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3 **Title: Medicine in the age of COVID-19: considerations for the ongoing use and**
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28 **Source of submission:** Prepared specifically for AMSJ

29 **160 character summary of article:** COVID-19 has necessitated rapid adoption of telehealth.
30 The evidence for telehealth, however, is inconclusive at best. Further studies are required
31 before it sees more widespread use.

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1 **Medicine in the age of COVID-19: considerations for the ongoing use and development** 2 **of telehealth**

3 Coronavirus disease 2019 (COVID-19) has been the source of mass disruptions to healthcare
4 systems globally. The virus, however, has prompted a time of unprecedented medical
5 innovation. Telehealth, a means of delivering healthcare via telecommunication technologies,
6 is one medical technology that has undergone expeditious development in recent months. Of
7 note, telehealth is not a new technology – Australia has previously utilised telehealth during
8 national emergencies, including severe droughts and bushfires, albeit with limited uptake and
9 therefore, limited impact [1]. Social distancing laws during the coronavirus pandemic
10 however, have necessitated the rapid adoption of telehealth as a pragmatic solution to
11 maintaining public health during COVID-19.

12 Telehealth services have been crucial during the COVID-19 pandemic, enabling screening
13 and treatment of both infected individuals and non-infected vulnerable populations. China,
14 the initial epicentre of the virus, led the way with telehealth development. Several large
15 telecommunication providers rapidly adapted to enable remote health consultations while
16 health insurance providers modified policies to enable reimbursement of telehealth
17 consultations [2,3]. In response to China's success, many other countries have followed suit.
18 Over 50 health systems in the United States have designed programs that enable virtual
19 screening of high-risk patients [4]. Scotland has similarly promoted the development of
20 telehealth, with a £9.24 million investment to support the implementation of video
21 consultations for general practitioners [5]. Australia has also rapidly updated its telehealth
22 services; video consultations that were previously only accessible to individuals in remote
23 settings are now commonplace in many outpatient clinics [3,5].

24 Notably, telehealth has shown promise as an effective method of healthcare delivery in
25 prisons [6,7], during war [8], in low-income countries [9], and during pandemics [10]. There
26 is evidence of benefits for Australian rural communities in particular, including reduced
27 costs, improved access to healthcare for rural patients, and improved access to professional
28 development for rural clinicians [11]. There is also some evidence to suggest that telehealth
29 may be an effective method of healthcare delivery for patients with chronic diseases
30 including chronic obstructive pulmonary disease (COPD) [12], chronic heart failure [13] and
31 lower back pain [14]. This may be attributed to the fact that the frequent reviews which play a
32 core role in long-term chronic disease management can easily be substituted by
33 videoconference consultations, particularly for patients with stable disease. There is
34 additional evidence for efficacy in patients with mental illness, specifically in improving
35 medication adherence and reducing symptom severity [15].

36 In spite of this, there is a lack of high-quality evidence surrounding the cost-effectiveness of
37 telehealth. Trials assessing telehealth are often poor quality and typically lack solid economic
38 analysis [12-15]. High quality trials that do provide economic analyses tend to report poor
39 cost-effectiveness. Dixon *et al.* reports that whilst telehealth provided a small positive benefit
40 for patients with depression, the cost of the intervention was high relative to the small gain in
41 quality-adjusted life years [16]. Conversely, Clarke *et al.* demonstrates cost-effectiveness of
42 an intervention targeting patients with COPD but reports that the variability of savings
43 between intervention groups was too great to produce statistical significance [17]. The study
44 highlights perhaps the single greatest difficulty in determining cost-effectiveness of telehealth
45 is the fact that measured outcomes are overly reliant on variables other than telehealth
46 technology itself.

1 Several logistical barriers to telehealth also exist. For example, 14% of Australians lack
2 internet access, with rural and elderly populations being disproportionately affected [18].
3 Concerningly, these two demographics stand to benefit the most from ongoing telehealth
4 services. A lack of internet technology skills, particularly in older patients and clinicians,
5 adds difficulty to navigating telehealth services [19]. Both patients and physicians have raised
6 additional concerns regarding establishing a provider-patient relationship and the
7 incompleteness of physical examinations [20,21]. Finally, privacy concerns are widespread,
8 particularly in the context of the rapid adoption of systems that may not have been adequately
9 tested [22,23].

10 The undeniably challenging environment of COVID-19 has called for the rapid development
11 of telehealth. There is a paucity of high-quality evidence supporting telehealth however, with
12 existing research rarely providing conclusive data, further large-scale clinical trials with
13 robust economic data is necessary. Accessibility must be addressed, particularly for rural and
14 elderly patients. Education for both medical students and clinicians is similarly vital to ensure
15 proficiency in telehealth use amongst healthcare workers. There must also be rigorous testing
16 of telehealth infrastructure, not only to address security concerns, but also to ensure usability
17 of the service. Telehealth undoubtedly shows promise as an effective healthcare delivery
18 system but will require evolution from its current form before it can establish itself in the
19 modern medical landscape.

1 **Conflict of interest**

2 The authors declare that they have no competing interests.

3

4 **Authors contribution**

5 JM and HM contributed to the conception and design of the manuscript, prepared the
6 manuscript and contributed to manuscript editing and review. JM and HM both approved the
7 final manuscript.

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