

A Cost-Effectiveness and Psychological Evaluation of Early Skin Biopsies vs Later-Onset Surgeries in Melanoma Management

Kritin K. Verma, BS, MBA; Smriti S. Panchal, BS; Daniel P. Friedmann, MD; Michelle B. Tarbox, MD; Sancy A. Leachman, MD, PhD

PRACTICE POINTS

- Early melanoma detection via skin biopsy is generally more cost-effective than managing advanced-stage disease, largely due to the high costs associated with systemic therapies (eg, immunotherapy) used in later-stage melanoma.
- Earlier diagnosis is associated with improved patient outcomes, including better quality of life and reduced psychological distress, compared with later-stage melanoma diagnoses requiring more extensive intervention.
- Integrated prevention and early detection strategies—such as dermoscopy, teledermoscopy, and public health initiatives—may optimize melanoma outcomes while reducing overall health care expenditures.

Compared to later-onset procedures, early diagnosis of melanoma using affordable skin biopsies can result in better patient outcomes, lower health care expenditures, and enhanced psychological well-being.¹ Numerous research and economic evaluations that highlight the possible advantages of early intervention in melanoma care lend support to this strategy. In health care systems, the cost of early identification and screening for

skin cancer is a critical factor.¹ There has been debate in the literature regarding performing more frequent biopsies earlier for skin cancers, which may greatly improve patient outcomes at the expense of increased financial cost, compared with performing fewer biopsies, which reduces costs at the potential expense of managing later-onset melanoma.^{1,2} We sought to summarize the current literature and address some considerations that may help bring more clarity to this topic.

According to a study of a large health care system, the average cost of a skin cancer screening visit was \$150, of which \$105 (70%) went toward the costs of the office visit and \$45 (30%) went toward the costs of the biopsy.¹ In the changing health care landscape, it is crucial to take into account the possible compounded savings from early diagnosis and treatment. While biopsies do involve some expenses, consideration of immunotherapy costs for advanced melanoma also should be considered, as they provide an alternative viewpoint on the financial effects of melanoma treatment.² The use of new systemic treatments such as immunotherapy has led to a notable rise in Medicare users' first-year melanoma treatment expenses. The average expense of treating stage IV melanoma rose from \$47,739 in 2007 through 2012 to \$117,450 in 2018 through 2019. This sharp rise highlights how much more expensive treating advanced melanoma is than performing biopsies for early detection and treatment. Hundreds

Kritin K. Verma (ORCID ID: 0000-0003-0548-3526) and Dr. Tarbox are from Texas Tech University Health Sciences Center, Lubbock. Kritin K. Verma is from the School of Medicine, and Dr. Tarbox is from the Department of Dermatology. Smriti S. Panchal is from the University of California, Berkeley. Dr. Friedmann is from Westlake Dermatology Clinical Research Center, Westlake Dermatology & Cosmetic Surgery, Austin, Texas. Dr. Leachman is from the Department of Dermatology and Knight Cancer Institute, Oregon Health & Science University, Portland.

The authors have no relevant financial disclosures to report.

Correspondence: Kritin K. Verma, BS, MBA, Texas Tech University Health Sciences Center, School of Medicine, 3601 4th St, Lubbock, TX 79430 (kritin.k.verma@ttuhsc.edu).

Cutis. 2026 May;117(5):E4-E5. doi:10.12788/cutis.1407

of biopsies might be carried out for the cost of a single advanced melanoma therapy, possibly identifying several cases at an earlier, more manageable stage.²

Patient quality of life and survival rates also can be considerably improved by early melanoma detection through screening.³ Compared to patients with later-stage diagnoses, those with early-stage melanoma reported a higher overall quality of life. Better physical functioning and reduced levels of anxiety and sadness were linked to early identification using skin biopsies. Patients with more advanced melanoma who had later-onset procedures, on the other hand, experience worsening psychological symptoms and physical health.³

A cost-effectiveness analysis using a Markov cohort model compared the long-term economic impact of early detection and primary prevention of melanoma. It found that daily use of sunscreen could prevent a substantial number of new skin tumors and melanoma deaths and reduce health care costs when compared to early detection strategies such as performing extra biopsies.⁴ There already are programs across the United States that aim to educate the public on the importance of wearing sunscreen; this has, in turn, reduced the prevalence of skin cancer in certain communities. Primary prevention resulted in just 1364 new melanomas and more than \$430 million in expenditures per 100,000 individuals, whereas early diagnosis produced 2446 new melanomas and more than \$660 million in economic expenses per 100,000 individuals.⁴ It is imperative to acknowledge that skin biopsies remain a vital tool for the early identification of melanoma, particularly in high-risk groups.

By using technologies such as teledermoscopy, the cost-effectiveness of skin cancer referral and consultation can be further enhanced; for example, teledermoscopy for skin cancer referral and triage would result in faster clinical resolution at an average cost of \$54.64 per case. This method may reduce the need for redundant in-person consultations and increase the effectiveness of melanoma identification.⁵

Large-scale public health initiatives in skin cancer prevention and early detection have the potential to be very effective, as evidenced by the War on Melanoma project at Oregon Health & Science University (Portland, Oregon). This all-encompassing strategy, which uses cutting-edge technologies, public education, and health care professional

training, has improved melanoma outcomes and decreased health care expenditures with encouraging results.⁶

A few tactics can be used to best balance the costs of later-onset procedures and early skin biopsies. These include using advanced technologies such as teledermoscopy and dermoscopy, provider training to increase diagnostic accuracy, public health campaigns to raise awareness and promote prevention, and a comprehensive strategy combining targeted early detection strategies with primary prevention.^{5,6} Health care systems can optimize the financial efficiency and clinical results of melanoma treatment by putting these principles into practice.

Compared to later-onset melanoma procedures, early skin biopsies typically are more cost-effective, produce better patient outcomes, and offer psychological advantages, even if they may have a higher initial cost. Health care systems can optimize the trade-off between early detection and cost effectiveness in melanoma management by putting sophisticated technology to use, enhancing provider training, and implementing focused screening programs.^{5,6} To support evidence-based policies and guidelines, future research should assess the long-term economic impact of different melanoma prevention and detection measures.

REFERENCES

1. Matsumoto M, Secrest A, Anderson A, et al. Estimating the cost of skin cancer detection by dermatology providers in a large health care system. *J Am Acad Dermatol*. 2018;78:701-709.e1. doi:10.1016/j.jaad.2017.11.033
2. Gogebakan KC, Mukherjee K, Berry EG, et al. Impact of novel systemic therapies on the first-year costs of care for melanoma among Medicare beneficiaries. *Cancer*. 2021;127:2926-2933. doi:10.1002/cncr.33515
3. Young JN, Griffith-Bauer K, Hill E, et al. The benefit of early-stage diagnosis: a registry-based survey evaluating the quality of life in patients with melanoma. *Skin Health Dis*. 2023;3:E237. doi:10.1002/ski2.237
4. Gordon L, Olsen C, Whiteman DC, et al. Prevention versus early detection for long-term control of melanoma and keratinocyte carcinomas: a cost-effectiveness modelling study. *BMJ Open*. 2020;10:E034388. doi:10.1136/bmjopen-2019-034388
5. Buja A, Rivera M, Girardi G, et al. Cost-effectiveness of a melanoma screening programme using whole disease modelling. *J Med Screen*. 2020;27:157-167. doi:10.1177/0969141319885998
6. Gogebakan KC, Berry EG, Geller AC, et al. Strategizing screening for melanoma in an era of novel treatments: a model-based approach. *Cancer Epidemiol Biomarkers Prev*. 2020;29:2599-2607. doi:10.1158/1055-9965.EPI-20-0881