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# Treatment adherence, healthcare resource utilization and costs in patients with gastrointestinal neuroendocrine tumors (GI NETs)

Beilei Cai, PhD[1]; Michael S. Broder, MD, MSHS[2]; Eunice Chang, PhD[2]; Tingjian Yan, PhD[2]; Al B. Benson III, MD[3]

[1]Novartis Pharmaceuticals Corporation, East Hanover, NJ 07936; [2]Partnership for Health Analytic Research, LLC, Beverly Hills, CA 90212; [3]Northwestern University, Chicago, IL 60611

## BACKGROUND

- Approximately two-thirds of neuroendocrine tumors (NETs) occur in the gastrointestinal (GI) tract, including the stomach, small intestine, appendix, colon, and rectum. [1-3]
- NCCN guidelines for unresectable and metastatic GI NETs recommend somatostatin analogues (SSA; octreotide and lanreotide) as first-line treatment for patients with clinically significant tumor burden or symptoms of hormone secretion, and as an option for asymptomatic patients with low tumor burden. [4]
- A 2013 systematic review of multiple databases found limited information on resource use, cost of illness, and economic outcomes for NETs. [5]

## OBJECTIVE

- To assess real world treatment adherence, healthcare resource utilization and costs in patients with GI NETs who initiated pharmacologic treatments.

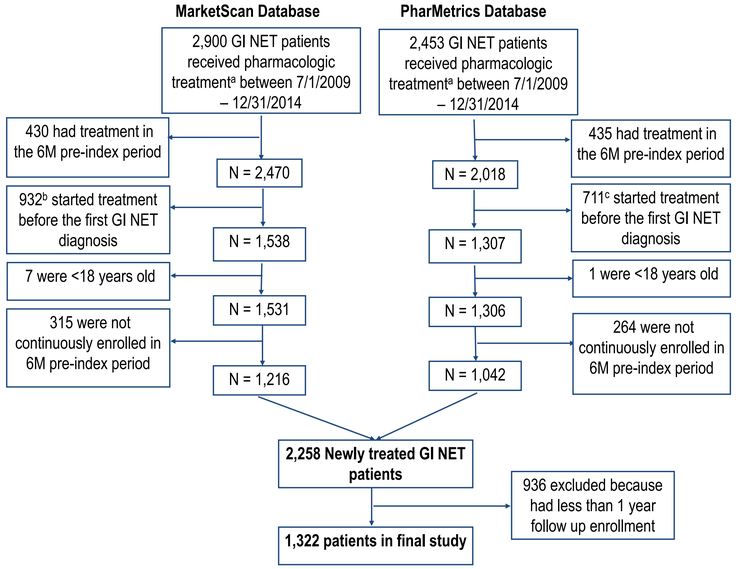
## METHODS

- Retrospective cohort study using data from two large US commercial claims databases, Truven Health Analytics MarketScan and IMS PharMetrics, between 01/01/2009 – 12/31/2014.
- Study population
  - Inclusion Criteria:
    - Age ≥ 18 with GI NETs newly treated with pharmacologic therapy between 7/1/2009 and 12/31/2014
      - ≥ 1 inpatient or ≥ 2 outpatient claims within 12 months for GI NETs
      - The first GI NET pharmacologic treatment claim on or after the appearance of the first GI NET diagnosis code was considered the index date.
        - Pharmacotherapy: somatostatin analogues (SSA), targeted therapies (TT), cytotoxic chemotherapies (CC) and interferon
  - Exclusion Criteria:
    - Lack of at least six months enrollment before the index date (baseline) and at least one year after the index date (the first day of treatment) or
    - Evidence of pharmacologic treatment during the baseline period
- Study Measures:
  - Medication adherence, measured by proportion of days covered (PDC)
    - Calculated as the number of days with first-line therapy available ("covered") divided by number of days in observation period (365 days).
  - All-cause healthcare resource utilization (HCRU), including inpatient hospitalizations, emergency department (ED) visits, non-ED outpatient service visits, and any pharmacy utilization.
  - All-cause healthcare costs, calculated by adding up all medical costs and pharmacy costs
    - Medical costs include inpatient hospitalization costs, ED service costs, and non-ED outpatient service costs.
- Statistical Analysis:
  - Descriptive statistics including means, standard deviations, and relative frequencies and percentages for continuous and categorical data, respectively, were reported.

## RESULTS

- Of 1,322 patients with 1-year of follow-up,
  - 847 initiated SSAs, 397 cytotoxic chemotherapy, 35 targeted therapies, 2 interferon and 41 various combinations **(Table 1)**
  - Mean (SD) of PDC was 0.669 (0.331) for SSA, 0.466 (0.236) for cytotoxic chemotherapy, and 0.505 (0.328) for targeted therapies **(Table 1)**
  - SSA users had the mean (SD) of 20.5 (13.5) office visits and 0.59 (1.03) hospitalizations per year, cytotoxic chemotherapy users had 30.5 (19.8) and 0.89 (1.45), and targeted therapy users had 17.7 (12.5) and 1.23 (1.93) office visits and hospitalizations respectively **(Table 1)**
  - Total annual cost for SSA-treated patients during the 1st year was $99,691 (82,423); $134,912 (116,078) for cytotoxic chemotherapy; and $158,397 (82,878) for targeted therapies **(Figure 2)**
- Among 685 patients with 2 years of follow-up, the annual mean costs in year 2 were $8,071, $58,944, and $36,248 lower than year 1 for SSA, cytotoxic chemotherapy, and targeted therapies, respectively.

### Figure 1. Patient Identification

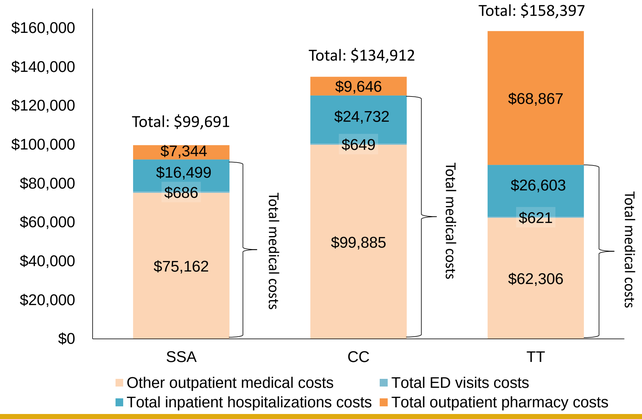



[a] Somatostatin analogues (SSA), targeted therapy, cytotoxic chemotherapy, or interferon
[b] 324 (34.8%) within 3 months, and 516 (55.4%) within 6 months
[c] 249 (35.0%) within 3 months, and 380 (53.4%) within 6 months

### Table 1. All Cause Healthcare Resource Utilization and Treatment Adherence in Patients with 1-Year Post-Index Continuous Enrollment

| | Somatostatin analogues (SSA) | Cytotoxic Chemo (CC) | Targeted Therapies (TT) |
|---|---|---|---|
| n (%) | 847 (64.1) | 397 (30.0) | 35 (2.6) |
| No. of office visits, n (%) | 20.5 (13.5) | 30.5 (19.8) | 17.7 (12.5) |
| No. of ED visits, n (%) | 0.58 (1.48) | 0.57 (1.37) | 0.83 (1.54) |
| 0 | 587 (69.3) | 274 (69.0) | 21 (60.0) |
| 1 | 163 (19.2) | 78 (19.6) | 7 (20.0) |
| 2 | 48 (5.7) | 24 (6.0) | 4 (11.4) |
| 3+ | 49 (5.8) | 21 (5.3) | 3 (8.6) |
| No. of inpatient hospitalizations, n (%) | 0.59 (1.03) | 0.89 (1.45) | 1.23 (1.93) |
| 0 | 545 (64.3) | 220 (55.4) | 18 (51.4) |
| 1 | 191 (22.6) | 102 (25.7) | 9 (25.7) |
| 2 | 59 (7.0) | 32 (8.1) | 2 (5.7) |
| 3+ | 52 (6.1) | 43 (10.8) | 6 (17.1) |
| Total days of stay among patients with hospitalizations, n (mean) [SD] | 302 (9.3) [16.5] | 177 (11.8) [15.9] | 17 (19.0) [22.7] |
| Proportion of days covered in first year since index date, mean (SD) | 0.669 (0.331) | 0.466 (0.236) | 0.505 (0.328) |

### Figure 2. All-Cause Healthcare Costs in Patients with 1-Year Post-Index Continuous Enrollment




## LIMITATIONS

- This study presents descriptive results only and is not intended to compare the therapies examined.
- Treating NETs is complex and clinical decision-making is determined by location, tumor markers, extent of disease, and other factors. The administrative claims data used in this study did not include this level of detail.
- Healthcare cost estimates may be underestimated as services not covered by insurance would not have been included.
- Findings may not precisely reflect the US population because the group studied, commercially insured patients, may be healthier than the general population.

## CONCLUSIONS

- In this descriptive study, more than 60% of patients initiated treatment with SSAs, about 30% initiated treatment with CC, and under 3% initiated treatment with TT.
- Regardless of initial pharmacologic therapy, healthcare resource utilization and cost are high for the study patients.[6]
- We reported resource utilization and costs associated with different treatment therapies and costs were higher in the first year than in the second year.
- Use of pharmacologic therapy (chemotherapy and targeted therapy in particular) may indicate our study population included a large proportion of patients with advanced NETs.
- Additional research with a larger sample size is needed to better understand real-world utilization and costs for GI NETs patients treated with different pharmacological therapies.

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Correspondence: Beilei Cai, PhD - beilei.cai@novartis.com

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