Direct Economic Burden of High-Risk and Metastatic Melanoma: Evidence From the SEER-Medicare Linked Database

Background
Current 5- and 10-year survival rates for patients with melanoma are 92% and 89%, respectively. For localized melanoma, the 5-year survival rate is 99%, but drops to 65% and 15% for regional and distant stage diseases, respectively. With few effective treatment options available for late-stage melanoma, the disease carries significant mortality. Little is known, however, about the direct costs incurred by third-party payers for advanced melanoma. To address this knowledge gap, we analyzed a large retrospective claims database to document per patient monthly costs incurred by the Medicare system for enrollees with high-risk (stage IIB, IVA, IVC) or metastatic (stage IV) melanoma.

Methods
Study design
Retrospective database analysis.

Data source
Data were taken from the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database combining clinical information on incident cancer cases in the United States between 1983 and 2002 with longitudinal (1991–2005) Medicare claims.

Inclusion criteria
Patients included in the study met the following inclusion criteria:

• Age ≥18 years
• ≥1 malignant melanoma diagnosis (ICD-0-2 code C44.x) of stage IIB or higher
• ≥6 months of continuous Medicare Part A and B benefits eligibility postdiagnosis

• Patients who died prior to 6 months post-index date were not excluded from the analysis.

Stratification by disease stage
Disease stage was assigned based on clinical criteria set forth by the American Joint Committee on Cancer (AJCC) TNM staging system for melanoma. The AJCC stage for each diagnosis was determined using an algorithm comprising the new SEER variables HSTST (patient stage at initial visit), location, regional, or distant; E10PN (number of positive lymph nodes), E1052 (tumor size in mm); and E1051 (extent of disease: with or without ulceration). Stage IIB/C was defined as advancement to stages III or IV; for patients at stage IIIA/B, defined as advancement to stage IV with ulceration.

For each patient, an index date was defined as the date of the first observed stage IIB or higher diagnosis. Patients were then categorized into mutually exclusive categories based on the stage (IB or higher) observed at the index date.

Primary outcomes
Total all-cause healthcare utilization and costs reimbursed by Medicare aggregated across the entire follow-up period available for each patient. Variables examined included the following:

• Hospitalizations
• Skilled nursing facility admissions
• Emergency room visits
• Physician office visits
• Other ancillary care (home health, hospice, all other ancillary visits)

Outcome results were evaluated from the index date until death, interruption of benefits coverage (6 months), or end of the database (12/31/2005). Utilization and costs were aggregated and reported at the level of per patient per month.

Statistical analyses
All analyses were carried out using SAS (Version 9) statistical software. Exploratory descriptive analyses were performed and entailed the tabular display of mean values, standard deviations, medians, and ranges of continuous variables and frequency distributions for categorical variables of interest.

Results

Patient characteristics (Table 1)
• 6,470 patients met all inclusion criteria.
• Stage distribution was IIB/C (38%), IVA (46%), IVC (1%), and IV (15%).
• Median follow-up was 56, 36, 19, and 6 months for each stage, respectively.

Survival (Table 2)
• Overall 1-year survival rate post-index date was 81%; range: 35% (stage IVA) to 94% (stage IIB/C).
• Among patients who died, median survival time post-index date was 23 months; range: 8 months (stage IVA) to 38 months (stage IIB/C).

Healthcare utilization and costs (Table 3)
• Patients with stage IV disease incurred 5.1 hospital days per month, compared with 0.5, 0.2, and 1.1 days per month for patients with stage IIB/C, IVA, and IVC melanoma, respectively (all P<0.001).

• Percentage of patients with at least one hospital admission, however, was significantly lower (97%) among patients with stage IIB/C disease at index.

• Mean inpatient costs for stage IV disease were $3,337 per month, compared with 0.5, 0.6, and 1.1 days per month for patients with stage IIB/C, IVA, and IVC melanoma, respectively (all P<0.001).

• Mean office visit costs for patients with stage IVA disease were $1,827 per patient per month, versus $471, $680, and $1,369 for stages IIB/C, IVA, and IVC, respectively (all P<0.001).

• Total healthcare costs, inclusive of all care settings, were $8,190 per patient per month for stage IV disease, compared with $7,032, $5,236, and $4,880 for stages IIB/C, IVA, and IVC, respectively (all P<0.001).

Limitations
• No data on prescription drug utilization or costs; therefore, total direct costs incurred by non-Medicare payers were likely to be higher than estimates shown in this study.

• Our study focused on direct costs incurred by the Medicare system and did not address costs incurred by commercial third-party payers (e.g., managed care plans) or the broader societal costs of melanoma, including caregiver burden and lost workplace productivity.

• This study included only patients aged 65 years or older. Findings may therefore not be representative of the general population with high-risk or metastatic melanoma.

• While subjects were stratified based on the disease stage observed at the index date, we did not identify subsequent progression to higher stages nor did we attempt to stratify costs incurred during initial versus subsequent stages.

Conclusions
• Our study is the first to provide stage-specific estimates of resource utilization and costs in high-risk and metastatic melanoma using real-world administrative data.

• Hospitalizations represented the largest component of overall healthcare costs across stages, although physician office visits and other ancillary services contributed significantly to the total cost burden.

• Efforts to address the large unmet treatment need in patients with advanced melanoma may result in cost savings for Medicare.

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References