

# Proximity to Healthcare Providers, Bankruptcy, and Relationship Status within Neuroendocrine Cancer Patients

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## Background

Neuroendocrine cancer is a rare malignancy. Variables that weigh into patients living many years with the diagnosis likely contribute to years to decades of unplanned medical expenses. According to the American Journal of Managed Care (AJMC), the economic burden of rare diseases is 10 times higher than more common conditions. The purpose of this study was to quantify social and financial metrics in neuroendocrine cancer patients in order to better understand barriers to specialized care and potentially apply the lessons learned during the pandemic to develop strategies to survey and treat patients closer to home.

## Methods

Deceased neuroendocrine cancer patient were identified from a large patient cohort treated at a subspecialty neuroendocrine center. Demographics (gender, race, relationship status, and zip code) were cross-referenced against public records for bankruptcy, and judgements/liens (N=908). AJCC stage at diagnosis time interval from diagnosis to death was also evaluated.

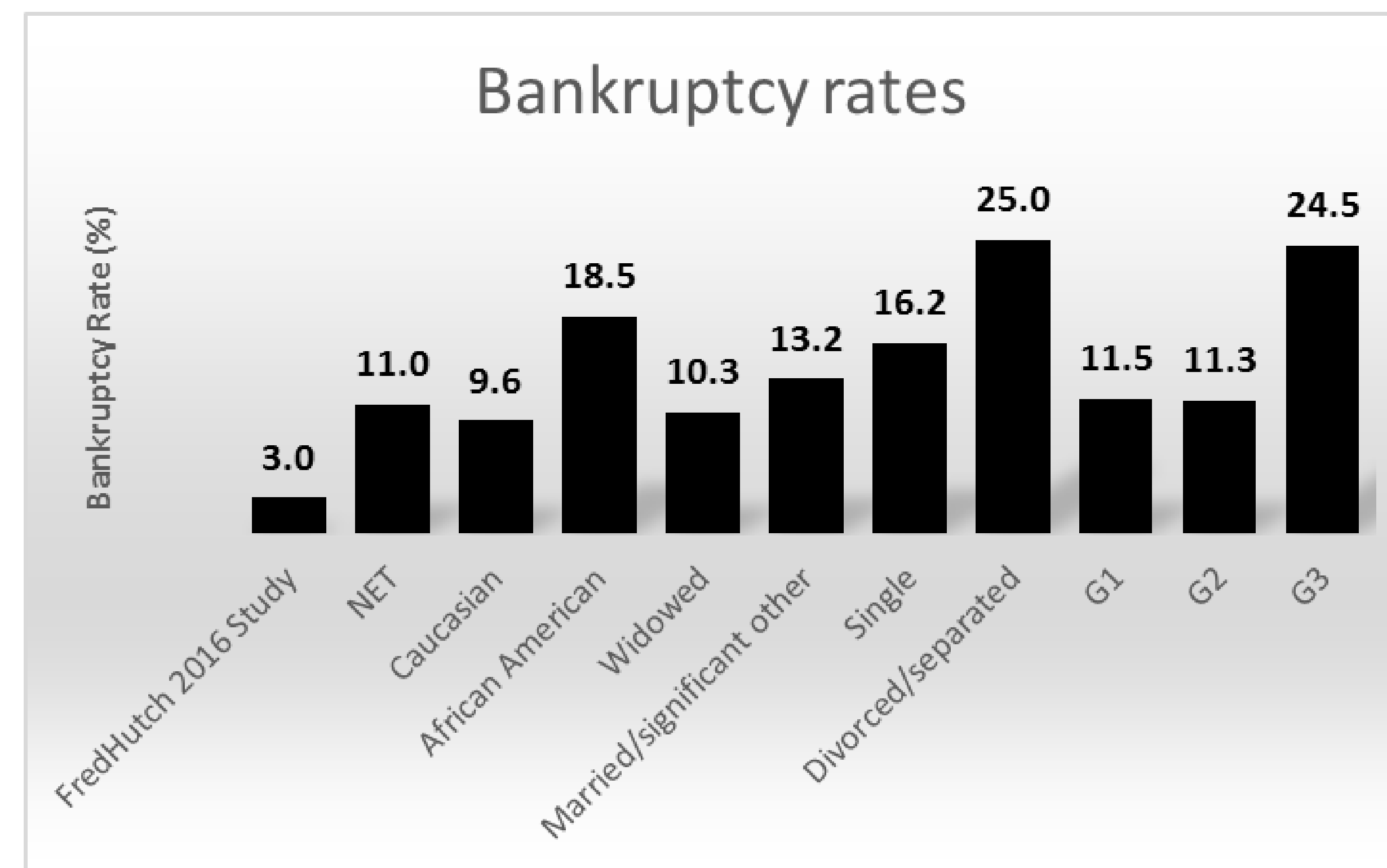
## Results

Distance to provider: Median distance traveled for in-person consultation/treatment was 224±5.7miles (range 0.1-4070miles). Distance to provider and overall survival: Overall survival was shorter for patients who traveled >100miles (1776±93days) when compared to NET patients traveling <100miles (2445±451days, p=0.03). Bankruptcy rates: Bankruptcy rate in NET patients was 10.4%. The average age for filing a bankruptcy petition was 52yrs. Bankruptcy rates were highest in African American (15%), divorced (35%), and widowed (33%) patients. Bankruptcy rates and tumor grade: Bankruptcy rates were higher in G3 NET patients (24%) when compared to G2 (12%) and G1 (9%). Bankruptcy rates and stage: In stage I-III NET patients, the bankruptcy rate was 7.14%. In stage IV NET patients, the bankruptcy rate increased to 15.8%. Bankruptcy rates and proximity to NET specialist: Rates increased with distance to clinic up to 150 miles (max = 24%) after which levels decreased to baseline of 10%. Bankruptcy and overall survival: We were unable to show a significant difference in OS associated with bankruptcy; this may be due to confounding variables. Divorce rates in NET: Divorce rate in NET patients was 12.5%. Divorce rates were highest for female NET patients (15%) when compared to male NET patients (10%). There was no significant difference in overall survival between divorced/single/widowed NET patients when compared to married/significant-other NET patients.

## Conclusions

Bankruptcy rates were increased in NET patients and linked to proximity to NET subspecialty care. The data didn't show any significant association between bankruptcy and OS, potentially due to confounding variables. However, patients who lived more than 10 years with the diagnosis were more likely to file bankruptcy than patients who lived < 5 years. Reduced proximity to specialist care was linked to worse overall outcomes. In combination, these data argue for improved access to specialist care, including but not limited to, the use of telemedicine and engagement of localized medical oncologists as partners in the care of patients with a rare cancer. Other socioeconomic factors may also impact NET diagnosis and outcomes. Including but not limited to, education, poverty, and addiction.

## Figures



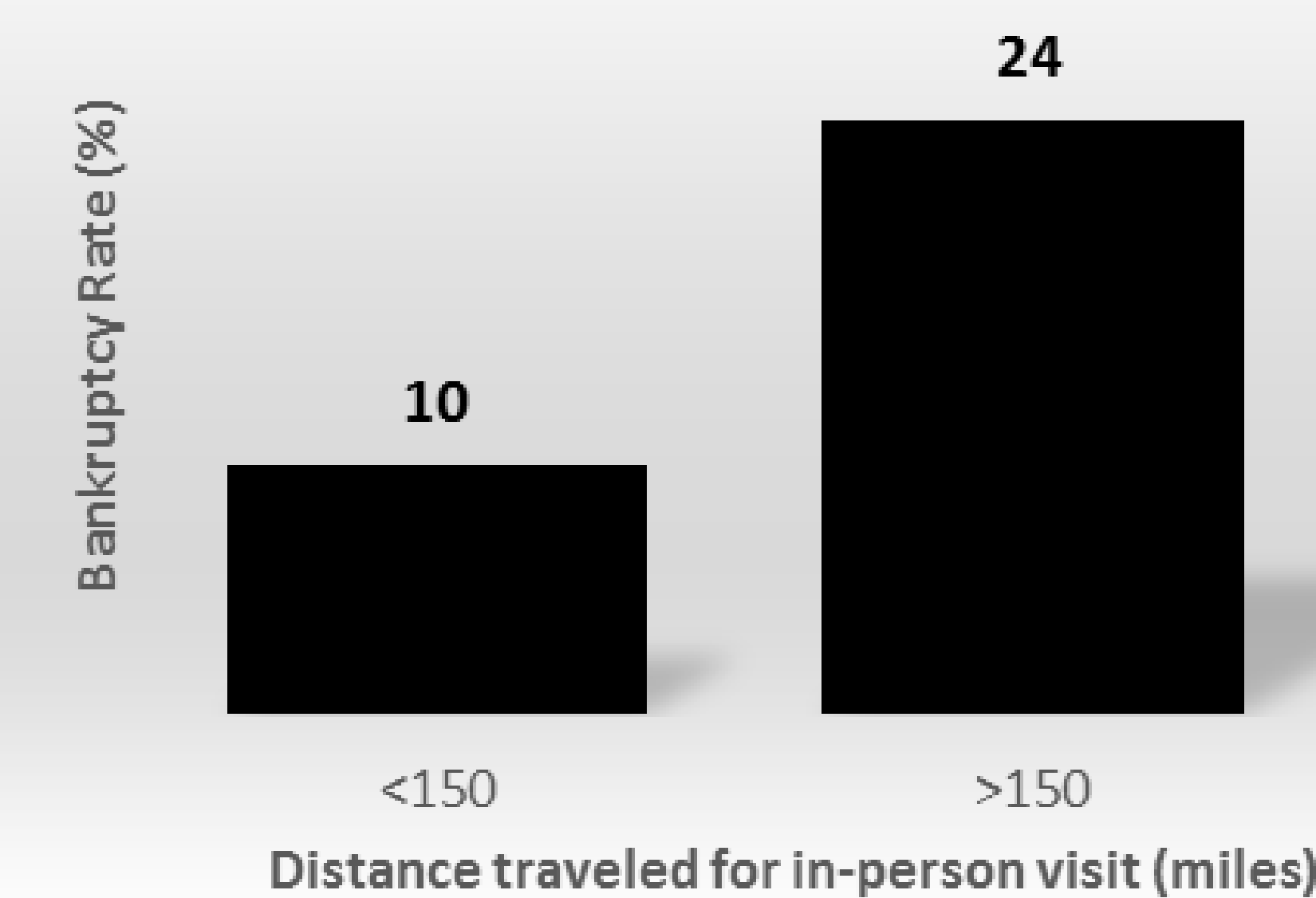
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### Overall Survival and Distance to Clinic



Distance to provider and overall survival: Overall survival was shorter for patients who traveled >100miles (1776±93days) when compared to NET patients traveling <100miles (2445±451days, p=0.03).

### Bankruptcy Rate and Distance to Clinic



Bankruptcy rates and proximity to NET specialist: Rates increased with distance to clinic up to 150 miles (max = 24%) after which levels decreased to baseline of 10%.

## References

Ramsey SD, Bansal A, Fedorenko CR, Blough DK, Overstreet KA, Shankaran V, Newcomb P. Financial Insolvency as a Risk Factor for Early Mortality Among Patients With Cancer. J Clin Oncol. 2016 Mar 20;34(9):980-6. doi: 10.1200/JCO.2015.64.6620. Epub 2016 Jan 25. PMID: 26811521; PMCID: PMC4933128.

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