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Journal Pre-proof

Use of a hybrid teledermatology model in an Australian tertiary hospital in the COVID-19 pandemic

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1 The COVID-19 pandemic has led to the adoption of teledermatology by health services
2 across the world. There is increasing support for the utility of teledermatology in the
3 outpatient setting, however the role in the inpatient and emergency setting is less
4 established. We report on the use of teledermatology in the inpatient and emergency
5 setting at St George Hospital Dermatology Department, a tertiary centre in Sydney,
6 Australia.

7
8 Inpatient and emergency consultations are conducted in our institution by one of two staff
9 Dermatologists per day and one hospital-based Dermatology resident. A hybrid model of
10 inpatient teledermatology consults was established prior to the COVID-19 pandemic. All
11 referrals were seen face-to-face by the Dermatology resident to ensure a relevant history,
12 and high-quality clinical and dermatoscopic photographs were taken. Referrals would then
13 be summarised and sent to the on-call dermatologist who provided an impression and plan
14 for the resident to enact. For severe or life-threatening cases, the on-call dermatologist
15 would also attend for a face-to-face consultation. This system involved both synchronous
16 and asynchronous models depending on the triaging of consults performed by the
17 Dermatology resident. To avoid COVID-19 exposure of the on-call Dermatologists, which
18 would subsequently shut down provision of dermatology services to both the outpatient
19 and the inpatient/emergency service, this hybrid-model of inpatient teledermatology was
20 maintained during the pandemic and outpatient clinics were converted to teledermatology
21 for large proportions of 2020 and 2021.

22
23 Using this hybrid approach, our dermatology service avoided any shut down periods from
24 COVID-19 exposures to the two on-call dermatologists. The main exposure site for COVID-19
25 was in the emergency department and this was the main source of inpatient referrals
26 (Figure 1). There was no statistically significant difference ($p > 0.05$, Student *T*-Test) in the
27 number of inpatient consults seen between pre-COVID-19 2019 ($n=295$, mean 27 consults
28 per month(CPM), standard deviation (SD) 10.9), 2020 ($n=305$, mean 25 CPM, SD 6.3) or 2021
29 ($n=323$, mean 27 CPM, SD 8.1)¹. This may be due to the establishment of a hybrid model of
30 inpatient teledermatology. In 2021, 70% of inpatient consults had a treatment plan
31 provided to the referring team within the same day of referral.

32

33 The role of teledermatology to increase efficiency of inpatient consults has been described
34 prior to the COVID-19 pandemic with a reduction in the time taken for inpatient medical
35 teams to receive advice from Dermatology consults². Concordance in investigations and
36 treatment plans between tele-consults and face-to-face consults has also been described^{3,4}.
37 The COVID-19 pandemic has seen the wider adoption of teledermatology services⁵. The
38 experience of our department supports the use of teledermatology for efficient delivery of
39 care that has been stable throughout the COVID-19 pandemic. Our experience supports use
40 of a hybrid model of teledermatology rather than a virtual model and could be applied in
41 other parts of the world.

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References

1. Ho G, Blake SC, Sheriff T, Daniel BS, Murrell DF. Impact of COVID-19 on inpatient dermatology consults in an Australian tertiary hospital. *Australasian Journal of Dermatology*. 2021; 62(3): 427-428
2. Sharma P, Kovarik CL, Lipoff JB. Teledermatology as a means to improve access to inpatient dermatology care. *Journal of Telemedicine and Telecare*. 2016; 22(5): 304-310
3. Keller JJ, Johnson JP, Latour E. Inpatient teledermatology: diagnostic and therapeutic concordance among a hospitalist, dermatologist and teledermatologist using store-and-forward teledermatology. *JAAD*. 2020; 82(5): 1262-1267
4. Gabel CK, Nguyen E, Karmouta R, Liu KJ, Zhou G, Alloo A. Use of teledermatology by dermatology hospitalists is effective in the diagnosis and management of inpatient disease. *JAAD*. 2021; 84(6): 1647-1553.
5. Loh CH, Chong Tam SY, Oh CC. Teledermatology in the COVID-19 pandemic: A systematic review. *JAAD Intl*. 2021; 5: 54-64



Figure 1. Spread of referring specialties to Dermatology in 2021

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