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conditions that require full-thickness pathologic evaluation.4

This analysis may lack generalizability to commercially insured patients. Additionally, specialty–specific biopsy totals are likely conservative due to the suppression of small biopsy values (≤10) at the level of each provider. Despite shortcomings, this analysis supports an overall growth of skin biopsies and a predominance of tangential biopsies across various subsets of dermatologists and regions. It also reflects the growing role of dermatology NPCs in addressing dermatologic care needs and the potential importance of standardized training and education to support the accuracy of biopsies performed by nondermatologists.

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Conflicts of interest
Dr Feng is a consultant for Cytrellis Biosystems, Inc and Soliton, Inc. Dr Gronbeck has no conflicts of interest to declare.

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Pediatric teledermatology: A retrospective review of 1199 encounters during the COVID-19 pandemic

To the Editor: The incorporation of telemedicine into routine dermatologic care during COVID-19 has created new opportunities to evaluate and optimize our existing teledermatology platforms. Previous pediatric studies have shown that teledermatology improves access to care1,2 while offering opportunities to improve show rates and reduce wait times.3 We performed a retrospective review of 1110 video visits (live, interactive, patient-to-provider) and 89 e-consults (store-and-forward, provider-to-provider) during the early COVID-19 pandemic (March 18 to May 1, 2020) to acquire key information on continued applications of teledermatology.

In addition to collecting patient demographics (Table I) and encounter-specific data (eg, diagnoses and referring provider), we reviewed dermatology provider surveys embedded within each virtual encounter. Video visit surveys asked providers about connectivity issues, video quality, and the use of supplementary photographs. Logistic regression was performed to identify associated factors (Table II). For e-consults, providers indicated whether the encounter was sufficient to assist in diagnosis or provide advice on treatment. Providers also noted when additional workup and/or triage to an in-person visit were recommended.

Primary care providers placed the most e-consults (36.0%), followed by inpatient providers (30.3%), emergency department providers (22.5%), and other subspecialty services (11.2%). The overall mean turnaround time was 5.84 hours (range, 0.07-188.13 hours), though the emergency department typically received responses within 90 minutes. Providers reported assisting in diagnosis and advising on treatment in more than 90% of the e-consults. Further workup and/or triage to an in-person visit were recommended about half the time (48.8%).

Providers reported issues with connectivity (26.5%) and inadequate video quality (25.5%) in about one-fourth of video visits. Most video visit providers (76%) reported using parent-submitted
photographs. When photographs were not submitted, providers said they would have helped with the diagnosis most of the time (73.4%).

The prevalence of public insurance across teledermatology encounters was significantly lower than our practice baseline, and during video visits with patients on Medicaid, providers were more likely to report inadequate video quality. We also observed a significant reduction in Black patients receiving care. These findings are important because disparities in access to dermatologic care disproportionately affect minority children and those enrolled in Medicaid.4 A platform like e-consults, which relies on providers and does not require families to have internet access, could address these inequities, although widespread implementation would require reimbursement policies that cover several forms of teledermatology.

We learned that e-consult providers primarily assisted in diagnosis or treatment recommendations. Because the turnaround time was relatively quick (6 hours) and the median wait time to see a pediatric dermatologist in our region is approximately 4 months,3 we see e-consults as an opportunity to expedite care, enhance knowledge among requesting providers, and limit redundant consults.

Providers reported connectivity issues about one-fourth of the time, although we saw a significant reduction in connectivity issues and improvement in the perceived video quality over time (likely reflecting provider and patient acclimation). Given that previous studies have shown both store-and-forward and live interactive teledermatology to be comparable diagnostically,2,5 a hybrid model may be ideal as store-and-forward modalities eliminate connectivity issues altogether by not requiring a live interactive experience.

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Table I. Patient characteristics for all visit types

| Characteristic          | Pre-COVID in-person visits (N = 18,188), n (%) | COVID in-person visits (N = 347), n (%) | COVID e-consults (N = 89), n (%) | COVID video visits (N = 1110), n (%) |
|-------------------------|-----------------------------------------------|--------------------------------------|----------------------------------|-------------------------------------|
| Age group, y (%)        |                                               |                                      |                                 |                                     |
| 0-1                     | 4053 (22.3)                                   | 128 (36.9)                           | 28 (31.5)                        | 303 (27.3)                          |
| 2-7                     | 4000 (22.0)                                   | 74 (21.3)                            | 17 (19.1)                        | 197 (17.7)                          |
| 8-13                    | 4628 (25.4)                                   | 67 (19.3)                            | 21 (23.5)                        | 219 (19.7)                          |
| 14-18                   | 4911 (27.0)                                   | 72 (20.7)                            | 22 (24.7)                        | 354 (31.9)                          |
| Over 18                 | 596 (3.3)                                     | 6 (1.7)                              | 1 (1.1)                          | 37 (3.3)                            |
| Sex                     |                                               |                                      |                                 |                                     |
| Female                  | 10,149 (55.8)                                 | 191 (55.0)                           | 36 (40.4)                        | 604 (54.4)                          |
| Male                    | 8039 (44.2)                                   | 156 (45.0)                           | 53 (59.5)                        | 506 (45.6)                          |
| Race                    |                                               |                                      |                                 |                                     |
| Black                   | 4289 (23.6)                                   | 46 (13.3)                            | 22 (24.7)                        | 212 (19.1)                          |
| Other                   | 5510 (30.2)                                   | 68 (19.6)                            | 24 (30.3)                        | 270 (24.5)                          |
| White                   | 9970 (54.8)                                   | 233 (67.1)                           | 40 (44.9)                        | 683 (61.5)                          |
| Ethnicity               |                                               |                                      |                                 |                                     |
| Hispanic or Latino      | 1850 (10.2)                                   | 31 (8.9)                             | 6 (6.7)                          | 108 (9.7)                           |
| Not Hispanic or Latino  | 16,338 (89.8)                                 | 316 (91.1)                           | 83 (92.3)                        | 990 (89.2)                          |
| Insurance               |                                               |                                      |                                 |                                     |
| Private                 | 9037 (49.7)                                   | 242 (69.7)                           | 61 (68.5)                        | 771 (69.6)                          |
| Public                  | 8822 (48.5)                                   | 83 (23.9)                            | 27 (30.3)                        | 337 (30.4)                          |
| Self-pay                | 329 (1.8)                                     | 22 (6.3)                             | 1 (0.08)                         | 0                                  |
Table II. Factors associated with provider-reported connectivity issues, video quality, and submission of photographs*

| Age group, y       | Connectivity issues (Y/N) (N = 1042) | Video quality adequate (Y/N) (N = 1035) | Photographs submitted (Y/N) (N = 1054) |
|--------------------|---------------------------------------|----------------------------------------|----------------------------------------|
|                    | n OR (95% CI) P                       | n OR (95% CI) P                        | n OR (95% CI) P                        |
| 0-1                | 198 Reference -                       | 197 Reference -                        | 200 Reference -                        |
| 1-7                | 278 1.66 (1-2.75) .051                | 276 0.6 (0.36-0.99) .045               | 279 1.70 (0.91-3.15) .095              |
| 7-13               | 332 1.43 (0.8-2.58) .229              | 197 0.64 (0.32-1.29) .151              | 201 0.74 (0.38-1.40) .352              |
| 13-18              | 36 1.58 (0.87-2.87) .134              | 329 0.66 (0.37-1.17) .223              | 337 0.30 (0.12-0.74) .009              |
| Over 18            | 198 2.52 (1.01-6.29) .047             | 36 1.14 (0.39-3.28) .812               | 37 0.89 (0.46-1.69) .729               |
| Insurance          |                                       |                                        |                                        |
| Commercial         | 722 Reference -                       | 717 Reference -                        | 732 Reference -                        |
| Public             | 320 0.95 (0.69-1.3) .728              | 318 0.7 (0.51-0.95) .022               | 322 0.74 (0.53-1.05) .087              |
| Diagnosis          |                                       |                                        |                                        |
| Acne               | 225 Reference -                       | 223 Reference -                        | 228 Reference -                        |
| Adnexal skin disorder | 24 3.16 (1.23-8.09) .017          | 24 1.43 (0.49-4.15) .51                | 25 0.49 (0.17-1.4) .181                |
| Alopecia           | 63 1.01 (0.49-2.08) .984              | 63 4.7 (1.71-12.94) .003               | 63 0.35 (0.17-0.71) .003                |
| Dermatitis         | 295 1.37 (0.81-2.3) .237              | 295 1.1 (0.65-1.84) .728               | 297 0.52 (0.3-0.89) .018                |
| Hemangioma         | 131 1.18 (0.57-2.45) .647             | 130 1.11 (0.54-2.3) .774               | 132 1.4 (0.58-3.34) .454               |
| Infection or infestation | 63 2.07 (1.02-4.22) .044        | 63 0.59 (0.29-1.18) .137               | 64 0.93 (0.37-2.33) .881                |
| Melanocytic nevus  | 62 1.71 (0.83-3.54) .148              | 62 0.59 (0.29-1.18) .133               | 63 1.51 (0.57-4.02) .408                |
| Other              | 78 0.99 (0.51-1.93) .971              | 77 1.11 (0.58-2.12) .759               | 78 0.6 (0.31-1.15) .126                |
| Pigmentary disorder | 24 0.96 (0.32-2.87) .945          | 23 1.38 (0.46-4.11) .563               | 26 2.61 (0.56-12.14) .221               |
| Psoriasis          | 31 1.02 (0.42-2.51) .963              | 31 1.09 (0.45-2.67) .845               | 31 0.66 (0.27-1.64) .373                |
| Rash               | 46 0.42 (0.15-1.17) .097              | 44 0.87 (0.39-1.93) .734               | 47 0.73 (0.3-1.77) .486                |
| Study week         |                                       |                                        |                                        |
| Week 1             | 32 Reference -                       | 31 Reference -                        | 38 Reference -                        |
| Week 2             | 132 0.79 (0.35-1.79) .575             | 130 1.09 (0.46-2.6) .841               | 137 0.65 (0.29-1.43) .282               |
| Week 3             | 142 0.7 (0.31-1.57) .382              | 140 1.26 (0.53-3.59) .599              | 143 1.86 (0.81-4.25) .144               |
| Week 4             | 168 0.87 (0.39-1.93) .735             | 167 1.45 (0.62-3.4) .396               | 168 2.44 (1.07-5.57) .033               |
| Week 5             | 223 0.34 (0.15-0.75) .007             | 222 1.54 (0.67-3.57) .312              | 223 2.12 (0.97-4.62) .059               |
| Week 6             | 260 0.26 (0.12-0.57) .001             | 260 3.06 (1.31-7.17) .01               | 260 2.14 (0.99-4.64) .053               |
| Week 7             | 85 0.18 (0.07-0.48) .001              | 85 2.63 (1.01-6.88) .049               | 85 2.17 (0.87-5.41) .095                |
| Visit type         |                                       |                                        |                                        |
| Follow-up          | 695 Reference -                       | 691 Reference -                        | 703 Reference -                        |
| New patient        | 347 0.89 (0.64-1.24) .489             | 344 0.64 (0.47-0.88) .006              | 351 2.31 (1.54-3.45) <.001             |

OR, Odds ratio.
*Bold indicates statistical significance.

Key words: COVID-19; e-consults; store-and-forward; teledermatology; telehealth; telemedicine; video visits.

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None disclosed.

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