

# Implementation and evaluation of a store-and-forward teledermatology workflow in a United States safety-net hospital urgent care emergency center: A retrospective cohort study



Christian L. Carr, MD,<sup>a</sup> Aya Alame, MD,<sup>a</sup> Benjamin F. Chong, MD,<sup>a</sup> Melissa Mauskar, MD,<sup>a,b</sup> Jeffery Metzger, MD,<sup>c</sup> Catherine Neal, MD,<sup>d</sup> Joan S. Reisch, PhD,<sup>e</sup> and Arturo R. Dominguez, MD<sup>a,f</sup>

**Background:** Teledermatology (TD) is an important method for increasing access to care in outpatient settings. However, less is known regarding its use in emergency/urgent care centers.

**Objective:** To evaluate the effect of TD on urgent care emergency center (UCEC) dwell time and postencounter utilization.

**Study type and methods:** This retrospective cohort study evaluated patients in a safety-net hospital (Parkland Health, Dallas, Texas, USA) UCEC, who (1) received a TD consult in 2018, (2) were referred to dermatology clinic in 2017, or (3) were referred to dermatology clinic in 2018 without a TD consult.

**Results:** We evaluated 2024 patients from 2017 to 2018. Of the 973 referred to dermatology clinic in 2018, 332 (34%) received TD consultations. Mean dwell time for patients receiving TD was longer versus the 2017 cohort (303 vs 204 minutes, respectively). Patients receiving TD consultation with inflammatory skin conditions had lower odds of dermatology clinic visits compared with those that did not (odds ratio, 0.5; 95% CI, 0.3-0.8). Teledermatology was not associated with differences in repeat UCEC utilization.

**Limitations:** Single institution study and inability to account for differences in patient complexity.

**Conclusion:** TD increases dwell time in a safety-net hospital's UCEC but can reduce dermatology clinic utilization for patients with inflammatory skin conditions. (JAAD Int 2023;12:112-20.)

**Key words:** health care utilization; teledermatology; urgent care.

From the Department of Dermatology, University of Texas Southwestern Medical Center, Dallas, Texas<sup>a</sup>; Department of Obstetrics and Gynecology, University of Texas Southwestern Medical Center, Dallas, Texas<sup>b</sup>; Department of Emergency Medicine, University of Texas Southwestern Medical Center, Dallas, Texas<sup>c</sup>; Department of Emergency Medicine, Texas Health Resources, Fort Worth, Texas<sup>d</sup>; Division of Biostatistics, Department of Population and Data Sciences, University of Texas Southwestern Medical Center, Dallas, Texas<sup>e</sup>; and Department of Internal Medicine, University of Texas Southwestern Medical Center, Dallas, Texas.<sup>f</sup>

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Correspondence to: Arturo R. Dominguez, MD, Department of Dermatology, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd, Box 9190, Dallas, TX, 75390-9069. E-mail: [arturo.dominguez@utsouthwestern.edu](mailto:arturo.dominguez@utsouthwestern.edu).

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## INTRODUCTION

Numerous international studies have demonstrated that teledermatology (TD) can expand access to care, particularly among underserved communities and is accurate and cost effective in outpatient settings.<sup>1-6</sup> Although dermatologic disease may be responsible for up to 10% of consultations in emergency departments (EDs), less is known about TD in this setting. Previous studies in France, Germany, Australia, and the United States have shown that TD is acceptable for ED providers/patients, clarifies diagnosis and management, is time-efficient, and may reduce unnecessary hospitalizations.<sup>7-13</sup> However, utilization of EDs internationally differs from the United States, where uninsured and immigrant patients often seek care at safety-net hospital EDs. In this context, TD could play a significant role in improving dermatological access for patients who face barriers to in-person visits. In Texas, where over 18% of the population is uninsured, TD could be a vital tool for overcoming some of these barriers. Therefore, further research evaluating the effect of TD in urgent care centers (UCC) and EDs across different regions and health systems is warranted.

Our objective was to assess the impact of a store-and-forward (SAF) TD system within the electronic medical record workflow in an UCC. The primary aims of this study were to evaluate the effect of a SAF TD system on workflow, as measured by dwell time and postencounter utilization in our hospital's UCC. Our hypothesis was that utilization of a TD workflow would increase dwell times but decrease in-person postencounter utilization of the UCC and dermatology clinic.

## METHODS

### Study setting

Parkland Health (PH) is a large, urban, safety-net hospital system located in Dallas, Texas, United States. As the safety-net hospital of Dallas County, PH provides access to health care for all residents of the county, regardless of income and insurance status. Furthermore, uninsured county residents meeting certain income criteria may receive significantly reduced (at times free) health care under the county charity system, otherwise known as Parkland

Financial Assistance. Patients evaluated in the urgent care emergency center (UCEC) are walk-ins or are triaged from the ED if the medical problem is of lower acuity. In 2018, the PH UCEC completed approximately 69,000 patient visits. Each year, the UCEC accounts for the most dermatology clinic referrals of all clinical sites and in 2017, was responsible for 1173 of 6768 referrals.

## CAPSULE SUMMARY

- Teledermatology increases access to care and provides accurate and rapid diagnosis and management support.
- Store-and-forward teledermatology may increase patient dwell times in a safety net hospital system urgent care emergency center. However, many patients are appropriately managed via teledermatology, potentially reducing the need for evaluation in dermatology clinic.

## Teledermatology program

Prior to development of a UCEC SAF TD workflow in 2018, UCEC provider (primarily Advanced Practice Providers) either diagnosed and treated patients presenting with dermatological disease without assistance, placed an inpatient dermatology consultation for in-person evaluation within 3-4 hours by the hospital con-

sult team, and/or referred the patient to the outpatient dermatology clinic for follow up. Only patients with insurance/funding, including Dallas County-funded income-based financial assistance (county charity), are scheduled in dermatology clinic.

A previously developed internal outpatient SAF TD workflow was modified for use in the UCEC and is described in Carter et al.<sup>11</sup> From January 1, 2018 to December 31, 2018, UCEC providers submitted electronic consults (e-consults) to a dermatologist during the hours of 08:00-17:00. Providers completed a standardized questionnaire within EPIC electronic medical record. Providers were also instructed to upload digital patient photographs using EPIC Haiku. This information was then sent as an e-consult with an automated alert to a pager carried by the on-call dermatologist, who provided a diagnosis and recommendations for treatment and triage within 2 hours. The consulting provider was then alerted to completion of the e-consult through a push notification on their mobile device as well as the ED tracking board. If a diagnosis could not be made or if the condition was thought to be urgent, the patient was evaluated in-person by the inpatient dermatology consultation service.

## Study design

A retrospective chart review was performed on all e-consults from the UCEC during 2018, and outpatient referrals to dermatology clinic from the UCEC in 2017 and 2018. Eligible patients met the

**Table I.** Patient sociodemographics and health care utilization by year and TD status ( $n = 2024$ )

	2017 $n = 1051$	2018 overall $n = 973$	2018 TD $n = 332$	2018 non-TD $n = 641$
<i>N</i> (%)				
Sociodemographics				
Age, mean (SD)	43 (15)	44 (16)	46 (16)	43 (15)
Sex				
Female	507 (48)	507 (52)	176 (53)	331 (52)
Male	544 (52)	466 (48)	156 (47)	310 (48)
Race/ethnicity				
White non-Hispanic	179 (17)	173 (18)	70 (21)	103 (16)
Black non-Hispanic	336 (32)	354 (36)	110 (33)	244 (38)
Hispanic	489 (47)	417 (43)	135 (41)	282 (44)
Other non-Hispanic	47 (4)	29 (3)	17 (5)	12 (2)
Insurance				
Medicare	89 (8)	97 (10)	38 (11)	59 (9)
Medicaid	36 (3)	78 (8)	15 (5)	63 (10)
County charity	437 (42)	390 (40)	126 (38)	264 (41)
Private	116 (11)	76 (8)	31 (9)	45 (7)
None	373 (36)	332 (34)	122 (37)	210 (33)
Health care utilization				
Required in-person consult				
Yes	24 (2)	33 (3)*	*	33 (5)
No	1027 (98)	940 (97)	*	608 (95)
Repeat UCEC encounter				
Yes	157 (15)	151 (16)	57 (17)	94 (15)
No	894 (85)	822 (84)	275 (83)	547 (85)
Dermatology clinic visit				
Yes	285 (27)	212 (22)	49 (15)	153 (25)
No	766 (73)	761 (78)	283 (85)	478 (75)
Combined repeat UCEC or dermatology clinic visit				
Yes	382 (36)	315 (32)	91 (27)	224 (35)
No	669 (64)	658 (68)	241 (73)	417 (65)

TD, Teledermatology; UCEC, urgent care emergency center.

\*TD patients not included in number of in-person consultations.

following criteria: (1) had an in-person visit to the UCEC between January 1, 2017 and December 31, 2018, (2) evaluated during their UCEC encounter for a dermatological concern, and (3) referred to dermatology clinic or received a TD or in-person dermatology consult. In 2018, patients who presented multiple times to the UCEC and had TD consults at 1 encounter but not the other were included in the TD group. Patients with dermatological conditions managed by providers in the UCEC but not referred to dermatology clinic were not included in either cohort. This study was approved by institutional review board at University of Texas Southwestern Medical Center. (STU 092017-015).

### Study end points

Prior to initiation of our study, we defined 2 primary outcomes for evaluation: (1) UCEC dwell time and (2) in-person utilization of the UCEC or

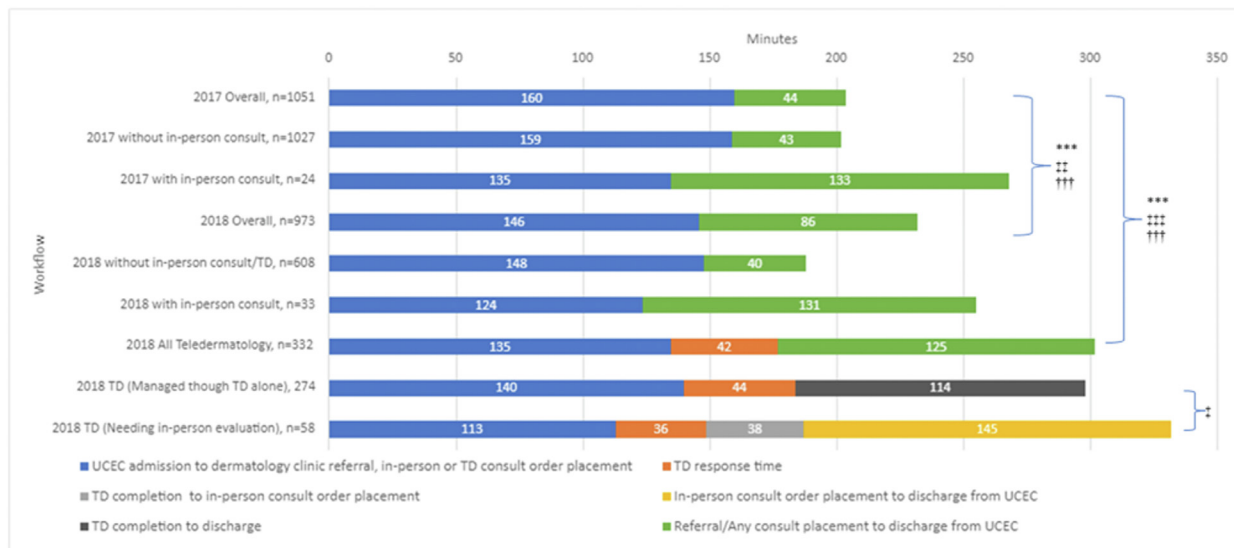
dermatology clinic at 6 months for the same dermatologic problem addressed in the original UCEC encounter.

Dwell time was defined as the time between a patient's arrival in the UCEC to discharge from the UCEC.

### Statistical analysis

Data were collected for each of 2 years including demographic information (sex, race, ethnicity, and age), insurance type (county charity, private, Medicare, Medicaid, or none), dwell time and return visits, including clinic, in-person visits, or return to urgent care.

Descriptive statistics for categorical measurements include frequency counts and ranges; for the numerical measure (age) mean and SD were determined. For dwell time, numerical measure (minutes) mean was determined. A Student *t* test for 2 independent groups was utilized to compare age for the 2



Dwell time p value - \*\*\* <0.0001

Arrival to referral, in-person or TD consult order placement p value - ††† <0.0001, †† <0.01, † <0.05

Referral to discharge p value - ††† <0.0001

**Fig 1.** UCEC dwell time comparisons based on year, TD, and inpatient consultation. Each cohort is subdivided to show mean time per step involved in patient management and treatment. The basic steps are (1) time from arrival in the UCEC to placement of referral to dermatology clinic, and (2) placement of dermatology clinic referral to discharge. Cohorts with more steps are shown as well. *TD*, Teledermatology; *UCEC*, urgent care emergency center.

different years and dwell times.  $\chi^2$  contingency table analysis was used for comparing each of the categorical measures by year. A significance level was chosen as 0.05.

Stepwise logistic regression analysis was utilized to determine the factors that were predictive of a return to UCEC, dermatology clinic, or either, in 2017 or 2018. Possible predictors for each of the 3 models were age, gender, race, insurance type, and in-person visit. For 2018, TD was also included. Race-ethnicity groups and insurance type were utilized as indicator variables. Criterion for entry was 0.05.

Of note, patients without insurance were not included in the multivariable analysis of dermatology clinic utilization or the combined subsequent UCEC encounter and/or dermatology clinic visit for either cohort because patients without insurance could not be scheduled in the PH dermatology clinic. SAS version 9.4 was used for all analyses (SAS Institute, Inc).

## RESULTS

### Study population characteristics

The total sample size consisted of 2024 patients from 2017 to 2018. In total, our cohort represented a diverse population in which just over 50% (1014) of

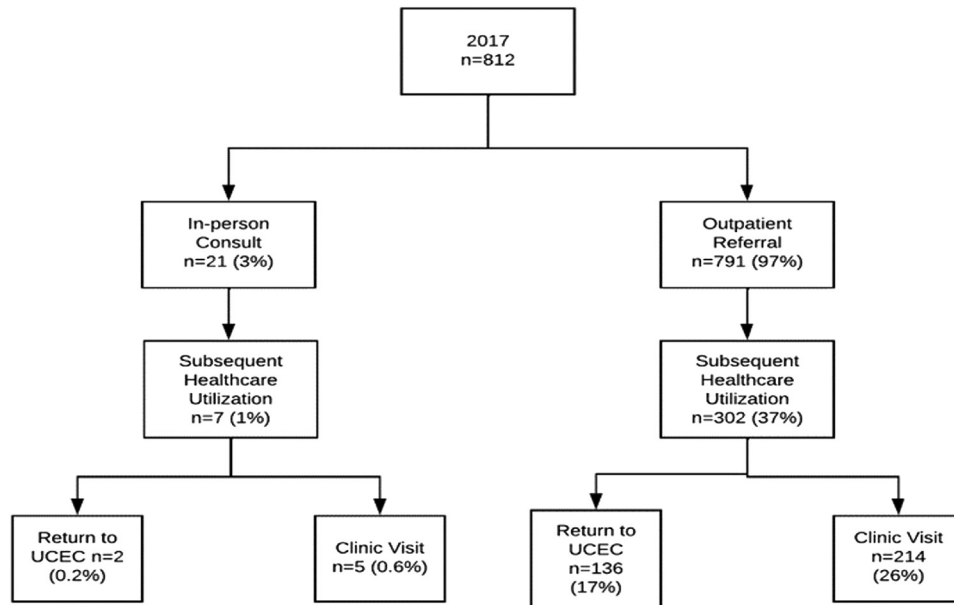
the 2024 patients evaluated were women, 45% (906) were Hispanic, and the mean age was 44 years (SD = 15). Of the 972 patients referred in 2018, 34% (332) received TD consultations (Table D).

### Dwell time

Fig 1 contains information regarding dwell time with breakdown based on workflow steps. Mean dwell time for the 2018 cohort was 230 minutes versus 204 minutes in 2017 ( $P < .0001$ ).

Cohorts were stratified according to whether they received an inpatient consultation and/or TD e-consult. Overall, patients evaluated in 2018 via TD had a mean dwell time of 303 minutes; significantly longer than patients seen in 2017 ( $P < .0001$ ). The longest mean dwell time was by patients receiving TD consults that also required in-person evaluations by the inpatient consult service (331 minutes). Dwell time was slightly attenuated in patients managed via TD alone (297 minutes). Cohorts managed by UCEC providers without a TD consult or inpatient dermatology consult experienced the shortest dwell times (202 minutes in 2017 and 188 minutes in 2018).

These stratified cohorts were categorized by workflow steps (time to referral/consult order placement, order placement to consult/TD response, and



Percentages listed are based on percent of total group.

UCEC – Urgent Care Emergency Center

**Fig 2.** Subsequent health care utilization of 2017 urgent care emergency center (UCEC) cohort with inflammatory conditions. The number of patients with inflammatory conditions evaluated in 2017 in the Parkland Health UCEC that met inclusion criteria is shown. These patients are initially organized in the flowchart by the number of patients who received management from the UCEC provider and referred to dermatology clinic and patients receiving in-person dermatology consultation. The number of patients in each of these groups and their subsequent in-person health care utilization for the same dermatologic condition during the following 6 months is shown. Patients with post-UCEC encounters are then organized according to whether the utilization was in dermatology clinic or the UCEC.

response to discharge). The mean time from TD consult order placement to response was 42 minutes. Mean time from TD response to discharge was 125 minutes; significantly longer than the 42 minutes from referral placement to discharge for patients in 2017 ( $P < .0001$ ). Time from in-person consult order placement to discharge was relatively similar for the 2017 and TD cohorts receiving in-person consultations in 2018 ( $P = .56$ , Fig 1).

### Health care utilization

For evaluation of postencounter in-person health care utilization, patients were stratified according to disease type (inflammatory and neoplastic).

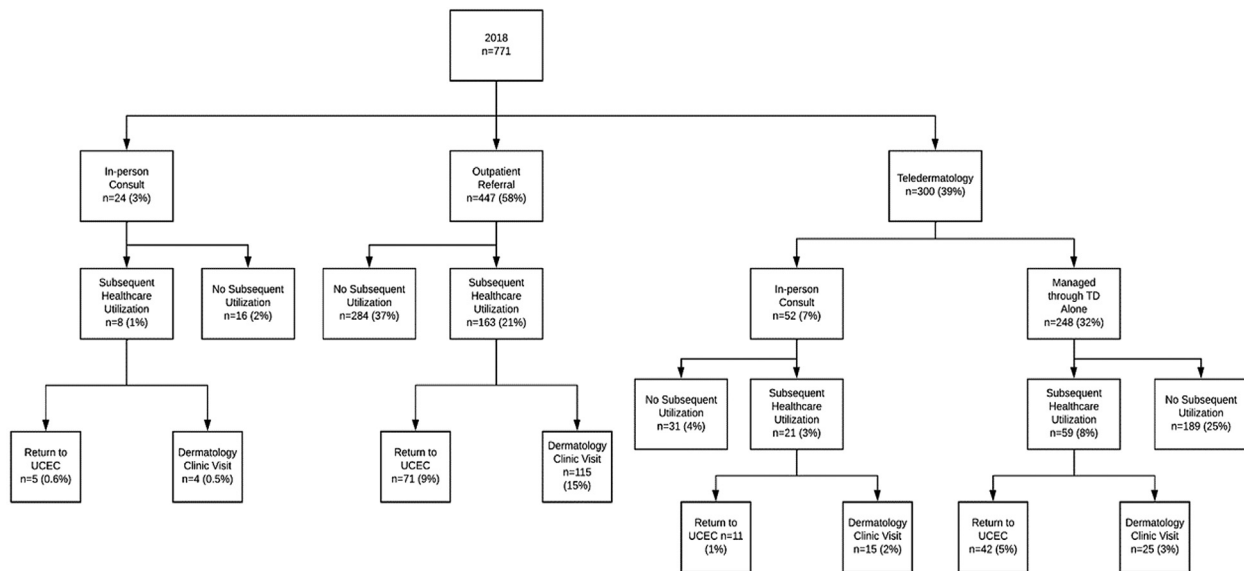
Figs 2 and 3 illustrate the summary of both the 2017 and 2018 cohorts with inflammatory dermatological conditions. Of the 812 patients in 2017, 138 (17.0%) and 219 patients (27.0%) returned to the UCEC and dermatology clinic, respectively. Compared with 2017, in 2018 there was almost no difference in the number of patients returning to the UCEC (16.7%). However, there was a statistically

significant decrease in the patients seen in dermatology clinic at 6 months (20.6%,  $P = .0031$ ). Notably, 248 of 300 (83%) of patients receiving TD consultations did not require in-person dermatology consultation and were managed through TD alone. Of these 248 patients, 42 (16.9%) returned to the UCEC and only 25 (10%) were seen in dermatology clinic.

### Dermatology clinic

For our 2017 cohort, stepwise logistic regression showed that age (odds ratio [OR], 1.02 per year; 95% CI; 1.01-1.04;  $P = .0002$ ) and insurance (county charity OR, 1.59; 95% CI, 1.04-2.42;  $P = .032$  and Medicaid OR, 3.02; 95% CI, 1.32-6.95;  $P = .009$ ) were associated with increased odds of a dermatology clinic visit during the 6 months following the initial UCEC encounter.

In 2018, patients with TD e-consults had reduced odds of clinic visits (OR, 0.50; 95% CI, 0.33-0.77;  $P = .001$ ). Of the other sociodemographic variables, only private insurance was close to statistical



Percentages listed are based on percent of total group.

UCEC – Urgent Care Emergency Center, TD – Teledermatology

**Fig 3.** Subsequent health care utilization of 2018 urgent care emergency center (UCEC) cohort with inflammatory conditions. The number of patients with inflammatory conditions evaluated in 2018 in the Parkland Health UCEC that met inclusion criteria is shown. These patients are separated in the flowchart by (1) number of patients who received management from the UCEC provider with referral to dermatology clinic, (2) patients who received in-person dermatology consultation, and (3) patients with teledermatology consultation. The number of patients in each of these groups with subsequent in-person health care utilization for the same dermatologic condition in the following 6 months is shown. The number of patients evaluated by teledermatology who received in-person consultations is also shown. Patients with post-UCEC encounters are then separated into whether the utilization was in dermatology clinic or return to UCEC.

significance (OR, 0.50; 95% CI, 0.25-1.001;  $P = .0502$ ) (Table II).

### Urgent care emergency center return

For the 2017 cohort, age (OR, 1.02 per year; 95% CI, 1.01-1.04;  $P = .0003$ ) and Medicaid insurance (OR, 2.48; 95% CI, 1.09-5.61;  $p = .029$ ) were associated with increased odds of a UCEC visit.

In 2018, patients identifying as Hispanic (OR, 0.49; 95% CI, 0.33-0.75;  $P = .001$ ) had decreased odds of returning to the UCEC. Patients with county charity (OR, 1.69; 95% CI, 1.14-2.51;  $P = .009$ ) and male sex (OR, 1.59; 95% CI, 1.09-2.34;  $P = .018$ ) had increased odds of returning to the UCEC. Receipt of TD consultation was not associated with decreased or increased odds of returning to UCEC (Table II).

### Either dermatology clinic or urgent care emergency center return

In 2017, age (OR, 1.03 per year; 95% CI, 1.02-1.05;  $P < .0001$ ) was associated with increased odds of post-UCEC encounter in-person health care utilization. Private and Medicare insurance (OR, 0.59; 95%

CI, 0.36-0.97;  $P = .037$  and OR, 0.45; 95% CI, 0.25-0.81;  $P = .008$ , respectively) were associated with decreased odds of post-UCEC visits to either dermatology clinic or the UCEC.

In 2018, male sex (OR, 1.47; 95% CI, 1.03-2.10;  $P = .034$ ) was associated with increased odds of post-UCEC encounter visits to either the dermatology clinic or the UCEC. Private insurance (OR, 0.55; 95% CI, 0.31-0.99;  $P = .046$ ) was associated with decreased odds of post-UCEC visits to either dermatology clinic or the UCEC. Receipt of TD consultation was not associated with return to the UCEC (Table II).

### Neoplastic

No significant results were found when comparing postencounter in-person utilization in patients with neoplastic conditions (data not shown).

### DISCUSSION

In this large retrospective cohort study, we found varying effects of TD on UCEC dwell time and in-person health care utilization.

**Table II.** Multivariable stepwise logistic regression of variables associated with in-person post-UCEC encounter health care utilization

	Dermatology clinic OR (95% CI), <i>P</i> value		UCEC return OR (95% CI), <i>P</i> value		Either clinic or UCEC return OR (95% CI), <i>P</i> value	
	2017	2018	2017	2018	2017	2018
	Age	1.02 (1.01-1.04), <i>P</i> = .002		1.02 (1.01-1.04), <i>P</i> = .0003		1.03 (1.02-1.05), <i>P</i> < .001
Sex*				1.59 (1.09-2.34), <i>P</i> = .018		1.47 (1.03-2.10), <i>P</i> = .034
Race/ethnicity						
White						
Black						
Hispanic				0.49 (0.33-0.75), <i>P</i> = .001		
Other						
Insurance						
County charity	1.59 (1.04-2.42), <i>P</i> = .046			1.69 (1.14-2.51), <i>P</i> = .009		
Private		0.50 (0.25-1.001), <i>P</i> = .0502			0.59 (0.36-0.97), <i>P</i> = .037	0.55 (0.31-0.99), <i>P</i> = .046
Medicare					0.45 (0.25-0.81), <i>P</i> = .008	
Medicaid	3.02 (1.32-6.95), <i>P</i> = .031		2.48 (1.09-5.61), <i>P</i> = .029			
Teledermatology	NA	0.50 (0.33-0.77), <i>P</i> = .001	NA		NA	

In-person consultation evaluated but was not statistically significant.

NA, Not applicable; OR, odds ratio.

\*Reference group female.

First, our data indicate that implementation of an internal SAF TD workflow in an UCEC may significantly increase dwell time. Regardless of health system, this remains an international concern given the threat of ED overcrowding.<sup>14</sup>

Although an increase in dwell time is not entirely unexpected because consultations of any type (not just telemedicine) may increase dwell time, we had hypothesized that rapid access to a teledermatologist may decrease the overall amount of work or time spent evaluating the patient by the primary provider. To provide some clarification on how TD affects dwell time, we included a breakdown of the workflow (Fig 1). TD consultation includes 3 important steps: (1) patient arrival in the UCC to consult order placement, (2) placement of TD e-consult order to response by a teledermatologist, and (3) receipt of response by the consulting UCEC provider to implementation of recommendations and patient discharge (or transfer). Our initial hypothesis was that step 2 would explain the increase in dwell time. However, our analyses showed that teledermatologist response time is not the only contributor to the dwell time increase as it accounted for an average of 42 minutes. Thus, response time does not fully explain the average increase of 99 minutes in dwell time (2018 TD cohort:

303 minutes vs 2017 cohort: 204 minutes). The additional time occurs during the period following receipt of teledermatologist response to patient discharge. This finding was also noted in all groups receiving dermatology consultation regardless of whether that evaluation occurred by TD or in-person (Fig 1) and suggests that there are barriers to timely discharge of patients in the UCEC after specialist consultation. For example, after submitting the TD or in-person consult requests, UCEC providers continue to see other patients, potentially delaying the implementation of consult recommendations. In the TD workflow, UCEC providers received e-consult completion notifications on the ED patient digital tracking board as well as a Haiku app push notification on their phones. Occasionally, providers were called directly by the teledermatologist with recommendations; however, this was not done on a regular basis and may be an area for quality improvement. Additionally, consult recommendations made by the teledermatologist, such as obtaining labs and other studies prior to patient discharge, may contribute to delay.

Our second finding of interest is the discordance in results seen in post-UCEC encounter in-person utilization patterns. Contrary to our hypothesis, TD did not decrease repeat UCEC utilization. However,

we found that implementation of the UCEC TD system decreased the overall percentage of patients with inflammatory skin conditions that required a dermatology clinic visit compared with the previous year. Specifically, patients receiving TD consultations had lower subsequent utilization of the dermatology clinic; a finding noted in previous outpatient TD studies.<sup>15,16</sup> It is difficult to determine why patients evaluated via TD return to the UCEC but have decreased in-person utilization of the dermatology clinic for follow up. Studies demonstrating decreased utilization of dermatology clinic generally note that TD consultations may reduce utilization by providing effective management for simple cases that may not need further dermatologic evaluation and can be followed by general practitioners.<sup>15</sup> Thus, the decrease in clinic utilization may represent patients who felt that they received adequate management and did not require dermatology clinic follow up. Separately, a similar rate in return to the UCEC may indicate that complex cases will return to the UCEC despite evaluation by a dermatologist due to the severity of their condition.

Although we did not find a change in UCEC utilization, the decrease in dermatology clinic utilization is important. Especially for patients enrolled in the county charity program, PH shares similarities to socialized health care systems in countries with universal health care where taxes and public funding are earmarked for the provision of medical services. To provide the highest level of benefits for as many people as possible, PH must focus on efficiency and cost-saving measures, without sacrificing a high level of care. Although dwell time may be increased from TD, more patients received rapid access to dermatology expertise with an apparent decrease in clinic utilization. Thus, we believe that TD is an invaluable resource for PH and may prove beneficial for use in other resource-limited settings.

### Limitations

This study has limitations. First, this is a non-randomized retrospective cohort study that assessed the effect of implementation of a SAF TD system at a large US safety-net hospital UCEC with a dedicated inpatient dermatology consult service. Although our sample size was large and diverse, single institution studies lack generalizability, requiring further studies to confirm the results.

Second, TD was not mandatory during 2018 and some providers may have used the system more frequently due to differences in provider experience in treating dermatological disease. In addition, this study did not include patients with dermatologic conditions that were managed by UCEC providers

without assistance and were not referred to our dermatology clinic.

Finally, this study was conducted at a large, urban, safety-net hospital with patients who may have significant barriers to health care access. Although we have tried to consider the effect of these forces, it is likely that our sociodemographic variables do not adequately account for the degree of social stress and CIs that contribute to repeat health care utilization in this population.

### CONCLUSIONS

In summary, implementation of a SAF TD workflow in the PH UCEC increased dwell times, although responses were timely and decreased in-person utilization in dermatology clinic in patients with inflammatory skin conditions. Future studies may consider validation of our results to determine the ability of TD to decrease utilization in various health care systems.

### Conflicts of interest

Dr Chong is an investigator for Biogen Inc. He is a consultant for Bristol Myers Squibb, EMD Serono, Horizon Therapeutics, and Biogen Inc. He receives royalties from MAPI Research Trust. Drs Carr, Alame, Mauskar, Metzger, Neal, Reisch, and Dominguez have no conflicts of interest to declare.

### REFERENCES

1. Uscher-Pines L, Malsberger R, Burgette L, Mulcahy A, Mehrotra A. Effect of teledermatology on access to dermatology care among Medicaid enrollees. *JAMA Dermatol*. 2016;152(8):905-912. <https://doi.org/10.1001/jamadermatol.2016.0938>
2. Coates SJ, Kvedar J, Granstein RD. Teledermatology: from historical perspective to emerging techniques of the modern era: part II: emerging technologies in teledermatology, limitations and future directions. *J Am Acad Dermatol*. 2015;72(4):577-586; quiz 587-588. <https://doi.org/10.1016/j.jaad.2014.08.014>
3. Levin YS, Warshaw EM. Teledermatology: a review of reliability and accuracy of diagnosis and management. *Dermatol Clin*. 2009;27(2):163-176, vii. <https://doi.org/10.1016/j.det.2008.11.012>
4. Jobbágy A, Kiss N, Meznerics FA, et al. Emergency use and efficacy of an asynchronous teledermatology system as a novel tool for early diagnosis of skin cancer during the first wave of COVID-19 pandemic. *Int J Environ Res Public Health*. 2022;19(5):2699. <https://doi.org/10.3390/ijerph19052699>
5. Zakaria A, Miclau TA, Maurer T, Leslie KS, Amerson E. Cost minimization analysis of a teledermatology triage system in a managed care setting. *JAMA Dermatol*. 2021;157(1):52-58. <https://doi.org/10.1001/jamadermatol.2020.4066>
6. Wang RH, Barbieri JS, Nguyen HP, et al. Clinical effectiveness and cost-effectiveness of teledermatology: where are we now, and what are the barriers to adoption? *J Am Acad Dermatol*. 2020;83(1):299-307.
7. Jack AR, Spence AA, Nichols BJ, et al. Cutaneous conditions leading to dermatology consultations in the emergency department. *West J Emerg Med*. 2011;12(4):551-555. <https://doi.org/10.5811/westjem.2010.4.1653>



8. Cheeley J, Chen S, Swerlick R. Consultative teledermatology in the emergency department and inpatient wards: a survey of potential referring providers. *J Am Acad Dermatol*. 2018;79(2):384-386. <https://doi.org/10.1016/j.jaad.2018.01.033>
9. Muir J, Xu C, Paul S, et al. Incorporating teledermatology into emergency medicine. *Emerg Med Australas*. 2011;23(5):562-568. <https://doi.org/10.1111/j.1742-6723.2011.01443.x>
10. Duong TA, Cordoliani F, Julliard C, et al. Emergency department diagnosis and management of skin diseases with real-time teledermatologic expertise. *JAMA Dermatol*. 2014;150(7):743-747. <https://doi.org/10.1001/jamadermatol.2013.7792>
11. Carter ZA, Goldman S, Anderson K, et al. Creation of an internal teledermatology store-and-forward system in an existing electronic health record: a pilot study in a safety-net public health and hospital system. *JAMA Dermatol*. 2017;153(7):644-650. <https://doi.org/10.1001/jamadermatol.2017.0204>
12. Villa L, Matz O, Olaciregui Dague K, Kluwig D, Rossaint R, Brokmann JC. The assessment of dermatological emergencies in the emergency department via telemedicine is safe: a prospective pilot study. *Intern Emerg Med*. 2020;15(7):1275-1279. <https://doi.org/10.1007/s11739-020-02323-1>
13. Jünger M, Arnold A, Lutze S. Teledermatologie zur notfallmedizinischen Patientenversorgung: zweijahreserfahrungen mit teledermatologischer Notfallversorgung [Teledermatology for emergency patient care: two-year experience with teledermatological emergency care]. *Hautarzt*. 2019;70(5):324-328. <https://doi.org/10.1007/s00105-019-4384-x>
14. Trzeciak S, Rivers EP. Emergency department overcrowding in the United States: an emerging threat to patient safety and public health. *Emerg Med J*. 2003;20(5):402-405. <https://doi.org/10.1136/emj.20.5.402>
15. Landow SM, Mateus A, Korgavkar K, Nightingale D, Weinstock MA. Teledermatology: key factors associated with reducing face-to-face dermatology visits. *J Am Acad Dermatol*. 2014;71(3):570-576. <https://doi.org/10.1016/j.jaad.2014.02.021>
16. Wu LW, Cho SK, Chamseddin B, et al. Evaluation of the effect of store-and-forward teledermatology on in-person health care system utilization in a safety-net public health and hospital system. *J Am Acad Dermatol*. 2021;85(4):1026-1028. <https://doi.org/10.1016/j.jaad.2020.12.088>