

Provider Perspectives on Pediatric Store and Forward Teledermatology at Boston Medical Center: A Cross- sectional Survey

Mason Mcdowell, Sara Stulac, Margaret S Lee

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Mason Mcdowell¹; Sara Stulac^{1, 2, 3} MD; Margaret S Lee^{1, 4, 5} MD, PhD

¹ Boston University Chobanian & Avedisian School of Medicine Boston US

² Boston Medical Center Department of Pediatrics Boston US

³ Boston University Department of Pediatrics Boston US

⁴ Boston Medical Center Department of Dermatology Boston US

⁵ Boston University Department of Dermatology Boston US

Corresponding Author:

Margaret S Lee MD, PhD

Boston University Chobanian & Avedisian School of Medicine
72 E concord st
Boston
US

Abstract

Background: Access to pediatric dermatologists is limited by prolonged waiting times, limited appointments, and uneven geographic availability. Provider-to-provider store-and-forward teledermatology (SAFTD), which allows referring providers to send images and clinical information to dermatology for asynchronous evaluation, triage, and recommendations, alleviates these barriers. Therefore, we hypothesized that SAFTD could be particularly helpful to diverse, low-income patients seen at community health centers affiliated with a safety-net hospital (SNH) system like Boston Medical Center (BMC); these patients face increased healthcare challenges related to language barriers and limited resources for accessing care.

Objective: Examine provider perspectives on pediatric SAFTD in a safety-net hospital setting.

Methods: We conducted an anonymous cross-sectional survey of BMC pediatric dermatologists, dermatology residents, pediatricians, pediatric residents, and pediatric nurse practitioners who use the SAFTD service. This study was approved as exempt per BMC institutional review board (H-43783). Surveys included both qualitative and Likert scale data which were examined via thematic and univariate analyses, respectively.

Results: Among dermatology providers fielding SAFTD cases (n=7), mean satisfaction was 4 out of a maximum score of 5, with 85.7% preferring it to traditional referrals given improved triage and faster intervention, although patient comprehension of recommendations and photo quality (particularly focus, lighting, and adequate number of images) could be improved. Pediatric providers (n=15) reported a mean satisfaction score 4.93 of 5, 100% preferring it over traditional referral methods (primarily citing faster intervention and increased patient convenience), with 93% reporting they learned new management strategies, although some cited difficulty capturing and uploading high-quality photos and having limited time to act upon recommendations.

Conclusions: Pediatric SAFTD is an efficient and educational means of delivering care to our safety-net pediatric patient population. We can recommend SAFTD to SNH's, particularly if photography support and protected time can be provided to participating providers. Clinical Trial: n/a

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Original Manuscript

Provider Perspectives on Pediatric Store and Forward Teledermatology at Boston Medical Center: A Cross-sectional Survey

Mason McDowell^a, Sara Stulac, MD, MPH^{b, d},

Margaret S. Lee MD, PhD^{c, d}

Affiliations: ^aBoston University Chobanian & Avedisian School of Medicine, ^bBoston University Chobanian & Avedisian School of Medicine Department of Pediatrics, ^cBoston University Chobanian & Avedisian School of Medicine Department of Dermatology, ^dBoston Medical Center

Address correspondence to: Margaret S. Lee, MD, PhD, Boston University Department of Dermatology, 609 Albany Street, Boston, MA, 02118 [margaret.lee@bmc.org].

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Conflict of Interest Disclosures: Mason McDowell, Margaret Lee, and Sara Stulac each certify that we have no conflicts of interest.

Short title: Asynchronous Teledermatology Pediatric Provider Perspectives at Boston Medical Center

Data availability: Study data is available at https://docs.google.com/spreadsheets/d/1qFGPEl9WjYlm3kTnjhta_he8aengCDJ5/edit?usp=sharing&ouid=108825875240473126892&rtpof=true&sd=true

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Abbreviations: BMC (Boston Medical Center), DP (dermatology providers), FTF (face-to-face), PP (pediatric providers), SAFTD (Store and Forward Teledermatology), SNH (safety-net hospital).

Category of Study: Cross-sectional survey study.

Author statement: All authors approved the final manuscript as submitted for publication in *JMIR Dermatology* and agree to be accountable for all aspects of the work. We affirm that this study was conducted following the highest ethical principles and all words contained in this manuscript are truthful.

ABSTRACT

Background: Pediatric store-and-forward teledermatology (SAFTD) has been in use for well over a

decade, but little is known about provider perspectives in a safety-net hospital setting and from pediatric providers. **Objectives:** An anonymous cross-sectional survey of Boston Medical Center pediatric and dermatology providers was implemented to examine provider perspectives on pediatric SAFTD in a safety-net hospital setting. **Results:** Among dermatology providers fielding SAFTD cases (n=7), mean satisfaction was 4 out of a maximum score of 5, with 6/7 (86%) preferring it to traditional referrals given improved triage and faster intervention, although patient comprehension of recommendations and photo quality (particularly focus, lighting, and adequate number of images) could be improved. Pediatric providers (n=15) reported a mean satisfaction score 4.93 of 5, 15/15 (100%) preferring it over traditional referral methods (primarily citing faster intervention and increased patient convenience), with 14/15 (93%) reporting they learned new management strategies, although some cited difficulty capturing and uploading high-quality photos and having limited time to act upon recommendations. **Conclusions:** Pediatric SAFTD is an efficient and educational means of delivering care to our safety-net pediatric patient population. We can recommend SAFTD to SNHs, particularly if participating providers receive photography support and protected time to provide dermatologic recommendations to patients.

Key words: Teledermatology, eConsult, store and forward teledermatology, dermatology education, pediatric dermatology, dermatology access, safety-net population.

INTRODUCTION

Access to pediatric dermatologists is limited by prolonged waiting times, limited appointments, and uneven geographic availability [1]. Provider-to-provider store-and-forward teledermatology (SAFTD), which allows referring providers to send images and clinical information to dermatology

for asynchronous evaluation, triage, and recommendations, alleviates these barriers [2, 3]. In 2020, Boston Medical Center (BMC) launched an Epic-based SAFTD service for pediatric providers, with dermatology residents and board-certified pediatric dermatologists responding to requests within 72 hours. We hypothesized that SAFTD is particularly helpful to patients and providers in a safety-net hospital (SNH) system like BMC where language, transportation, and financial challenges play a heightened role in care delivery [4, 5].

METHODS

An anonymous cross-sectional REDCap survey approved as exempt per BMC institutional review board (H-43783) was emailed to all BMC pediatric SAFTD users, including pediatric dermatologists, dermatology residents, pediatricians, pediatric residents, and pediatric nurse practitioners. Completed responses were collected between 6/29/2023 and 8/7/2023. Surveys included qualitative and Likert scale (ranging from 0 to 5) data which were examined via thematic and univariate analyses, respectively.

RESULTS

Among responses obtained from 15/26 (58%) pediatric providers (PP), mean satisfaction was 4.93 of 5, with 14/15 (93%) reporting they were very satisfied. All PP preferred it to traditional referral methods (Table 1), primarily citing decreased time to intervention and saving patients resources such as time and cost of travel to clinic. Satisfaction with response time, digital template, and time-to-FTF were all high, with means of 4.8, 4.33, and 4.26, respectively. Recommendations were communicated via phone for 10/15 (66%) PP, with 5/15 (33%) using the patient portal. Barriers to using SAFTD included difficulty capturing high-quality photographs, limited provider time to contact patients regarding recommendations, and photograph uploading challenges. PP appreciated the opportunity to learn dermatology in real-time and 14/15 (93%) reported changing their

subsequent patient management after using SAFTD.

Among responses obtained from 7/17 (41%) dermatology providers (DP), mean satisfaction was 4 of 5 and 6/7 (86%) preferred it to traditional referral methods (Table 2), citing improved triage and decreased time to intervention. Additional benefits of SAFTD included increased collaboration between Dermatology and Pediatrics and decreased language barriers. DP priorities for photograph improvement included focus, lighting, and adequate number. Patient and guardian comprehension of teledermatology recommendations at follow-up in-person appointments was assessed as moderate overall by DP, with a mean score of 2.67 of 5. One respondent preferred traditional over SAFTD referrals, stating that in-person assessment is necessary for adequate diagnosis and that SAFTD may delay appropriate care.

DISCUSSION

Pediatric and dermatology providers at BMC are highly satisfied with SAFTD, particularly in its ability to provide prompt treatment, superior triage, and reduced barriers to care. Providers highlighted that it decreases language and transportation barriers which disproportionately affect the diverse and low-income populations served by BMC [4, 5]. The proportion of BMC PP “very satisfied” with SAFTD surpasses that reported in similar studies occurring in non-SHN settings [6, 7]. Although participation bias may have contributed, high PP satisfaction with SAFTD suggests heightened value in SNHs. These findings add to current literature showing that SAFTD increases access to care [2, 3, 9].

Previous studies note photograph quality as a SAFTD limitation [3, 6]. Our results provide more detail for improving pediatric photography support or training to ensure images are in focus, taken with adequate illumination, and provide a comprehensive range of clinical views to improve SAFTD quality.

Our study shows that SAFTD can be used to train pediatric and dermatology residents, as well as pediatric providers with less dermatology experience. PP valued how SAFTD facilitated real-time learning in dermatology, with 93% affirming that the service improved their management practices for dermatological conditions. This expands on quiz-based data and survey studies suggesting that PP learn from SAFTD over time [8, 9] by confirming that learning co-occurs with routine patient care. In the setting of variable dermatological training for pediatricians [10] and pediatric advanced practice providers, SAFTD presents an opportunity to incorporate dermatology education into day-to-day primary care. Furthermore, with board-certified pediatric dermatologist workforce shortages [1], increasing PP knowledge of common dermatological conditions allows DP to focus on more complex and severe conditions.

This study provides evidence that SAFTD may be particularly helpful for pediatric residency programs and SNHs serving resource-limited populations. Addressing PP barriers to use with photography support and allocating protected time for dermatologic recommendations would further strengthen these benefits. Future efforts to optimize SAFTD for primary care, dermatology education, and expanded pediatric dermatology access hold significant promise.

Table 1: Pediatric Provider Responses to Multiple Choice Questions

Question	Selection (number selecting, % of respondents)
How satisfied are you with the Pediatric Dermatology eConsult service? ^a	4 (1, 7%) 5 (14, 93%)
How satisfied are you with the response time for pediatric dermatology eConsults? ^a	4 (3, 20%) 5 (12, 80%)
How satisfied are you with the template used to provide content in the pediatric dermatology eConsults? ^a	1 (1, 7%) 3 (1, 7%) 4 (4, 27%) 5 (9, 60%)
How satisfied are you with the referral time to in-person evaluation,	2 (1, 7%)

	3 (2, 13%)
if indicated, by pediatric dermatology eConsult? ^a	4 (4, 27%)
	5 (8, 53%)
What proportion of eConsult diagnoses are concordant with your initial evaluation? ^b	1 (1, 7%)
	2 (1, 7%)
	3 (4, 27%)
	4 (7, 47%)
	5 (2, 13%)
Has the information provided in the pediatric dermatology eConsult(s) changed the way you manage other patients?	No (1, 7%)
	Yes (14, 93%)
What impact has the information provided in the pediatric dermatology eConsults had on the number of patients you refer to dermatology?	Decreased (4, 27%)
	No change (3, 20%)
	Increased (8, 53%)
Do you prefer the eConsult or traditional referral system?	eConsult (15, 100%)
With what method do you inform patients of recommendations made via eConsult?	Patient portal (5, 30%)
	Phone call (10, 67%)

Table 1 Legend: Total number of pediatric provider respondents was 15. "eConsult" is synonymous with provider-to-provider SAFTD

^aLikert scale: 1= not satisfied at all and 5= the most satisfied.

^bLikert scale: 1= always discordant; 5= always concordant.

Table 2: Dermatology Provider Responses to Multiple Choice Questions

Question	Selection (number selecting, % of respondents)
How satisfied are you with the Pediatric Dermatology eConsult service? ^a	3 (1, 14%)
	4 (5, 71%)
	5 (1, 14%)
	2 (1, 14%)
	3 (3, 43%)
To what extent do eConsults include adequate quality photos? ^b	4 (3, 43%)
Rate the importance of the below actions for eConsult quality	

Checking that images are in focus ^c	5 (7, 100%)
Making sure images have clear orientation and location ^c	3 (3, 43%)
	4 (1, 14%)
	5 (3, 43%)
Including images of symmetrical contralateral skin for rashes ^c	2 (2, 29%)
	3 (3, 43%)
	4 (1, 14%)
Ensuring adequate lighting ^c	5 (1, 14%)
	4 (3, 43%)
	5 (4, 57%)
Verifying adequate number of photos/views ^c	3 (1, 14%)
	4 (4, 57%)
	5 (2, 29%)
Making sure hair does not obscure condition ^c	3 (2, 29%)
	4 (4, 57%)
	5 (1, 14%)
Do eConsults include adequate clinical information? ^b	2 (1, 14%)
	3 (4, 57%)
	4 (2, 29%)
What is your overall level of comfort diagnosing conditions via eConsult? ^d	3 (3, 43%)
	4 (4, 57%)
To what extent do eConsults reduce unnecessary face-to-face dermatology appointments? ^e	3 (5, 71%)
	4 (2, 29%)

Table 2 Legend: “eConsult” is synonymous with provider-to-provider SAFTD.

^aLikert scale where 1= not satisfied at all and 5= the most satisfied.

^bLikert scale where 1= none of the time and 5= all the time.

^cLikert scale where 1= not important and 5= very important.

^dLikert scale where 1= unable to make diagnoses via eConsult and 5= equally comfortable diagnosing as compared to face-to-face visits.

^eLikert scale where 1= not at all and 5= greatly.

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Figure 1 Legend: Top primary care pediatric provider (red) and dermatology provider (blue) reasons for preference from free text explanations.

Figure 2 Legend: Top primary care pediatric provider barriers to SAFTD use.

Contributors Statement Page

Mason McDowell conceptualized and designed the study, designed data collection instruments, participated in data analysis, drafted the initial manuscript, and critically reviewed and revised the manuscript.

Dr Sara Stulac designed data collection instruments, participated in data collection, analysis, and critically reviewed and revised the manuscript.

Dr. Margaret Lee conceptualized and designed the study, designed data collection instruments, participated in data analysis, drafted the initial manuscript, and critically reviewed and revised the manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Supplementary Files

Figures

Title: Table 1. Pediatric provider responses to multiple choice questions Table 1 Legend: Total number of pediatric provider respondents was 15. "eConsult" is synonymous with provider-to-provider SAFTD. aLikert scale: 1= not satisfied at all and 5= the most satisfied. bLikert scale: 1= always discordant; 5= always concordant.

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How satisfied are you with the referral time to in-person evaluation, if indicated, by pediatric dermatology eConsult? ^a	2 (1, 7%) 3 (2, 13%) 4 (4, 27%) 5 (8, 53%)
What proportion of eConsult diagnoses are concordant with your initial evaluation? ^b	1 (1, 7%) 2 (1, 7%) 3 (4, 27%) 4 (7, 47%) 5 (2, 13%)
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Do you prefer the eConsult or traditional referral system?	eConsult (15, 100%)
With what method do you inform patients of recommendations made via eConsult?	Patient portal (5, 30%) Phone call (10, 67%)

Title: Table 2. Dermatology provider responses to multiple choice questions Table 2 Legend: “eConsult” is synonymous with provider-to-provider SAFTD. aLikert scale where 1= not satisfied at all and 5= the most satisfied. bLikert scale where 1= none of the time and 5= all the time. cLikert scale where 1= not important and 5= very important. dLikert scale where 1= unable to make diagnoses via eConsult and 5= equally comfortable diagnosing as compared to face-to-face visits. eLikert scale where 1= not at all and 5= greatly.

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