Where are we now with inpatient consultative dermatology?: Assessing the value and evolution of this subspecialty over the past decade

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The importance of inpatient consultative dermatology is often underrecognized and undervalued. A significant need exists because the burden of skin disease in the hospital is great and expertise regarding the recognition and management of uncommon and severe skin disorders is limited outside the field. In response to this need, the concept of a dermatology hospitalist was defined and the Society for Dermatology Hospitalists was created in 2009. Over the past decade, the subspecialty has developed and fostered both research and education. Data now exist demonstrating the value of inpatient dermatology services not only to patients but also to payors and health care systems. Future needs include strategies to improve access to expertise and additional efforts to establish our field as an indispensable and enduring component of hospital-based care. (J Am Acad Dermatol 2019;80:1804-8.)

Key words: complex medical dermatology; dermatology consultation; dermatology hospitalist; inpatient consultative dermatology; inpatient dermatology; value-based care.

Dermatology is often viewed by both the lay public and medical providers as a purely outpatient specialty.[1] This assumption inevitably leads to the question "is there truly a need for inpatient dermatology consultants?" Although the answer might seem obvious to practicing dermatologists, the prevalence and complexity of cutaneous disease in the hospital is not always appreciated outside of the field. This report is a compilation of the trajectory that inpatient dermatology has taken from its inception as a subspecialty to the field's most recent demonstrations of its value to patients, payors, and the entire health care system, with additional attention to where future needs lie.

THE NEED

It was previously common for dermatology departments to have a dedicated inpatient program available to accept new admissions. Changes to reimbursement and health care financing have led to a dramatic transformation in the landscape of hospital-based care. With the adoption of the diagnosis-related group (DRG) system in 1983, metrics for inpatient admissions changed. Subsequently, patients with cutaneous disorders were more frequently admitted to primary care services attended by nondermatology providers. In 1982, only 15.5% of dermatology patients were admitted to other physician providers, with dermatologists acting as consultants. By 1997, this number had increased to 32.4% and continues to grow, with few dedicated admitting dermatology services remaining in practice today.[2]

Despite this change, the number of patients being admitted specifically for cutaneous disorders is rising. During 2008-2010, the volume of Medicare discharges for dermatology-specific DRGs increased an average of 3.4% per year.[3] Assessment of the Centers for Medicare and Medicaid Services MedPAR (Medicare Provider and Analysis Review) database for the 2016 fiscal year was notable for $517,639,851 in total charges for 4 dermatology-specific DRGs

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encoding for major and minor skin disease with and without major complications.[4] General medical training in the recognition and management of uncommon and severe skin disorders is deficient.[5] As such, lack of inpatient dermatology consultants might lead to the inappropriate management of patients with cutaneous disease—including patients admitted by dermatologists for escalation of care. The burden of skin disease among hospitalized patients admitted for noncutaneous DRGs is also high. In a study performed in 1995 by Nahass et al,[6] all general medicine patients were offered a full skin examination (regardless of primary diagnosis) within 48 hours of admission. Of the 231 participants, 35.9% were found to have a cutaneous finding; benign diagnoses, such as seborrheic keratosis, angiomas, and onychomycosis, were excluded. These cutaneous findings frequently represented an unrecognized manifestation of the underlying disease (37%) or an important secondary diagnosis requiring treatment.[6] This study highlights a high prevalence of skin disease in the general inpatient population even without inclusion of iatrogenic disease (such as drug eruptions), which might develop during hospitalization.

CAPSULE SUMMARY

- The prevalence and complexity of cutaneous disease among hospitalized patients is high.
- Inpatient consultative dermatology has advanced as a subspecialty over the past decade to provide much needed expertise regarding uncommon and severe skin disorders. Recent data support the significant clinical, outcomes-based, and economic value associated with inpatient dermatology care.

THE IMPORTANCE OF EXPERTISE

Evidence supporting the value of consultative dermatology in the United States initially came from major academic centers who elected to publish data from their individual inpatient services either in isolation or collaboration. These centers—Massachusetts General Hospital, University of California Los Angeles, University of California San Francisco, University of Alabama at Birmingham, the Mayo Clinic, Brigham & Women's Hospital, Stony Brook, University of Iowa, University of Miami (Florida), and the Cleveland Clinic—gathered information regarding the reason for consultation, procedures performed, final diagnoses, and interventions provided to varying degrees.[3,7-12] What becomes apparent upon review of these publications is that the initial reason for consultation is often ill defined (vague description, "rash," unknown diagnosis, skin lesions)[7,10,12,13] This highlights the fact that our colleagues often rely on the expertise of the dermatology consultant, not only to perform procedures and provide treatment recommendations but also to formulate an appropriate differential diagnosis.

These publications also demonstrate the type of disorders encountered by inpatient dermatologists. Taken in aggregate, the most common final diagnoses rendered by consultants frequently fall into 1 of 5 general categories: drug eruptions, cutaneous infections, chronic dermatoses (including psoriasis and eczema), contact dermatitis, and vascular disorders. The overall concordance, or agreement, between the primary team's preliminary diagnosis and the actual diagnosis (per the consulting team) ranged only 22%-52%.[3,7-12] This disparity is significant and indicates an opportunity for meaningful intervention, as demonstrated by the finding that dermatology consultation changed treatment in 58%-96% of cases.[3,7-12]

Skeptics might challenge whether symptomatic management, such as the application of a topical cream, is truly a meaningful intervention as it relates to the inpatient setting. Galimberti et al from the Cleveland Clinic addressed this criticism by stratifying cases into simple and complex cutaneous conditions.[12] For simple disorders, a change in therapy occurred in 72% of cases; however, for complex conditions, including severe drug reactions, connective tissue disease, and graft-versus-host disease, dermatology consultation changed management 97% of the time.[12] Thus, for the sickest patients, many with disease that extends beyond the skin, dermatology consultation not only provides value but might also significantly impact morbidity and mortality. Data specifically evaluating these endpoints, however, is currently lacking.

It is important to consider not only patients with the most severe skin conditions but also those who are hospitalized with severe systemic disorders and also have cutaneous disease. Dermatologists from the University of Pennsylvania evaluated consults received from the primary hematology and bone marrow transplant service. Among the 204 consults seen, 51% were neutropenic (absolute neutrophil count <1000 cells) and 30% were bone marrow transplant recipients, highlighting the complexity and severity of the cohort. What they discovered was that even for some of the sickest patients in the

Abbreviations used:

DRG: diagnosis-related group
SDH: Society for Dermatology Hospitalists

hospital, dermatology consultation resulted in a change of diagnosis in 59% of cases.[14]

THE RESPONSE

As demonstrated, there is a significant need for the expertise and value provided by dermatology consultants within the hospital. Although many providers have successfully balanced this role and clinical responsibilities in the past, the changing landscape of hospital-based medicine has made this practice increasingly difficult. Patients today are more complicated and more likely to have acute illness, polypharmacy (including biologic and immunosuppressant agents), and severe comorbid disease. Time constraints, structured outpatient practices, and the implementation of inpatient electronic medical records unfamiliar to the outpatient clinician have made it challenging for many dermatologists to dedicate the time necessary to care for these patients and their complex needs. It is difficult to assess how dermatology as a field has responded to these demands, considering there are few objective measures to quantify the specialty's dedication to this unique population. One specific action has been the proposed concept of a "dermatology hospitalist" whereby a committed individual or group, provides consultative care for hospitalized patients with skin disease. This model addresses the need for providers uniquely adept at providing high-level care to hospitalized patients through expertise in the acute management of severe skin disease, comorbid disorders, and increasingly varied and specific therapies.[15] This specialized knowledge also provides a unique educational opportunity for trainees and encourages their future participation in consultative dermatology.

It was in response to this idea that the Society of Dermatology Hospitalists (SDH) was founded. The mission statement of this group is "to strive to develop the highest standards of clinical care of hospitalized patients with skin disease by promoting clinical expertise, fostering research, and furthering education in the management of hospitalized patients with cutaneous disease."[16] At the group's inception in 2009, there were 5 members. By 2017, a total of 145 members were officially included in the SDH Expert Resource Group, demonstrating notable growth and increasing dedication to this subspecialty. Most of these providers are located at large, urban centers; however, diversity within the group is increasing. The majority also see medical dermatology patients in the outpatient setting. Among the members, there has been significant productivity including collaborative, multicenter investigations,[17] as well as thoughtful studies assessing the economic impact of dermatology in the hospital setting, including 4 of the 5 studies described in the next section.[18-21] Efforts to advance education have also been embraced by members, leading to the creation of 2 postgraduate fellowships dedicated to the training of dermatology hospitalists. Before 2009, only 1 such program existed.[22] Numerous dermatology residents have also been educated by these dedicated specialists. Although this is a single model, it objectively demonstrates growth within the field over the past decade—a measure that was previously lacking. It does not, however, diminish the work of those who provided care and value for many years before the creation of the SDH in 2009 out of their passion for caring for these patients.

THE OBJECTIVE VALUE

Although the initial descriptive data was meaningful, only recently have dermatologists been able to quantify their impact on the greater hospital system and demonstrate the cost associated with the lack of inpatient dermatologic care. The most robust data exist with regard to cellulitis. This common skin infection accounts for >600,000 admissions each year.[19] Although this diagnosis seems routine, there is no pathognomonic feature, and several disorders are known to mimic the clinical signs. Therefore, correct characterization relies on the presence of an experienced practitioner.

One of the first inquiries, a multi-institutional retrospective review, evaluated 74 cases where the dermatology service was consulted for presumed cellulitis (including 65 patients admitted for rash). In all, 74% of patients were determined to have a diagnosis of pseudocellulitis instead of a cutaneous bacterial infection. The most common disease mimics included stasis dermatitis (31%), contact dermatitis (15%), and inflammatory tinea (9%), disorders that can be successfully managed in the outpatient setting.[23] Because the study design only allowed for cases seen in consultation by dermatology, a minority of admissions for this condition, it is plausible that the cohort was skewed toward patients with an atypical course or presentation.[23]

In 2 recently published studies, this limitation was addressed by obtaining cases of presumed cellulitis from the emergency department or general inpatient population directly. Ko et al prospectively enrolled 175 patients who received a primary diagnosis of

Table I. Estimates of the economic value of inpatient consultative dermatology

Study	Estimated economic impact
Weng et al[18]	Dermatology consultation for suspected cellulitis could prevent 50,000-130,000 unnecessary hospitalizations annually and $195-$515 million in avoidable health care spending annually.
Milani-Nejad et al[20]	Dermatology consultation for patients with inflammatory skin conditions is associated with a 10-fold reduction in the odds of re-admission and can reduce the length of hospitalization by ~2.64 days.
Ko et al[19]	Dermatology consultation for suspected cellulitis could prevent unnecessary antibiotic exposure (and associated costs), including a reduction in the duration of both intravenous and total antibiotic use.
Li et al[21]	Dermatology consultation for suspected cellulitis could prevent 97,000-256,000 avoidable inpatient days and $80-$210 million in avoidable health care spending annually.

cellulitis by an emergency medicine physician and were admitted to an inpatient ward or observation unit.[19] The outcome of an early evaluation by a dermatologist was a significantly lower total duration of antibiotic treatment (<10 days for 50.6% with vs 32.5% without a dermatology consultation; absolute difference 18.1%; $P = .1$) and a higher rate of clinical improvement at 2 weeks. The rate of cellulitis misdiagnosis among this cohort was 30.7%.[19] Li et al prospectively enrolled 116 patients with a primary diagnosis of cellulitis from the emergency department and emergency department observation unit at a large academic hospital.[21] Each case received an early dermatology consultation, and the rate of cellulitis misdiagnosis was 33.6%. Of the 39 misclassified cases, 34 had already received antibiotics. The authors further expanded the investigation by extrapolating the potential clinical and economic impact of the intervention. It was estimated that early dermatology evaluation could result in up to 256,000 fewer inpatient hospitalization days nationally, with a net annual cost savings of $80-$210 million. On average, each dermatology consultation for presumed cellulitis could safeguard patients 1.6-2.2 antibiotic days.[21]

These results were supported by a retrospective, cross-sectional analysis by Weng et al using a patient data repository at a large, urban hospital.[18] A misdiagnosis rate of 30.5% was identified for presumed cases of cellulitis, and 66% of misclassified cases were hospitalized for this indication; 48 of 52 (92%) admissions received avoidable antibiotics. Unnecessary antibiotic use and hospitalization for misdiagnosed cases were nationally projected to cause >9000 nosocomial infections each year.[20]

While these publications allude to the economic and clinical implications of dermatology consultations on a larger scale, they are limited to a single disease state. Milani-nejad et al performed retrospective, multivariable modeling utilizing a de-identified database of hospitalizations to assess the impact of dermatology consultation on all inflammatory skin conditions.[20] When using this strategy, dermatology consultation was associated with a 10-fold reduction in the odds of re-admission for patients discharged primarily with an inflammatory skin condition. Consultation was also associated with a mean reduction in the length of hospitalization by 2.64 days when adjusted for the lag time between admission and dermatology consultation.[18] Each of these variables translates into significant health care cost savings, as well as important improvements in patient care (Table I).[18-21] Further research to better quantify the direct impact on morbidity and mortality is needed, as are creative solutions to reach an ever-expanding patient network.[24]

THE FUTURE

Much has been achieved in the 9 years since the formal inception and specialty's acceptance of inpatient dermatology as a subspecialty of dermatology. Indeed, many academic institutions now have, are recruiting, or at least appreciate the concept of inpatient dermatology, a distinct change from their positions a decade ago (Dr Fox, personal observations). However, there remain multiple gaps that our specialty still needs to address. Most obvious is the lack of access to inpatient dermatology consultations for most patients hospitalized with skin disease outside of academic institutions. The role of teledermatology in meeting this need has yet to be defined. Although the value inpatient dermatology provides to patients, payors, and the larger health care system has been supported by data and the significance of inpatient dermatology has been recognized by many within our specialty, further efforts are necessary to establish dermatology as an essential part of hospital-based care.

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