of treatment, and CC by 102 days (0.28 years) (Figure 2).
  - 74.1% of patients discontinued first-line therapy with no subsequent pharmacological or liver directed therapy; 7.6% (60/785) used second-line regimens (Table 2). Most (74%) CC users observed to use 2nd line therapy switched to SSA alone or SSA combination.
  - 61% (142/233) SSA users observed to use 2nd line switched to an SSA combination.
  - No clear pattern was visible following first-line therapy, although many chemotherapy-treated patients appeared to have liver-directed therapy around or after chemotherapy (Figure 3).

**LIMITATIONS**

- Claims are designed for payment, not research; codes may be used incorrectly.
- Reason for discontinuation is not reported in claims nor are deaths. So, although therapy may be stopped when patients are terminally ill, this cannot be confirmed.
- Treating NETs is complex and treatments are individualized based on many factors (e.g., tumor size, pathology, etc.) not available in our database.
- Results may not be applicable to non-commercially insured individuals.

**CONCLUSIONS**

- This study combined two very large, nationally representative claims databases (representing >100 million covered lives) to describe real-world treatment patterns for lung NETs in the US.
- Over 75% of patients began therapy with chemotherapy and almost 20% with somatostatin analogue monotherapy.
- The high proportion of chemotherapy use and low proportion receiving second-line treatment seems consistent with NCCN SCLC (rather than NET) treatment guidelines. For typical lung NETs, the NCCN guidelines mention chemotherapy (Category 3*) only if other treatment options are not feasible (although for atypical disease and low grade NETs with high tumor burden, chemotherapy may initially be used).  
  - Lung NET patients treated with chemotherapy may have had more aggressive tumor histology, but this cannot be confirmed in our dataset, nor could we verify if SCLC patients were miscoded as having lung NET.
  - Lung NET patients used first-line SSA treatment for a median of more than one year compared to just over 3 months for chemotherapy.
- The majority of patients stopped treatment while still enrolled in the health plan, although if patients had secondary insurance we might have missed further treatment.
- To verify the study findings and understand reasons for discontinuation of treatment after first-line, a study using more detailed clinical information (e.g., medical charts or physician surveys) is warranted.
- Category 3: major NCCN disagreement that the intervention is appropriate.

**REFERENCES**