

# Use of the 40-gene expression profile (40-GEP) test in Medicare-eligible patients diagnosed with cutaneous squamous cell carcinoma (cSCC) to guide adjuvant radiation therapy (ART) decisions leads to a significant reduction in healthcare costs

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## Background

- Adjuvant radiation therapy (ART) has been shown to be effective in subsets of cSCC patients with elevated risk of metastasis and is recommended in all relevant society guidelines; however, risk of metastasis predicted by risk factors has poor accuracy
- cSCC staging systems understage 36% of patients and overstage 75% of patients; translating to significant mismatch of treatment pathways and associated complications and costs.<sup>12</sup>
- The National Comprehensive Cancer Network (NCCN), American Society for Radiation Oncology (ASTRO), and American Academy of Dermatology (AAD), among others, have broad indications for ART usage.<sup>1-5</sup>
- ART can have significant complications, including radiation dermatitis, hair loss, nausea and vomiting, lymphedema, and even dementia in some cases. Importantly, subsequent radiation therapy in the same physical site is generally contraindicated due to the increase in radiation-induced secondary cancers.<sup>6</sup>
- Identifying cSCC patients who benefit from ART is needed to balance complications, outcomes and costs, to aid in cost-effective care strategies for cSCC patients.
- The 40-GEP test has been validated to improve upon current metastasis risk prediction methods, providing for more precise risk stratification for patients with high-risk cSCC.<sup>7,8</sup>
- Previously reported clinical utility studies of the 40-GEP test have demonstrated its use in directing personalized risk-aligned patient management, including follow-up, surveillance imaging, sentinel lymph node biopsy, and ART.<sup>9-12</sup>
- Recent evidence suggests that 40-GEP is valuable in guiding adjuvant radiation therapy (ART) decisions for cSCC patients; patients with a Class 2B result showed improved outcomes after ART, while no discernable benefit was observed in Class 1 and Class 2A cases.<sup>13</sup>

## Methods

- ICD-10 codes associated with cSCC were used to identify newly diagnosed patients in the 12-month period ending May 2022 with one year of follow-up (IQVIA). Data was then filtered for the Medicare eligible subset ( $\geq 65$  years) and normalized to the reported national incidence of SCC ([www.SkinFoundation.com](http://www.SkinFoundation.com))
- Four primary CPT code-defined modalities, namely image-guided radiation therapy (IGRT), intensity-modulated radiation therapy (IMRT), intensity-modulated proton therapy (IMPT), and radiation therapy (XRT), were used to identify cSCC patients treated with radiation therapy. The weighted average cost for four treatment modalities was calculated (\$60,693) from IQVIA database (**Table 1**).
- Using the frequency of 40-GEP results in the clinical validation study<sup>8</sup>, clinical orders<sup>14</sup>, and ART benefit study<sup>13</sup>, sensitivity analysis was conducted to evaluate the financial implications of ART treatment.
- Cost savings associated with different compositions of 40-GEP Class results was analyzed (**Figure 1**).

## Clinical Issue and Objective

Adjuvant radiation therapy (ART) has been shown to be effective in some subsets of cSCC patients and is recommended in all relevant society guidelines; however, it does carry clinically significant treatment-related morbidity and high costs to the healthcare system. Improving the identification of a specific population of cSCC patients most likely to benefit from radiation therapy and have improved outcomes will reduce morbidity and healthcare costs and provide a clinically and economically improvement in health resource utilization. The prognostic 40-gene expression profile (40-GEP) test has been validated to accurately stratify risk of metastasis in patients with one or more high-risk factors.<sup>7-8</sup> Recent analysis also confirm that 40-GEP results can identify patients more likely to respond to adjuvant radiation therapy.<sup>12</sup> This study aims to determine if utilizing the 40-GEP to guide ART can reduce costs in cSCC management.

## Results

**Table 1: ART usage and costs in Medicare-eligible cSCC population**

Demographics and ART usage among Medicare population	Patient count
Total number of unique cSCC patients identified in IQVIA database (June 2021 to May 2022)	731,482
Total number of cSCC patients that received ART	9,313
Total, normalized number of cSCC patients that received ART based on general population (1.8 million cSCC diagnosed annually) <sup>14</sup>	29,298
Total, normalized number of cSCC Medicare ( $\geq 65$ years) patients that received radiation treatment (88% assumed to be Medicare)	22,917
Radiation treatment modalities	Cost for ART Course(\$)
Image-guided radiation therapy (IGRT)	\$ 60,774
Intensity-modulated radiation therapy (IMRT)	\$ 95,047
Intensity-modulated proton therapy (IMPT)	\$ 145,422
Radiation therapy (XRT)	\$ 32,296
<b>Weighted average cost for radiation treatment</b>	<b>\$ 60,693</b>
<b>Total cost of radiation for Medicare patients</b>	<b>~\$ 1.39 billion</b>
<b>Total cost of 40-GEP test for Medicare patients</b>	<b>~ \$ 194 million</b>

**Figure 1. ART treatment costs and savings following 40-GEP guided management**

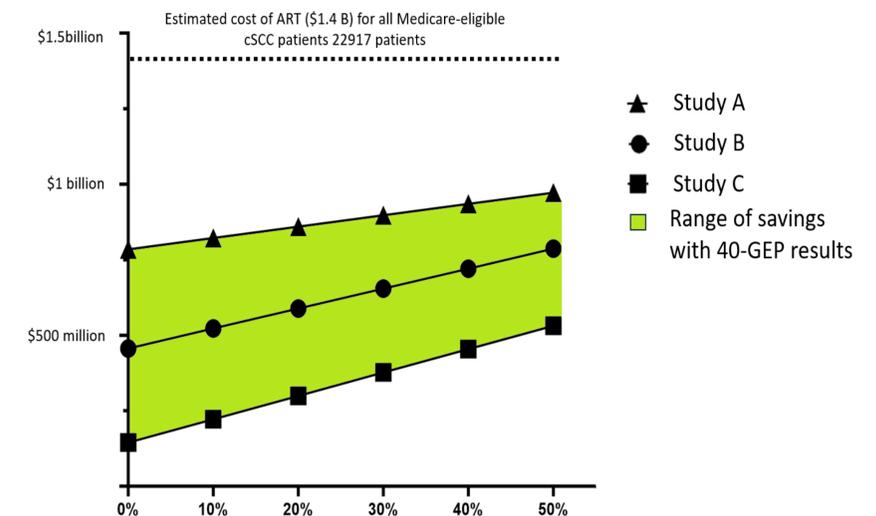


Figure 1: Annual savings if ART decisions were guided by 40-GEP results (Sensitivity analysis: '0%' assumes all Class 2A and 2B patients receive ART and no Class 1 patients. Sensitivity analyses assumes further ART avoidance in Class 2A patients)

## Conclusions

- The 40-GEP test has been shown to improve risk stratification accuracy over clinicopathologic staging systems.
- Recent data shows that the 40-GEP test identifies patients with a Class 2B result are more likely to respond to ART compared to patients with a Class 1 or Class 2A response.
- Using the distribution of 40-GEP results from published studies, utilization of a 40-GEP test result to avoid ART in these patients could save up to \$972 million in Medicare-eligible population. Sensitivity analysis shows, depending upon the distribution of the 40-GEP results, that for every 10% of Class 2A test results omitting ART, an extra \$38-66 million in annual savings is expected

## References

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## Disclosures

This study was sponsored by Castle Biosciences, Inc. (CBI), which provided funding to the contributing centers for tissue and clinical data retrieval. AP, MG, PM, SH, HC are employees and options holders of CBI. ASF is a consultant for CBI.