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## The Role of Cost-Effective Practices in Dermatology

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### Abstract

The face of medicine is changing; the healthcare system is becoming more conscious regarding medical care expenditure. It is important for dermatologists to be aware of cost-effective measures that may be used to treat skin pathology. These practices can be implemented in both the academic and outpatient settings to decrease medical expenditure. Although most literature in the field of cost-conscious dermatologic practice has been written on healthcare systems outside of the United States, these studies show that cost-effective medicine does not necessarily impact efficacy of treatment, patient outcome and patient satisfaction. The use of teledermatology, non-physician staff, multidisciplinary practices and home therapy are all viable options to cutting medical expenditure and are currently being employed across the country.

**Keywords:** Cost-Effective; Cost-Reduction; Teledermatology

### Introduction

As the healthcare delivery system becomes more cost-conscious, it is important for dermatologists to recognize cost-effective measures for the treatment of disease, as well as actions that may be implemented in the outpatient setting to decrease expenditure. The medical system previously focused on reimbursement plans encouraging unnecessary tests and/or care, and third-party self-interests; now the system has evolved so that outside forces seek to limit medical care to the absolute necessary with the goal of providing cost-conscious healthcare. Much of the literature written on cost-effective medical practice focus on regions outside the United States, and show cost-conscious medical care does not mean a decrease in efficacy of treatment or patient satisfaction. In this day and age, it is extremely important for dermatologists, non-dermatologists, and patients to be aware of cost-effective dermatologic practice.

### Cost-Conscious Strategies in Medical Dermatology

Cellulitis is one of the most common and expensive diseases diagnosed in the outpatient setting. However, it is often misdiagnosed by primary-care. One can just ask how many times dermatologists have been consulted for “bilateral leg cellulitis”? The Massachusetts General Hospital has determined that 67% of patients treated by primary-care for cellulitis are diagnosed by dermatology as having pseudo cellulitis not requiring antibiotic treatment; 100% of patients treated by primary-care receive antibiotics for cellulitis, versus 10% of patients treated by dermatologists. Dermatology consultation by primary-care not only improves diagnostic accuracy but is also cost-effective by decreasing the prescription of unnecessary antibiotics [1].

Psoriasis represents a large dermatologic disease burden. A Swiss study with a total of 383 patients determined that ambulatory care costs for mild psoriasis equal \$605-1110 USD per patient, per year and \$2421-9987 USD for severe psoriasis. From 2004 to 2005, the rough estimate total cost for inpatient psoriasis care was \$60.5 million USD, while the total cost for all psoriasis treatment was an estimated \$317-462 million USD [2]. Given that the American population is almost 39 times larger than the Swiss population, this study highlights the need for new, cost-effective therapeutic options for the treatment of psoriasis.

One such option for psoriasis is home-phototherapy. In the United Kingdom (UK), home-phototherapy with narrow-band ultraviolet-B (NB-UVB) radiation is estimated to decrease the total cost of treatment from \$686 USD (traditional outpatient therapy) to \$511 USD (home therapy). Patients achieve similar improvement and report minimal side effects. The majority of patients report they would choose to continue with home phototherapy over outpatient, due to convenience and lower cost [3]. The PLUTO trial in the Netherlands, also explored the use of home UVB

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therapy for psoriasis. Researchers found that per treatment home therapy was about \$52 USD less expensive than outpatient, with a significant quality-adjusted life-years (QALYs) gain. As both home and outpatient treatment options are equally effective and patients prefer home therapy, PLUTO recommends that home phototherapy should be the primary treatment option for eligible patients [4].

In Germany, a study determined which systemic treatments for moderate to severe psoriasis were the most cost-effective. Results demonstrated methotrexate was the most cost-effective, followed by ustekinumab 90mg and then infliximab [only if methotrexate was unable to achieve or maintain a Psoriasis Area and Severity Index (PASI)-75 response] [5]. These results show that conventional therapies for the treatment of psoriasis are more cost-effective than biologics, and should be the first-line therapeutic option.

Large-scale screening is also a cost-conscious measure in the practice of medicine by increasing QALYs gained by patients, as well as decreasing net treatment cost. Detecting diseases early prevents progression associated with medical complications and disease burden. In a Belgian study, researchers compared total-body skin examination (TSBE) to lesion-directed screening (LDS). Using budget effect analysis, this study showed that a one-time screen in those 18-years or older, would cost \$38.6 million USD for TSBE versus \$6.4 million USD (\$0.80 US per adult) for LDS, with about \$37,500 US QALY gained. These results suggest that a one-time screen is the most cost-effective strategy to reduce skin cancer mortality [6].

As the population ages, concern for dermatologic diseases associated with advanced age (fungus, xerosis, pruritus, skin breakdown) increases. Cost and economic mapping has been insufficient to provide information on the impact of age-associated skin conditions and disease [7]. Further large-scale studies will need to be completed to determine cost-effective measures for skin disease in the aging population.

## Cost-Effective Dermatologic Surgery

Studying the cost-difference of wide surgical excision versus Mohs micrographic surgery (MMS) for the treatment of basal cell carcinoma (BCC) found that the total cost of MMS treatment was about \$269-275 USD higher than traditional surgical excision for the treatment of both primary and recurrent BCCs. Although the incremental cost-effectiveness ratio (cost of MMS compared to surgical excision to prevent additional recurrence of BCC) did not show that MMS was superior to surgical excision, it is difficult to determine definite recurrent rates as this study was only three-years long [8]. More recently, the Ohio State University found that MMS was in fact the least expensive surgical technique for the removal of an average tumour (\$805 USD) versus standard surgical excision (SSE) with permanent margins (\$1206 USD), SSE with frozen margins (\$1200 USD), and ambulatory surgery center-SSE with frozen margins (\$2507 USD). In addition, as MMS technique and instrumentation becomes more advanced, the cost of MMS procedures has decreased dramatically over the last ten years [9,10]. It is possible that in the long run, MMS proves to be a more cost-effective treatment for non-metastatic NMSC that is amenable to excision, and will become the cornerstone of dermatologic surgery.

## Teleconferencing

With the age of easy communications access and real-time transmission, teledermatology and telepathology have become

popular, especially in areas with scarce dermatology resources. Using a consumer digital video camera attached to a MMS microscope, histologic pictures were sent in real-time for evaluation by a dermatopathologist. Out of 20 unknown tumors, there was a 95% concordance rate in diagnosis reached using light microscopy versus telepathology; of 20 Mohs frozen sections, there was a 100% concordance rate [11]. Dynamic telepathology may be a cost-effective measure to quickly reassess, confirm diagnoses and evaluate margins during MMS, thus resulting in higher patient turnover and fewer cases of re-excision.

Teledermatology has become an outlet for dermatologic consultation in rural areas. Primary-care physicians are able to send pictures or descriptions of skin pathology to off-site dermatologists to determine whether further intervention or follow-up is required. However, results on the cost-effectiveness of teledermatology are varied. Although real-time teledermatology is clinically feasible and does not result in significantly different outcomes compared to outpatient dermatology visits, one research group did not find it a cost-conscious alternative. However, they hypothesized if the outpatient dermatologist was greater than 78 km round-trip from the primary-care center, then teledermatology would be a cost-effective alternative to conventional office visits [12]. In another study, out of 248 patients requiring teledermatology consults from primary-care physicians in the UK, only 102 were referred for dermatology follow-up while 146 were managed in the primary-care office. Over three years, this study estimated \$15,600 USD saved in medical fees with 97% of patients being satisfied with their treatment and results [13]. New Zealand created a Virtual Lesion Clinic (VLC) using teledermatology to allow for efficient (assessment occurred in nine days versus 26.5 days for outpatient), accurate (positive predictive value of 63%) and cost-effective [reduced one-year costs compared to the conventional outpatient referral by greater than \$250,000 USD (\$826 USD per patient)] method of triaging “melanomas” referred from the public health care system. Images of lesions were sent to an off-site dermatologist who decided if lesions required dermatology assessment and/or excision, follow-up with a primary-care physician, re-imaging in three months or self-monitoring. 613 suspect lesions were evaluated and of these, 129 lesions were surgically removed; of the lesions excised, 76% were skin cancer (including 37% melanoma, 38% non-melanoma skin cancer, and 1 spizoid tumour of unknown malignant potential) [14].

In rural areas of the United States, access to dermatology is limited and the medical resources are not always in place to get patients the evaluation and treatment they require. Teleconferencing, whether in real-time or slightly delayed (by up to a couple of weeks), allows for off-site dermatologists to assess patients and determine if they require further follow-up or can continue treatment with primary-care. Although research in the field is lacking, especially regarding the state of teledermatology in the United States, one can see that teledermatology and telepathology may be a very cost-effective measure in the primary-care setting and for third party payers, while providing an extra source of income for dermatologists.

## Non-physician Staff

Patients seeking evaluation for dermatologic symptoms account for 14% of physician assistant (PA) visits. Primary-care PAs are a prime target for dermatology education, especially for the management of overall skin health. As PAs become the forefront of primary-care, they will also become a larger source of dermatology

referrals. PAs are becoming popular in the dermatology clinic for their ability to decrease the patient load on the dermatologist allowing for same-day appointments, urgent visits and follow-ups, as well as permitting surgical/cosmetic dermatologists to focus on procedures rather than clinical dermatology. The ratio of billing generated to gross income for an average dermatology PA ranges from 3:1 to 6:1, and they help with practice expansion by covering satellite offices. As PAs work under the supervision of dermatologists, it is important not to see PAs as competitors, but as assets to an outpatient office with a co-dependent, non-competitive relationship. PAs see patients at a discounted rate, allow the practice to be more productive per office day, and prove not only to be cost-effective for the medical system, but also generate a greater profit for the outpatient practice [15].

In an UK outpatient facility utilizing nurses for prescription triage, 47 patients required the prescription of 91 items over six months – most requests were due to change in skin condition or prescription refill. As a result, eight patients were able to defer their dermatology appointment. Only three patients reported that the nurses' prescription failed to work with the instructions provided, and only one reported an unspecified side effect from an undisclosed topical anti-pruritic [16].

When non-physician staff are appropriately trained in specific domains of dermatology, they are a safe and valuable asset to the outpatient dermatology practice. Dermatologists may delegate prescription refills, simple clinical dermatology and even routine cosmetic procedures (laser hair removal, non-ablative laser resurfacing, chemical peels and/or simple botulinumtoxin injections) to their non-physician associates thus freeing time to continue work in complex medical dermatology, surgical dermatology, cosmetic dermatology and dermatologic research.

## Multidisciplinary Clinics

Traditional dermatologic care requires multiple screening laboratories, possible inpatient hospital stay for erythrodermic, desquamative and bullous disorders, as well as metastatic skin cancer, and for skin cancer also includes staging and surgical excision. Providing coordinated care between a multitude of specialties may not only save patients, physicians and third-party payers money, but also improve communication between specialties, provide continuity of care, and decrease wait times for continued treatment.

The University of Michigan completed a blinded study in conjunction with their Multidisciplinary Melanoma Clinic (MDMC) with a sample of 104 patients treated at a community hospital compared those treated at the MDMC. Patients treated at the MDMC saved the third-party payer an average of about \$1600 USD per patient compared to the community facility, without significantly changing morbidity and mortality of patients when compared to the literature [10]. Although a multidisciplinary approach to dermatologic practice may provide a more cost-effective approach to treatment, it may not necessarily improve outcomes.

## Conclusions

Awareness of cost-effective medical practices is important in the outpatient dermatology practice and dermatologic field of medicine. Although there is a paucity of literature studying cost-conscious efforts in the American medical system, there are many examples employing these measures originating from outside the United States.

The use of teledermatology, non-physician staff, multidisciplinary practices and home therapy are all viable options to cutting medical expenditure and are being implemented across the country. Further large-scale research will need to be completed evaluating the use of these cost-effective measures and quantifying long-term medical costs saved.

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