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How data can deliver for dermatology

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Much has been written about big data in medicine, but few articles have focused on the potential for better data to transform dermatology.¹ We provide a conceptual framework for how technologic advances could enable standardized data collection and analysis from patient-provider encounters and improve patient care, advance our understanding of dermatologic diseases, and streamline billing and reimbursement. We also briefly address some of the challenges unique to dermatology, though our primary goal is to describe the rationale for supporting improvements in routine clinical data collection.

BETTER DATA CAN IMPROVE PATIENT CARE

Standardized summaries of symptoms, disease severity and control, test results, and quality of life can enhance individual patient care by facilitating continuity of care across visits, providers, and practice settings. Incorporating these data into decision support tools will enable more personalized care. For example, multiple sclerosis patients use the MS

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Bioscreen to compare their disease trajectory to similar patients and inform individual treatment discussions.² Such tools would be useful for many chronic dermatologic conditions.

BETTER DATA CAN ADVANCE UNDERSTANDING OF DERMATOLOGIC DISEASES

Standardized data from well-characterized populations can improve population health by identifying risk factors for disease, providing prognostic information, and enabling targeted prevention and treatment strategies. When data are standardized, findings can be compared across multiple data sets to evaluate their consistency and generalizability. Standardization of how the genetic code is reported has facilitated rapid advances in genomics.^{3,4} Similar efforts to standardize phenotypic and clinical data would advance scientific discovery. For example, a large systematic review found that genetic mutations predictive of atopic dermatitis are strongest in studies restricted to dermatologist-diagnosed atopic dermatitis.⁵ Better data could allow for further refinement of phenotypes and disease trajectories to translate into better identification and management of disease for patients.

BETTER DATA CAN STREAMLINE RISK ADJUSTMENT, BILLING, AND REIMBURSEMENT

Widespread capture and use of standardized measures could enable dermatology to introduce risk adjustment into payment models. This ensures that providers treating the sickest and most complicated patients are adequately compensated (Fig 1). Although efforts to electronically collect patient-reported outcomes at each clinic visit are still in their infancy, incorporating patients' own reports of disease severity or chronic disease control could, in theory, provide quality metrics and decrease clinicians' documentation burden for billing.

CHALLENGES AND OPPORTUNITIES FOR THE COLLECTION AND USE OF ELECTRONIC DATA IN DERMATOLOGY

Few dermatologic conditions have outcomes that are standardized, quantifiable, and readily identifiable in routinely collected medical data. Objective vital signs (eg, blood pressure, heart rate), laboratory tests (eg, CD4 counts, HbA1c values), or easily identifiable endpoints (eg, hospital admission, mortality) that are often used to improve clinical outcomes in other specialties are rarely available for dermatologic conditions. This lack of readily collected, easily quantifiable data requires innovative methods of data capture and analysis to ensure that additional burden does not fall on providers. The skin is uniquely accessible for measurement, and clinical data systems could incorporate measures, such as digitized photographic images and patient-reported signs and symptoms with validated assessments, to complement provider-generated data.^{6,7} New machine learning techniques can facilitate analysis of large quantities of data, and dermatology's high-volume ambulatory practices can serve as models for assessing the extent, severity, and impact of skin disease on the

patient. Innovations in the routine measurement of such outcomes combined with standardized clinical data will propel dermatology to the forefront of patient-centered care.

AN INTEGRATED APPROACH

The investment necessary to develop systems to capture both clinician-generated and patient-generated data will be substantial, and organizers will have to balance the desire for comprehensive high-quality data with logistics and cost. The American Academy of Dermatology recently launched DataDerm, a clinical data registry designed to standardize and compile data about patient visits to US dermatologists.⁸

To ensure success, population-based data registries must use valid and accepted quality-of-care measures, address data privacy and licensing issues, and be financially accessible and easy for practicing clinicians to implement. Efforts to improve data capture and standardization in dermatology have the potential to benefit our patients, our practices, and the population health and will require an interdisciplinary effort with input from patients, providers, researchers, and administrators.

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Fig 1. Example of a risk adjustment model. Risk adjustment models can incorporate multiple types of patient factors to help predict outcomes and make quality assessments more equitable. For example, if 2 dermatologic surgeons were to perform a wide local excision for melanoma and surgeon 1 treats a young, otherwise healthy individual and surgeon 2 treats an older individual with uncontrolled diabetes, a risk adjustment model could help to level the field when comparing postoperative outcomes for the 2 surgeons. *SES*, Socioeconomic status.