

**Letter**

**Biopsy rates vary with patient profile across different physicians in an academic dermatology practice**

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**Abstract**

Current healthcare trends promote data-driven “benchmarking” to decrease cost and increase quality. Dermatologists perform 79% of skin biopsies and biopsy rate is an easily measured benchmark. To reduce the risk of a misguided “one size fits all” benchmark for biopsies, it will help to document the factors driving divergent biopsy rates.

This letter compares biopsy rates and high-risk patient ratios for 1000 sequential patients from two academic dermatologists. Elevated biopsy rates (0.55 vs 0.42,  $p < 0.001$ ) were associated with elevated ratios of high-risk patients (.52 versus .30,  $p < 0.001$ ). Although limited by small sample size, this research takes a first step toward future efforts to improve accuracy of biopsy benchmarking.

**Letter to the editor**

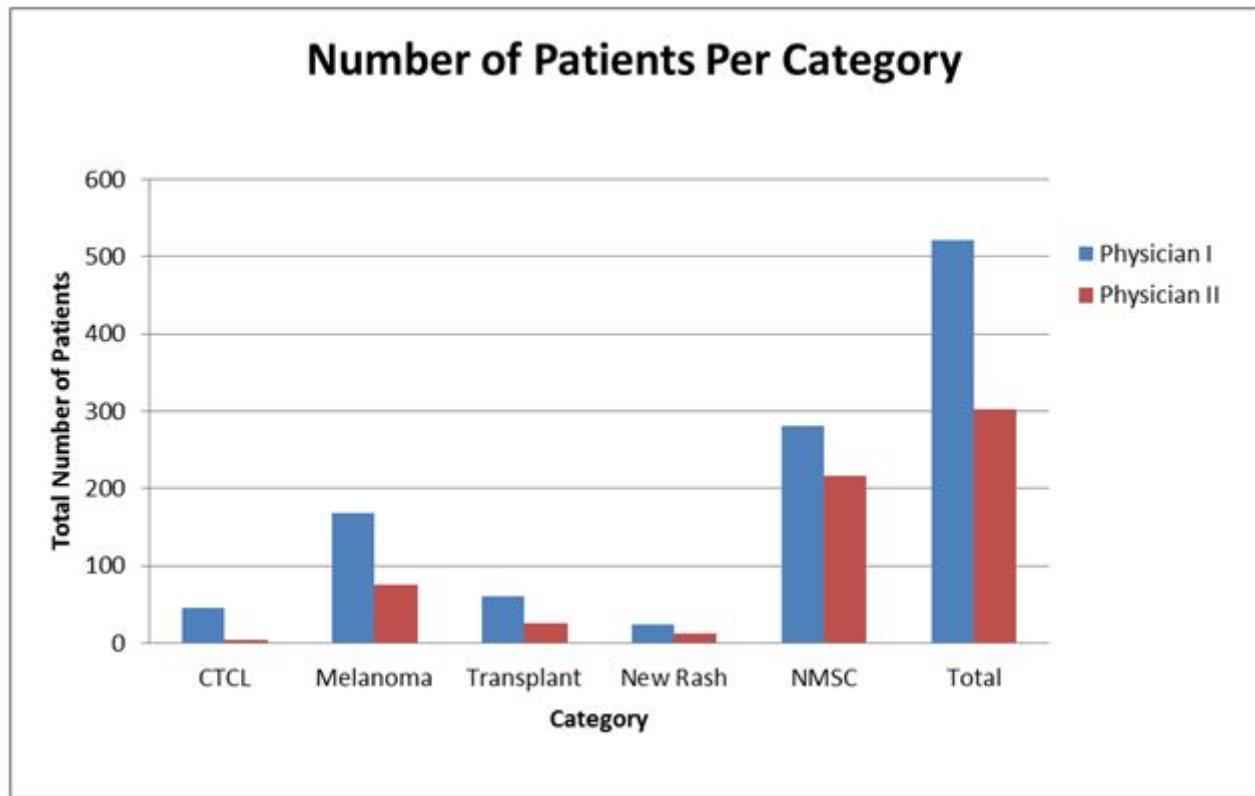
Between 1995 and 2008, dermatologists performed 79% of the skin biopsies in the US. Evaluation of easily measured procedures such as skin biopsies will become more common as healthcare policy-makers seek to decrease costs via data-driven “benchmarks.” As dermatology benchmarking proceeds, it will be useful to understand what drivers need to be included in the benchmarks. Different dermatologists, by choice or by accident, attract different types of patients. For instance, some dermatologists follow large cohorts of solid-organ transplant recipients at elevated risk for skin cancer, whereas others focus on issues such as psychocutaneous disorders that do not require biopsy as frequently. A “one-size-fits-all” approach to benchmarking biopsy rates could be misleading because certain types of patients require more biopsies.

We focused on five major patient categories in which skin biopsies are especially helpful. The first three predispose to skin cancer: history of melanoma (category 1) (1) or non-melanoma skin cancer (category 2) (2), and history of organ transplant (category 3) (3). In cutaneous T-cell lymphoma (category 4), serial skin biopsies are indicated to assess response (4). New dermatoses (category 5) often require skin biopsy for diagnosis (5).

We examined 2000 sequential patients in two faculty practices for (a) biopsy rates and (b) ratio of patients carrying a diagnosis that places them in one or more of the five categories described above. We asked whether increased biopsy rates were associated

with an increased ratio of high-risk patients. Subjects were the most recent 1000 consecutive Dermatology Clinic patients for each physician. For 1000 records the maximum half-width is 0.04 for a 95% binomial confidence interval, or 0.08 maximum confidence interval width for any dichotomous outcome. Chi-square tests were used for associations between patient characteristics and treating physician, using SAS® version 9.3. This study was approved by the University of Kansas Human Subjects Committee.

Physician I performed 545 biopsies or 0.55 biopsies per patient seen, compared to 423 or 0.42 biopsies per patient seen for Physician II. This was approximately 30% higher and was statistically significant ( $p < .001$ ). However, patients seen by Physician I were > 60% more likely to present with high biopsy-risk skin conditions, 0.52 versus 0.30, as in Figure 1 ( $p < .001$ ). Thus, it appears that higher biopsy rates (0.55 vs 0.42,  $p < .001$ ) are associated with higher-risk patient populations (0.52 versus 0.30,  $p < .001$ ). Owing to the observational nature of the data this is not definitive causal evidence, but it provides a reasonable hypothesis for further study. In addition to overall risk profile, data showed that risks in individual categories also differed between physicians (Table 1).



**Figure 1.** Overview of Patient Breakdown per Physician.

**Table 1.** Estimates (95% Confidence Intervals) of Proportion of Patients within Risk Category

Risk Category	Physician		$p^\dagger$
	I	II	
Cutaneous Lymphoma	0.045 (0.032, 0.058)	0.005 (0.001, 0.009)	< .0001
Melanoma	0.168 (0.145, 0.191)	0.075 (0.059, 0.091)	< .0001
Transplant	0.060 (0.045, 0.075)	0.026 (0.016, 0.036)	.0002
New dermatoses	0.024 (0.015, 0.034)	0.013 (0.006, 0.02)	.068
Non-melanoma skin cancer	0.281 (0.253, 0.309)	0.271 (0.244, 0.299)	.62

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†: *p*-value from chi-square test comparing rates of risk between physicians

Biopsy rates might be expected to vary in conjunction with different types of patient populations. We found that a physician who performed significantly more biopsies also had significantly more patients in “high biopsy risk” categories. This lends support to the proposition that accurate biopsy rate benchmarking must take patient profiles into consideration.

Limitations of this pilot study include small numbers of patients and practitioners, and use of literature-based, non-validated “biopsy-risk” categories.

## References

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