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On the validity of biopsy cost analysis pertaining to nonphysician clinicians

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To the Editor:

In a recent issue of *Dermatology Online Journal*, Gronbeck et al. aimed to estimate cost-effectiveness of skin biopsies performed by dermatologists versus non-physician clinicians (NPCs, referring to nurse practitioners and physician assistants), [1]. Their outcomes included the mean cost per skin cancer diagnosed and the aggregate cost of excess biopsies, which relied on literature-derived number needed to biopsy (NNB) ratios and the number of skin biopsies performed in the Medicare population. We would like to share several concerns regarding the validity of their methods.

The authors assumed that all biopsies performed were related to skin cancer diagnosis. This overlooks the many non-neoplastic conditions that skin biopsies are used to diagnose. Thus, their estimated excess biopsies and costs are probably overestimated. The authors also did not consider if the proportion of biopsies related to skin cancer differed across provider types or if any confounders (i.e., age, gender, comorbidities) might affect total biopsies performed.

The article inaccurately states that NPCs billing procedures independently are unsupervised. In the largest study of dermatology NPCs billing procedures independently, 92% were affiliated with dermatologists [2]. The relationships of NPCs to

dermatologists and patients are not fully visible in Medicare data or retrospective review. Some dermatologists view NPCs as colleagues, entrusting them to use their own medical judgement when deciding to perform a biopsy. Others view NPCs as “extenders,” having them perform skin biopsies as directed by the doctor but bill procedures independently. If a dermatologist is consulted by an NPC employee regarding a questionable skin lesion, some may manage their own legal risk by recommending to biopsy at a lower threshold than if the same patient were on the physician’s schedule. Some patients of NPCs may request biopsies out of fear that NPCs might not be fully qualified to provide reassurance based on physical examination alone.

When calculating excess biopsies using NNB ratios, the authors assumed that physicians and NPCs have identical sensitivity but different specificity (i.e., that dermatologists would find all cancers detected by NPCs, using fewer biopsies). No data is cited to support this assumption. In fact, one reader study found that NPCs had higher sensitivity, but lower specificity, than dermatologists for melanoma detection [3]. Hence, considering NNB without attention to the applied sensitivity for cancer detection could prove misleading. Additional limitations of the NNB have been published, including wide variability within institutions, non-standardized reporting, and sparse data on U.S.-based clinicians [4-6].

The aggregate annual cost of excess biopsies does not consider all relevant potential benefits and harms. Suppose NPCs raised their threshold to

biopsy, achieving higher specificity at a cost of lower sensitivity. Their NNB would be lower, reducing their cost per cancer found. The trade-off is that some cancers would be missed. In this thought experiment, the potential harms from delayed diagnoses are unaccounted for despite a “better” aggregate annual cost. Thus, well-intentioned efforts to improve the cost per cancer found may inadvertently harm patients if not appropriately considered.

Most importantly, no research has linked lower NNB to improved patient outcomes. To optimize patient-derived benefits while mitigating harms and costs,

additional metrics are needed to illuminate what matters most: which biopsies prevent metastases and save lives. Greater attention must be paid to the defining traits of diagnostic excellence: care that is safe, effective, patient-centered, timely, efficient, and equitable. Patients, not clinicians, should be our primary focus [7].

Potential conflicts of interest

The authors declare no conflicts of interest. Author opinions are their own and not representative of any organization.

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