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TeleHealth or TeleWealth? Equity challenges for the future of cystic fibrosis care (Commentary)[☆]Alessandro N Franciosi^{a,b}, Bradley S Quon^{a,b,*}^a Adult Cystic Fibrosis Clinic, St Paul's Hospital, Vancouver, Canada^b Centre for Heart Lung Innovation, St. Paul's Hospital and the University of British Columbia, Vancouver, Canada

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The COVID-19 pandemic has resulted in an accelerated transition to telehealth-delivered care for people with CF [1], providing a welcome alternative for both patients and CF multi-disciplinary teams who were struggling to balance the risks and benefits of in-person care during an unprecedented healthcare crisis [2]. Telehealth (TH) will undoubtedly play a role in the future of CF care but paradigm shifts in well-established care delivery models can generate unexpected service blind spots, some of which risk perpetuating existing healthcare disparities.

In this issue of the *Journal*, Albon et al. highlight important aspects of this very challenge, with their timely results suggesting that access to - and satisfaction with - TH may differ based on ethnicity and socio-economic status. Here, two areas of concern stand out: 1) the finding that people from minority racial or ethnic groups were significantly less likely to report having had a TH visit and 2) the same group reported a lower perceived quality of interaction. This latter finding was also observed when the study population was categorized based on their financial concerns, with those who reported financial difficulties during the pandemic more likely to report that their concerns were not addressed during TH consultations or that they were not included in a shared decision-making process. Sadly, these results are not entirely surprising. The interactions between ethnicity, socio-economic status, and digital/health literacy are multifaceted and complex [3,4] but the data

generally demonstrate that significant disparities exist that disproportionately affect minority and lower socio-economic groups [5–7]. While one can argue these challenges are not exclusive to any single specialty [8,9], CF teams would do well to consider how best to tailor systems to improve outcomes for people with CF [10].

Historic, geographic, and social challenges create barriers to the delivery of TH in an equitable manner. The availability of connections speeds recommended for multi-user videoconferencing or video streaming (50/10 Mbps - download/upload megabits per second) varies along urban and rural divides. In Canada, for example, 87.4% of individuals had 50/10 Mbps access in 2019 [11] and this represented 98.6% of urban residences, 45.6% of rural dwellers and only 34.8% of households on First Nations (Indigenous people of Canada) reserve lands. These inequalities in access are exaggerated in developing economies, as seen in Africa where only 28% of urban and 6% of rural households have internet access, according to the International Telecommunications Union (ITU). Programs such as the *Universal Broadband Fund* in Canada, the *Digital Agenda for Europe*, and the *ITU/UNESCO Broadband Commission for Sustainable Development* are all actively working to bridge the urban/rural connectivity divide. Even if broadband and mobile connectivity is made possible across geographic divides, the combined cost of internet services can be substantial. In Canada, costs amounted to 6.3% of total household income for families in the lowest income quintile, almost five times higher proportionally than those in the highest quintile (1.3% of income) [11]. As such, financial supports and incentives must be made available for lower-income patients so that TH access is within reach for all individuals living with CF.

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Providing definitive solutions to infrastructural deficiencies and market forces might extend beyond the remit of healthcare practitioners, though our role in identifying the repercussions and advocating for improvements on patient's behalf is not. What is directly modifiable however is the quality of interaction patients experience when making use of our services. Here, Albon et al. provide more food for thought, describing that people with CF from minority backgrounds were more likely to "think that their questions were not answered during TH". As the authors conclude, this perception may not be exclusive to the TH experience and may reflect shortcomings which are equally true of in-person consultations. Multiple factors may be blame, including racial and social bias [12], language barriers (which may have been accentuated by face-masks [13]) and the use of styles of communication which do not take into account the varied backgrounds and health literacy which patients come from. The onus here must be on the healthcare providers to do more. The very nature of TH may present the opportunity for augmenting, not weakening, performance in this area. The integration of translators or next-of-kin companions into TH consultations is immediately feasible and could help to significantly lessen some of these barriers. Indeed, emerging technologies such as real-time automated translation software [14] and automated closed-captioning incorporated directly into video-conferencing platforms may in time be added to the list of options at our disposal, though ensuring fitness for purpose in healthcare settings will be essential [15].

Finally, amongst the results reported, we took particular interest in the fact that people from a racial/ethnic minority group were less likely than those that identified as ethnically white to identify concerns regarding the lack of a physical exam or lack of sputum or throat culture in the context of TH visits. This finding raises questions about the values ascribed to various components of healthcare by different patient cohorts and how these differences in perceived values are formed. Sputum microbiology monitoring is a fundamental part of longitudinal care in CF and for a specific cohort of patients to be at risk of not recognizing its importance should be a finding of concern. This difference in perception may be driven by biases in overall health literacy or the patient education process. If so, these factors should be identified and addressed. In a recent audit of sputum microbiology sampling at our institution, we found that the shift to telehealth during the pandemic was associated with a 3-fold reduction in sputum samples received at out laboratory [16], suggesting that maintaining standards in certain areas following a shift to remote healthcare provision will be a challenge. Though our analysis did not assess patient factors such as race, ethnicity, geography or education, the results presented by Albon et al. would suggest that these factors may play a part or indeed compound the challenges we will face as TH takes on a more established role in CF care. Indeed, efforts are already being made to identify solutions to these emerging issues [17,18] and further research in this area would be of great benefit.

Though in its relative infancy, TH provides a clear opportunity to help reduce the burden of healthcare associated with CF. Crucially, the benefits incurred through TH - such as reduced interference with work schedules, decreased travel commitments and associated costs - must benefit those patients who are disproportionately disadvantaged by economic, social and geographic factors. We echo the sentiments by Albon et al. that future studies in this

area are needed to identify the optimal way to integrate TH and wider digital health technologies in CF care models. Pre-empting these challenges and finding ways to mitigate the knock-on effects will be essential to the future success of telehealth and blended care models and to ensure equitable care to all people with CF.

Declaration of Competing Interest

The authors report no conflict of interest.

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