



Healthcare Expenditure Burden of Melanoma in the Era of Immune Checkpoint Inhibitors

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BACKGROUND

Immunotherapy for Metastatic Melanoma: The Paradigm Shift

Melanoma

- 5th most common cancer in the US
- Melanoma can be fatal:
 - Extremely poor prognosis and resistance to treatment especially at metastatic stage
 - Responsible for >80% of skin cancer-related deaths

Immune Checkpoint Inhibitors (ICI)

- Block immune checkpoint proteins from binding with partner proteins
- “Game changer” for metastatic melanoma
- Prolonged survival from 5% to nearly 50% in clinical trials
- Currently the gold-standard treatment
- A major drawback is cost of therapy and administration

Knowledge gap

- There is no current information about how healthcare expenditures for melanoma treatment compares to other cancers in the general US population.
- Such information will help to understand the changing expenditure landscape in melanoma due to availability of newer treatments

OBJECTIVES

- To estimate the marginal healthcare expenditures of individuals with melanoma in the era of ICIs
- To evaluate the robustness of findings based on sources of variation reported in the literature

METHODS

Study Design: A retrospective cross-sectional study

Data Source: Medical Expenditure Panel Survey (MEPS)

Study period: 2011 -2020

Inclusion Criteria

Self-reported and clinical diagnosis of melanoma, non-melanoma skin cancer (NMSC) and other cancers

- Clinical diagnosis (International Classification of Disease (ICD -9th and -10th editions)*
- ≥18 years of age
- Positive sampling weights

Covariates: Sociodemographic, socioeconomic, and clinically relevant characteristics were selected based on previous literature and the Andersen Behavioral Model.

Main Outcome: Marginal adjusted healthcare expenditures of patients with:

- Melanoma versus NMSC
- Melanoma versus other (non-skin) cancers

Statistical Analysis

- Weighted descriptive statistics to compare characteristics of cohorts
- Mean total healthcare expenditures and by type of healthcare service
- Assessment of outcome distribution and model fit using Modified Park and Pregibon Link Function Tests
- Marginal expenditures (total expenditure and expenditures by healthcare service type) using Generalized linear model (Poisson distribution and log link)
- Sensitivity analyses by varying:
 - cost distribution (model fit)
 - cohort definition
 - comorbidity adjustment

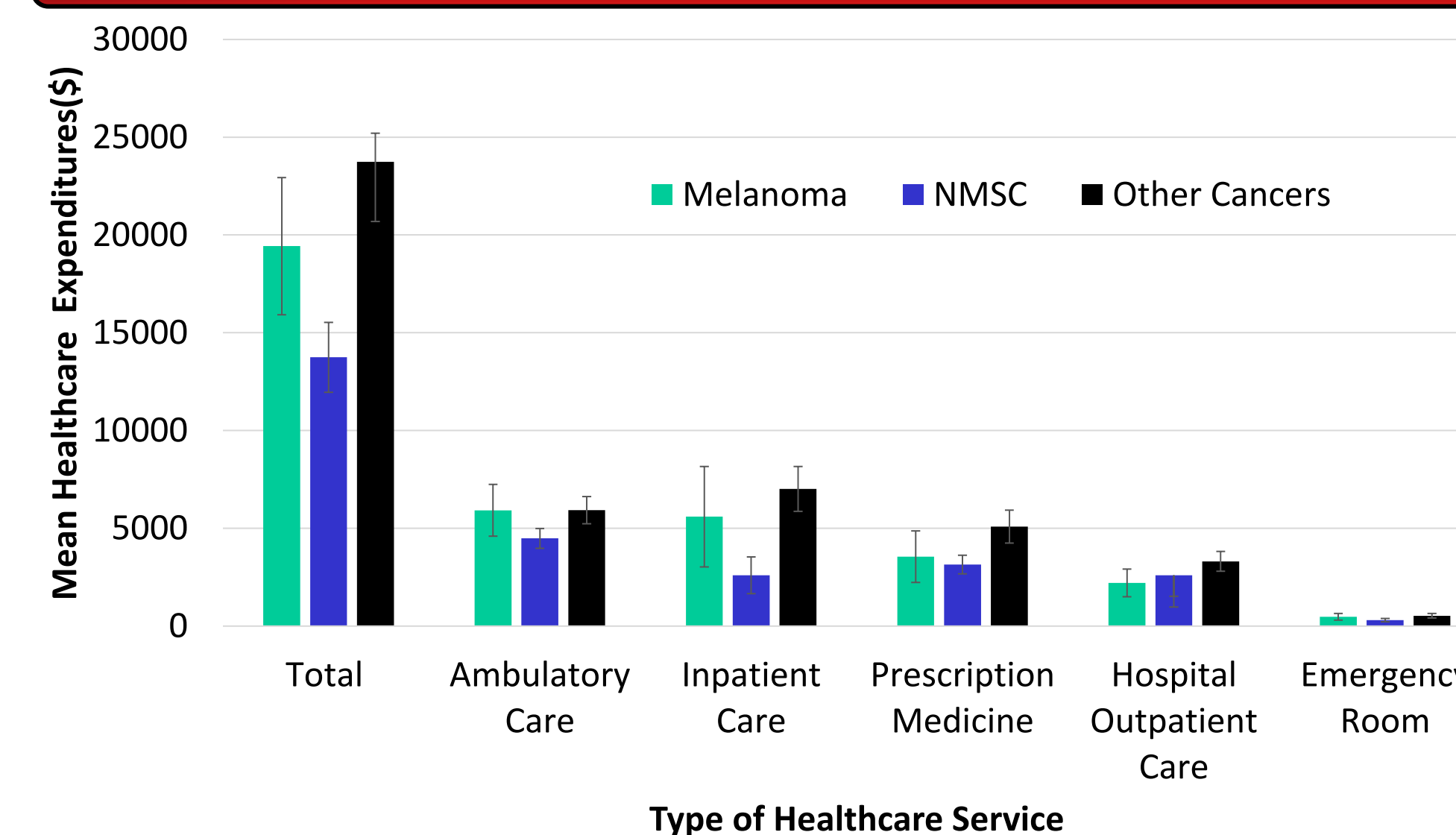
RESULTS

Table 1. Patient Characteristics

Variable	Melanoma (n=697,955)	NMSC (n=1,734,132)	Other Cancers (n=5,286,802)
Age in years (Mean, std. dev.)	58.0 (1.61)	58.0 (0.94)	58 (0.58)
Male Gender	51.23%	53.69%	42.74%
Non-Hispanic Whites	92.55%	97.61%	76.13%
Income Category			
▪ Poor/near poor	10.79%	5.72%	12.76%
▪ Low income	7.93%	10.70%	12.39%
▪ Middle income	23.88%	21.65%	25.31%
▪ High income	57.40%	61.92%	49.54%
Insurance status*			
▪ Private	70.94%	71.27%	63.85%
▪ Public	27.86%	27.26%	33.82%
▪ Not insured	1.20%	1.47%	2.33%
Elixhauser Comorbidity Index*			
▪ 0	18.12%	17.69%	13.89%
▪ 1	25.83%	23.19%	22.55%
▪ ≥2	56.05%	59.12%	63.56%

Asterisk denotes p<0.05

Figure 1. Unadjusted Mean Healthcare Expenditures



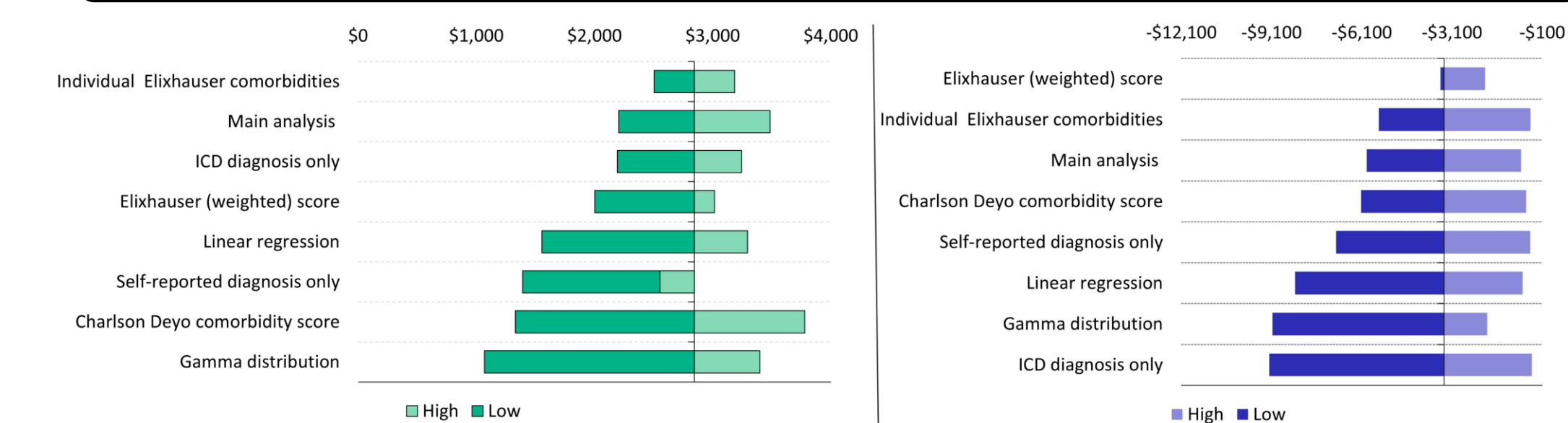
Error bars denote 95% confidence interval

Table 2. Adjusted Marginal HealthCare Expenditures

Expenditure category	Melanoma vs. NMSC	Melanoma vs. Other Cancers
Total	2844.75 (2204.77 – 3484.72)*	-3369.01 (-5934.15 – 803.85)*
Hospital Inpatient	1971.45 (127.48 – 3815.42)	-879.87 (-2758.90 – 999.16)
Ambulatory care	956.71(-16.57 – 1929.98)	-344.34 (-1351.71 – 663.03)
Prescription medicine	227.59 (-666.13 – 1121.30)	-966.63 (-1955.93 – 22.67)
Emergency room	143.14 (-48.39 – 334.66)	-24.04 (-228.02 – 179.94)
Home health	-228.89 (-864.30 – 406.52)	-263.40 (-484.90 – -41.91)*
Dental	48.39(-115.47 – 212.24)	153.33 (-2.96 – 309.61)
Vision	-21.95 (-52.13 – 8.22)	-10.99 (-40.77 – 18.79)

95% confidence interval is reported in parenthesis, asterisks denotes p<0.05

Figure 2. Sensitivity Analysis



Green : melanoma vs. NMSC; Purple: melanoma vs. other non-skin cancer; Low, High =lower and upper 95% confidence interval respectively

CONCLUSIONS

- In comparison with previous studies in the pre-ICI era; our study showed:
 - A higher mean annual healthcare expenditures for melanoma patients (\$19,821)
 - Lower marginal difference (-\$2844) compared to other cancers
- Cost of therapy can therefore be a barrier to the use of ICIs

REFERENCES

