

ORIGINAL PAPER

Managing an adult CF population in the COVID-19 pandemic—1 year on

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Summary

Background: The advent of the COVID-19 pandemic in 2020 required an alteration in the routine care of people with CF (pwCF), deemed to be extremely vulnerable.

Aim: We wished to report the alterations in clinical practice, including the introduction of remote video-assisted clinics, made to manage the adult pwCF attending our large centre.

Methods: We studied clinical records over a period of 2 years (March 2019 to February 2021) by comparing 19th March to 20th February (Y1) with 20th March to 21st February (Y2).

Results: We have shown out of hospital Multi Disciplinary Team (MDT) support increased and a greater proportion of IV therapy was administered at home. The VAC model of care increased clinical activity while reducing clinic non-attendance rates, suggesting more individuals engage with their carers.

Conclusions: This new model of care has allowed greater engagement with pwCF.

Introduction

Good practice in CF advocates regular surveillance to ensure the best outcomes. However, this poses an additional burden on people with CF (pwCF), leading to the exploration of remote monitoring and telemedicine services. The advent of the COVID-19 pandemic in 2020 necessitated the shielding of pwCF¹ who were deemed to be extremely vulnerable, requiring an alteration in the routine care of this group.

This article reports the alterations in clinical practice made to manage the adult pwCF attending our large centre ($n = 360$), including the introduction of remote monitoring service,

comparing it with clinical practice in the preceding year and any subsequent ongoing changes.

Methods

We studied clinical records over a period of 2 years (March 2019 to February 2021) by comparing 19th March to 20th February (Y1) with 20th March to 21st February (Y2). We looked at clinic attendance, interactions with MDT members, pulmonary function tests, use of IV and oral antibiotics, sputum sample collection, mucolytic use and Cystic fibrosis transmembrane conductance regulator CFTR modulator rollout.

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Results

Prior to the official national UK lockdown on 23 March 2020,² we sought to reduce the risk of COVID infection by cancelling all non-emergency Face to Face (FTF) appointments of 6th March and supported our cohort of pwCF via telephone or email. We used this unique opportunity to rapidly redesign outpatient services to provide remote consultations through digital technology. From 20 March 2020, we employed AccurX[®], an health care professional (HCP) initiated messaging service that allows staff to instantly send text messages to individuals. No special app is required for permitting audio and video compatibility, both pwCF and HCPs join a video call in a few simple steps. On 17 April 2020, 488 text message invitations were sent with 192 physician-led video-assisted clinics (VACs) targeting those pwCF with the poorest lung function. From 18 April 2020, we moved to the NHS England and NHS Improvement supported Attend Anywhere[®] platform, a secure video call service with pre-arranged appointment times. We constructed 10 bespoke MDT waiting area 'clinics' with 44 active MDT users, including an MDT clinic involving all allied disciplines. Over 10 months (April 2020 to February 2021), 1865 consultations totaling 638 h were conducted with the most activity (1558 consultations; 595 h, 84%) within the MDT clinic. Following UK lockdown easing from 31st July,³ in August 2020, routine FTF clinics were reinstated for Annual Reviews, but otherwise >90% of the cohort continued to be managed remotely via VAC [8% of our clinic population are not suitable for VAC (non-compliance with clinic reviews, chaotic lifestyles, clinical need)]. Overall, in Y2, there was a 38% increase in MDT clinic (FTF+VAC) appointments offered with a 6.74% increase in attendance and a 7.31% decrease in non-attendance (DNA) rates. Feedback from a 23-part survey completed by 44 consecutive pwCF attending virtual clinics was very positive, citing convenience and no risk of cross-infection.⁴

Table 1. Comparison between year 1 (Y1) and year 2 (Y2)

Service	Year 1	Year 2	Change (%)
Appointments			
Total			
Offered	1747	2412	+38.06
Attended	1323	1989	+6.74
DNA	434	423	-7.31
FTF			
Offered	1747	572	-67.2
Attended	1323	494	+7.14
DNA	434	78	-9.05
VAC			
Offered	NA	1840	NA
Attended	NA	1495	NA
DNA	NA	345	NA
Spirometry			
Total			
Hospital	2835	302	-89.35
Virtual (Nuvoair [®])	NA	593 (From September 2021)	NA
Sputum samples			
Total	2143	715	-66.63
Hospital	(IP) 746 (OP) 1397	(IP) 545 (OP) 170	
Remote (postal)	NA	14 (57 kits sent)	

Year 1 (1 March 2019 to 29 February 2020); Year 2 (1 March 2020 to 28 February 2021).

VAC = video-assisted clinic; DNA = did not attend; IP = inpatient; OP = outpatient.

The pandemic community psycho-social effects also affected pwCF. The bespoke specialist psychology service provided by our team had a caseload increase in Y2 of 42% (64 vs. 91 pwCF) with a capacity (appointment) increase of 8% [373 FTF (Y1) vs. 404 VAC (Y2)] having moved to a fully virtual service compared with the previous year. Clinic non-attendance rate reduced from 22% (84 FTF) to 14% (58 VAC) (Table 1).

CFTR modulators licenced have changed the course of the CF condition. The EMA licence for Ivacaftor/Tezacaftor/Elexacaftor (Kaftrio[®], Vertex pharmaceuticals[®]) was issued in August 2020 and became available in England to pwCF aged >12 years. In the following 3 months, 85% (n = 196) eligible pwCF were commenced on Kaftrio[®] (51%—September, 28%—October, 11%—November). Nine accessed Kaftrio[®] prior to the UK licensing under the managed access programme. Excluding these, 53% had Kaftrio[®] initiated during the FTF and 47% a virtual consultation.

The nationwide lockdown, shielding of vulnerable individuals and the availability of newer CFTR modulator therapies led to fewer admissions [Y1 = 366 admissions (5182 bed days), Y2 = 132 (139); Figure 1A], with a greater proportion of IV antibiotic courses being given at home (Y1, 340 IP vs. 141 OP; Y2, 132 vs. 103; $\chi^2 = 14.8$, $P < 0.001$). Overall, there was a reduction of 59% in inpatient IV therapy and 22% in-home IV therapy (Table 2).

Due to restrictions during the pandemic and caution with aerosol-generating procedures, the traditional model of care including spirometry within the hospital setting was challenging. To overcome this, from September 2020, we rolled out NuvoAir[®] packages, which include a Bluetooth spirometer and smartphone application with an online portal allowing individuals to share data with their healthcare team, including an accredited pulmonary physiologist who quality-assured the results. In Y2, there were 593 home spirometry measurements and 302 within the hospital pulmonary function department (a reduction of 89% from 2835 was recorded in Y1, see Table 1 and Figure 1B).

Specialist CF care involves CF specialist nurses (CFNS) supporting pwCF with a variety of clinical and social needs. There were 702 home visits (Y2) compared with 262 (Y1) and of these Y2 visits, 294 involved a Totally Implanted Venous Access Device (TIVAD) flush. Prior to Y2, all TIVAD flushes occurred in a clinic setting. Moreover, the CFNS team received 2049 phone calls (Y2) for support and advice compared with 1822 in Y1.

Over the 2-year period, 2858 sputum samples were sent for analysis: although more were processed in Y1, there were proportionally more outpatient samples in Y2 (Y1, 443 IP vs. 2161 OP; Y2, 177 vs. 353; $\chi^2 = 74.5$, $P < 0.001$). From September 2020, we introduced postal sputum sampling: all those returned were suitable for analysis.

There was an increase in the use of home mucolytic therapy in Y2 (rhDNase: home-care delivery prescriptions Y1 = 868, Y2 = 1133; nebulised hypertonic saline Y1 = 97, Y2 = 113), and a

Table 2. Proportion of home to IP IV courses and bed days

Year	IP	OP ^a	Proportion (%)	IP bed days	Home IV days
Year 1	340	141	29	5182	2211
Year 2	132	103	44	1393	1635
Total	472	244	33	6575	3846

^aPearson Chi-square statistic: $\chi^2 = 14.81$; $P < 0.001$.

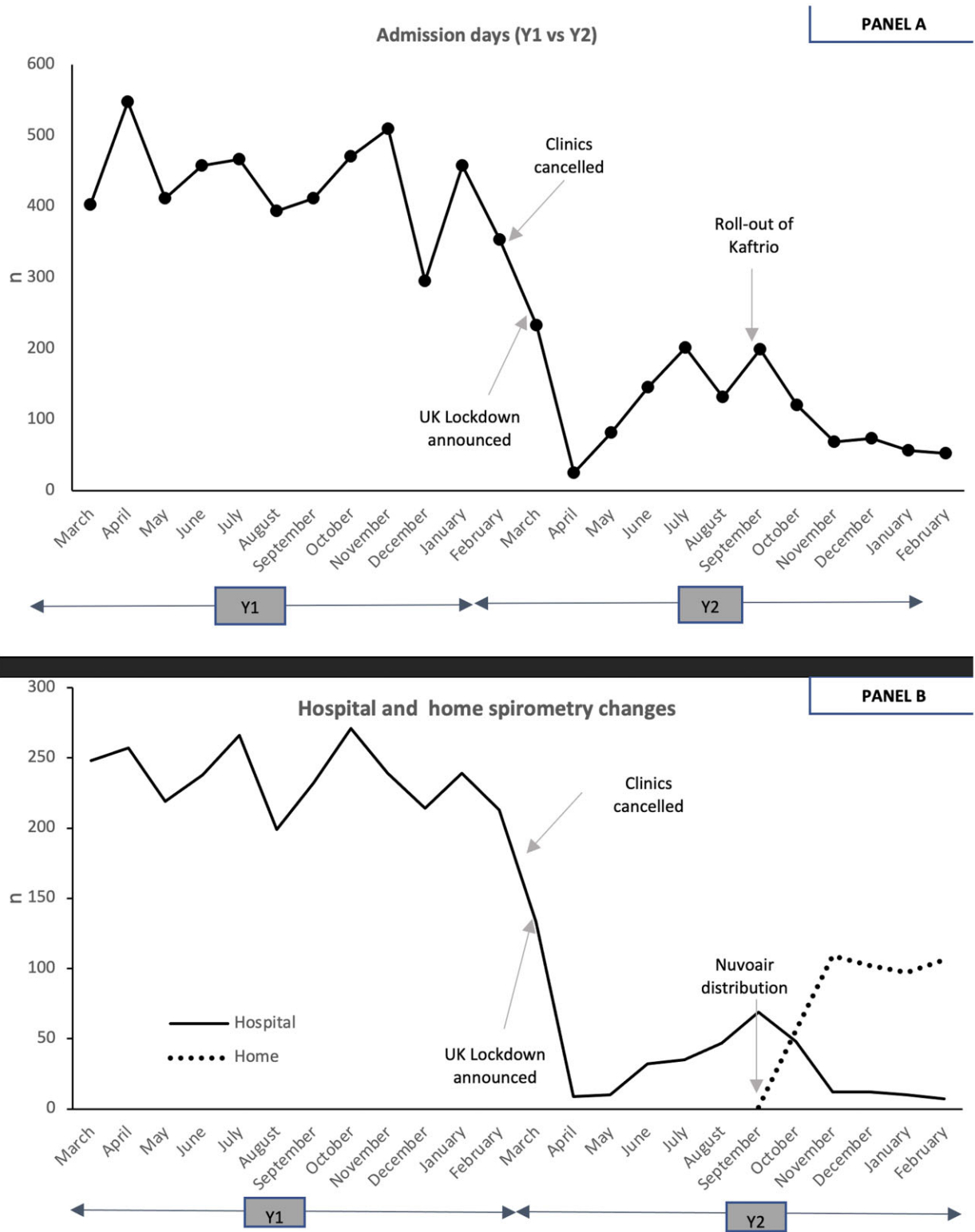


Figure 1. Comparison in admissions and spirometry (Y1 vs. Y2).

59% reduction in home antibiotic prescriptions to treat acute exacerbations (Y1 = 1438, Y2 = 849).

Conclusions

In summary, the pandemic necessitated a change in the pattern of care delivery for our pwCF—out of hospital support by the MDT increased and a greater proportion of IV therapy was administered at home. The VAC model of care increased clinical activity whilst reducing clinic non-attendance rates, suggesting more individuals engage with their carers. VAC improved pwCF's access to MDT services, abolishing the need to travel and the risk of cross-infection while improving appointment convenience. Additionally, VAC allowed vulnerable shielding MDT members or those self-isolating through COVID-19 contact to continue to provide care. While we are continuing to work on enhancing the response rate in remote sputum surveillance, following the introduction of the new CFTR modulators many pwCF no longer produce sputum, contributing to the low returns we saw.

This new model of care has allowed greater engagement with pwCF and has been well received—both MDT members and pwCF report high satisfaction with an increased number of pwCF using VAC.

In the post-COVID and CFTR modulator therapy era, there will be challenges in the delivery of care to pwCF, leading to the development of new ways of working. As part of this, going forward our model of care has changed such that where possible

all pwCFs are managed remotely in the community and F2F attendance at the hospital is reserved for annual review, emergency consultations, those requiring inpatient therapy, and the small proportion who are not suitable for or do not prefer remote monitoring.

Conflict of interest. All authors have no conflicts of interest to declare.

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