



Understanding downstream service profitability generated by dermatology faculty in an academic medical center: a key driver to promotion of access-to-care

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Abstract

Hiring new dermatology faculty at academic medical centers (AMCs) can be a difficult process. Academic dermatology departments, however, must have the financial freedom to nimbly respond to the needs of their community. To determine the downstream revenue and profitability produced by dermatology faculty, a retrospective review of charges and expenses downstream of professional services was performed to assess dermatology faculty and nurse practitioners from January 2019 to December 2020 at a single AMC in the southern United States. The downstream revenue per dermatology faculty was calculated using institutional data based on the number of services performed and the exact compensation per service. When this was not possible, the Medicare Allowable Charge was used to estimate the compensation for the service provided. Revenue was included from internal referrals to dermatopathology, Mohs surgery and repairs, chemistry and microbiology labs, radiology, and phototherapy. Profitability was calculated using institutional cost data to estimate the expense of each additional unit of services performed. The most valuable source of downstream income was dermatopathology services, which generated \$85,395/provider in 2019 and \$102,746/provider in 2020. Mohs surgery was also a significant source of downstream revenue contributing \$92,715 in 2019 and \$96,599 in 2020. Repairs after Mohs surgery internal referrals generated \$30,036 in 2019 and \$36,507 in 2020. The total contributions of chemistry and microbiology labs, radiology, and phototherapy were considerable but less impactful overall. The total downstream revenue calculated from these services for 2019 was \$228,304/provider and \$255,549 in 2020. The total downstream profitability for these services was calculated to be \$112,597/provider in 2019 and \$92,344/provider in 2020. In conclusion, faculty of academic dermatology departments produces a great deal more revenue and profitability for AMCs than the sum of their professional charges.

Keywords Downstream income · Fee for service · Value-based care · Managed care · Academic dermatology

Introduction

Many dermatology departments in Academic medical centers (AMCs) need additional faculty to serve a growing and changing patient population with diverse needs [1]. Efforts to improve access-to-care are impacted by economic forces in both capitated and fee-for-service healthcare

environments [2, 3]. In both settings, defining the true economic value of a provider is both essential and challenging [4]. Department income and expenses inherent in the provision of clinical services are readily available. However, these simple data do not demonstrate the full story of a particular provider's value. Downstream income is defined as income produced subsequent to clinical encounters resulting from services rendered. For example, a patient visit resulting in a biopsy produces income from dermatopathology services. These contributions stemming from clinical encounters are important to understanding the true value of dermatology faculty to the AMC. This article illustrates a method used for estimating the revenue and profitability of downstream services at an AMC. These data were essential to supporting

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the value of additional faculty members needed to improve access to dermatological care in our state.

Methods

The total downstream income generated by dermatology faculty and nurse practitioners (NP) were assessed for two years from January 2019 to December 2020 anticipating that COVID-19 might have significantly impacted the 2019 data ($n = 14$ in 2019 and $n = 12$ in 2020, $n = 3$ NPs each year). Downstream income is the sum of earnings generated subsequent to the services provided by general dermatologists. For professional services within the department of dermatology, the exact professional income (collections) from all sources was determined. For technical services provided outside the dermatology department (dermatopathology technical fees, lab chemistries, and radiology), downstream revenue was estimated by multiplying the quantity of each downstream service by the Medicare Allowable Charge (MAC). Profitability was determined by calculating the downstream income from dermatopathology, chemistry and microbiology, radiology, and Mohs surgery including repairs and subtracting the estimated expenses for provision each additional unit of these services including fixed and variable operating expenses such as rent, nursing/technical support, and supplies. Determining these expenses is challenging in a large institution. For instance, the amount of formaldehyde used in dermatopathology processing cannot be separated from that used for other pathology services.

Results

Table 1 shows the average income from downstream services per faculty member, and Table 2 displays the profitability of these downstream services. For 2019 and 2020, the downstream profit for an additional general dermatology faculty member was \$112,597 and \$92,344 per provider. Facility

Table 1 Downstream income: 2019 and 2020

Source	Income/provider (2019) $n = 14$	Income/provider (2020) $n = 12$
Dermatopathology	\$85,395	\$102,746
Chemistry and Microbiology Lab	\$2,776	\$2,248
Radiology	\$372	\$489
Mohs Surgery	\$92,715	\$96,599
Repairs after Mohs Surgery	\$30,036	\$36,507
Phototherapy	\$17,015	\$16,960
Total	\$228,304	\$255,549

Table 2 Downstream profitability: 2019 and 2020*

Source	Profit/provider (2019) $n = 14$	Profit/provider (2020) $n = 12$
Dermatopathology*	\$41,844	\$36,745
Chemistry and Microbiology Lab**	\$2,082	\$1,686
Radiology***	\$186	\$245
Mohs Surgery*	\$45,430	\$34,547
Repairs after Mohs Surgery*	\$14,718	\$13,056
Phototherapy*	\$8,337	\$6,065
Total	\$112,597	\$92,344

*Incremental costs for additional cases of dermatopathology and Mohs surgery/Repairs were estimated at 51% for FY19 and 64% for FY20 based on actual operating expenses (inclusive of nursing support, lease expenses, supplies, etc.) and net patient revenue (collections). These figures are inclusive of the entire department's collections and expenses; **The incremental cost of providing additional, largely automated, testing to cover supplies was estimated at 25%; ***The incremental cost of additional radiology tests was estimated at 50% to cover overhead expenses recognizing that it is not possible to determine when additional professional and technical staff may be needed for the increased demand

fees were not included in these calculations because no additional space was required to add these tests/procedures on top of those already being performed.

Discussion

These findings demonstrate that general dermatologists produce substantial profits related to downstream income for a department in a fee-for-service environment. The demand for dermatology services has continued to rise, but the supply of dermatologists has struggled to meet this demand. This mismatch has resulted in the meteoric rise of nonphysician clinicians to supplement the physician supply [5]. Meanwhile, the proportion of dermatologists pursuing a full-time career in academics has remained stagnant with poor retention of new faculty [6]. Dermatologists exiting academia cite compensation and lack of control over practice and personnel decisions as key issues degrading the satisfaction of academic dermatologists [7]. Academic dermatology departments are charged with providing quality care to patients regardless of financial incentives, producing cutting edge research, and training medical students and residents. For these reasons, it is essential that AMC's have the flexibility to recruit and retain faculty.

Dermatology departments collect the professional fees of their faculty and often operate at a negative annual variance with the hospital. However, the billing revenue for a provider belies their economic impact on an academic medical center. At a strategic level, the financial analysis of

return-on-investment for new faculty or changes in faculty compensation should be based on several factors including demand for services, professional income generated, and the contribution of downstream income.

Our results indicate that the economic impact of each academic dermatology faculty member on the academic medical center is much greater than the sum of their professional fees minus the cost of facilities, staffing, fringe benefits and medical supplies. Previously, the impact of downstream revenue on the total economic impact for various health care team members including medical scribes, genetic counselors, physical therapists, nurse navigators, and trauma center staff has been assessed, and the economic impact of these professionals on their institutions is also more complex than simple billing and RVU calculations can explain [7].

There are several limitations to this study. First, only the most commonly ordered chemistry and radiologic tests were included in the calculations and, therefore, downstream income may be underestimated. Second, referrals for professional services provided by other university departments were not included in these calculations recognizing profitability for this work is best awarded to the physicians in the department providing the service. Third, cost estimates were conducted using the best available data and are not exact. Fourth, new faculty hires will not be as productive as existing faculty for several years and, therefore, may refer fewer cases. Utilizing the average of all faculty including those doing patch testing and hospitalist dermatology may offset this fact. Finally, if the university is not aggressive in their collection efforts, some bills may not be sent, the primary insurer (Medicare or other) may reject some claims, secondary insurers may not be billed or pay their share, rejected claims may not be resubmitted, and patients may not pay their copays and deductibles.

The decision to hire additional faculty at a university medical center is largely related to financial exigencies including: (1) salaries of the new physician and their support staff; (2) the cost of clinic space, support staff, and supplies; (3) the professional income flowing to the department. However, accounting for only these variables neglects the significant contribution of downstream services. Of course, there are other services provided by academic dermatologists that cannot be calculated including: (1) the value of medical student and resident teaching and continuing medical education provided to community physicians; (2) the production of unfunded research and (3) the benefits to society of high-quality university care provided to each patient. Still, the mission of the hospital cannot be accomplished if income is not generated to maintain financial viability. This study demonstrates the financial viability of hiring additional general dermatology faculty in an academic medical

center environment by examining the crucial contribution of downstream revenue.

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Declarations

Conflict of interest Ross L. Pearlman has accepted grant funding from the American Academy of Dermatology (AAD) and served on an advisory board for Castle Biosciences. Robert T. Brodell is a principal investigator for a clinical trial (Novartis) and for the Corevitas psoriasis biologic registry. He has stock in Veradermics, Inc. Vinayak K. Nahar, Taylor S. Ferris, William T. Sisson, and William H. Black have no conflicts of interest.

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