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Evaluation of the uptake and use of the myCOPD app by people aged 65 years and over
Full report

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1 Background

The NHS Long-Term Plan (NHS England, 2019) promotes a move to more digitally enabled care, with the pace of implementation escalated by the pandemic. Enabling care at home where possible is a high priority nationally to increase operational resilience (NHS England, 2022). There is evidence to support use of digital remote monitoring, particularly measuring vital signs and monitoring symptoms for people living with conditions such as COPD and heart failure (e.g. Pedone *et al.*, 2013; Kitsiou *et al.*, 2021). However, older people are more likely to be digitally excluded (Good Things Foundation, 2022). There is also limited evidence specific to people living with clinical frailty, particularly for those living at home. Clinical frailty is a distinctive health state related to the ageing process in which multiple body systems gradually lose their in-built reserves, as defined by the British Geriatrics Society (2014). The population living with clinical frailty are at high risk of hospital admission and extended hospital stays, with hospital admission often leading to adverse effects on their level of functioning (Ellis, Marshall and Ritchie, 2014; Keeble *et al.*, 2019).

There is a range of digital tools in use across Wessex; some are offered to people with clinical frailty, and some are not. The myCOPD app (mymhealth.com) is a digital remote monitoring and self-management tool in use in Dorset for people living with COPD and at risk of deterioration in their condition. The features of the myCOPD app include education, a clinical management plan, the ability to record symptoms and COPD Assessment Test (CAT) scores, online pulmonary rehabilitation classes and videos demonstrating inhaler technique. Patient accounts are linked with their primary care healthcare professional overseeing their care.

Older people and those living with clinical frailty are not excluded from the Dorset myCOPD programme but there is limited understanding about its uptake and use amongst this population. A need to add to the evidence base in this area has been identified as a priority by local Integrated Care Systems to inform their decision-making.

The aim of the evaluation was to answer the following question:
What is the uptake of the myCOPD app and how is it used by older people including those categorised as having clinical frailty?

The objectives of the evaluation were:

- To assess uptake of the myCOPD app by people aged 65 and over, including those who are living with clinical frailty.
- To increase understanding of how the myCOPD app is used and managed by people aged 65 and over, including those who are living with clinical frailty.

2 Methods

The evaluation adopted a mixed-methods design. Aggregate quantitative data on the population who had registered for and declined the myCOPD app and the population eligible for onboarding to the app was provided by the Dorset Insight and Intelligence Service (DiiS). These included data on age, gender, electronic frailty index (eFI) categories, Index of Multiple Deprivation (IMD)[1] score and activation of the app. These were analysed to compare registration, activation and decline of the app by adults from

[1] IMD is a measure of relative deprivation at small local area level based on seven domains of deprivation, including income, employment and health. Each geographical area, designed to be of a similar population size with an average of approximately 650 households, is ranked from 1 (most deprived area) to 10 (least deprived area) (Ministries of Housing Communities & Local Government (2019) *The English Indices of Deprivation 2019: Frequently Asked Questions (FAQs)*. London).

different age ranges and from different frailty categories, with the total population with COPD eligible to be onboarded. Data on gender and IMD score were assessed to identify any differences in registration, activation or decline of the myCOPD app.

An anonymous questionnaire was circulated to 222 individuals registered with GP practices in three Primary Care Networks (PCNs). The study information and questionnaires were circulated directly by the PCNs, acting as gatekeepers. The PCN sent study information and the questionnaire to all patients registered to use the myCOPD app aged 65 and over, excluding patients residing in a care home and those whose medical notes readily identified that involvement was inappropriate, such as being in receipt of end-of-life care. Individuals were either sent a short SMS text message with a link to the online questionnaire, that incorporated study information, or were posted an invitation letter, questionnaire and pre-paid return envelope. The paper questionnaire was identical to the online questionnaire. The choice of SMS or postal was informed by individual recorded communication preferences or the preference of the PCN for communicating with older patients. The questionnaire sought feedback on the perceived benefits and burdens of the app, including support required to use it and how often they used it. The questions also included the PRISMA 7 questions. PRISMA 7 is a validated tool recommended for identifying frailty through self-report by the British Geriatrics Society (2014). Quantitative data from the questionnaires was analysed to describe the respondent population and their use of the app. Thematic analysis of qualitative responses was used to identify patterns in the data that informed how the app was used and managed by both older people generally and people with frailty.

3 Findings

3.1 *Quantitative data sets*

Aggregate data was extracted by the DiiS on 13 June 2022 and included data from both SystmOne data, which is data that comes from patient NHS records, and myCOPD data, which is data that comes from the mymhealth technology company. All Dorset patients were included.

Data sets received included a breakdown of the COPD population categorised as either highest risk or rising risk, as these were the populations offered the myCOPD app. The rising risk cohort were defined as current smokers, males, Body Mass Index greater than 30, residing in deprived areas and housebound. The highest-risk cohort had experienced one or more exacerbations and/or one or more hospital admission in the previous year. This data was stratified by frailty score, gender and age band, and deprivation decile.

Data sets of those registered with the app, those who declined the app and those who activated the app were also received. For each of these data sets, the data were stratified by age bands, gender and frailty score, and age bands, deprivation decile and frailty score. There were two data sets for those registered with the app, one taken from SystmOne data and one from mymhealth data. SystmOne data includes those registered with the myCOPD app since April 2020, which was the start of the myCOPD programme roll out in Dorset. Mymhealth data includes all Dorset patients who have ever registered with the myCOPD app, therefore including those who registered before the start of the programme in April 2020. The data for those who declined the app was only available from SystmOne data and the data for those who activated the app was only available from mymhealth data.

3.2 *Questionnaire data*

222 questionnaires were circulated to patients from three PCNs. 21 responses were received giving a response rate of 9.5% (Table 1). 162 questionnaires were circulated via a link within a SMS text message

and 60 as hard copies by post. A better response rate was obtained from postal questionnaires compared to online questionnaires, with a response rate of 15.0% compared with 7.4%.

One respondent had only completed the PRISMA 7 questions and was therefore excluded from analysis beyond age and frailty profiling. Only 12 of the remaining 20 respondents indicated they had used the app and were included in all analyses.

Table 1: Questionnaire response rate

	SMS	Paper	Total
Primary Care Network A	48	4	52
Primary Care Network B	114	0	114
Primary Care Network C	0	56	56
Total circulated	162	60	**222**
Number of responses	12	9	**21**
Response rate	7.4%	15.0%	**9.5%**

3.3 *Age, gender and frailty profile*

The total myCOPD eligible population was 15108, made up of those categorised as highest risk (n=808) and those categorised as rising risk (n=14300), as outlined in section 3.1. A breakdown of the myCOPD eligible population, the highest risk cohort and the rising risk cohort by age range, gender and frailty status are shown in Tables 2 to 4.

Table 2: Breakdown of myCOPD eligible population, highest risk cohort and rising risk cohort by age range

	myCOPD eligible	Highest risk cohort	Rising risk cohort
Age <65	27.6%	20.5%	28.0%
Age 65-74	30.8%	31.1%	30.8%
Age 75-84	30.5%	34.0%	30.3%
Age 85+	11.1%	14.4%	10.9%

Table 3: Gender breakdown of myCOPD population, highest risk cohort and rising risk cohort

	myCOPD eligible	Highest risk cohort	Rising risk cohort
Male	66.2%	48.6%	67.2%
Female	33.8%	51.4%	32.8%

Table 4: Breakdown of frailty status of myCOPD eligible population, highest risk cohort and rising risk cohort

	myCOPD eligible	Highest risk cohort	Rising risk cohort
Robust	28.5%	13.4%	29.4%
Pre-frailty (Mild frailty)	38.8%	37.1%	38.9%
Moderate frailty	21.4%	28.3%	21.0%
Severe frailty	11.3%	21.2%	10.7%

The age and likely prevalence of frailty amongst the questionnaire respondents is shown in Figure 1. A score of 3 or more on the Prisma 7 score is suggestive that the person may be living with frailty. 50% of respondents (10/20) who completed the Prisma 7 questions in full may have been living with frailty (Figure 2).

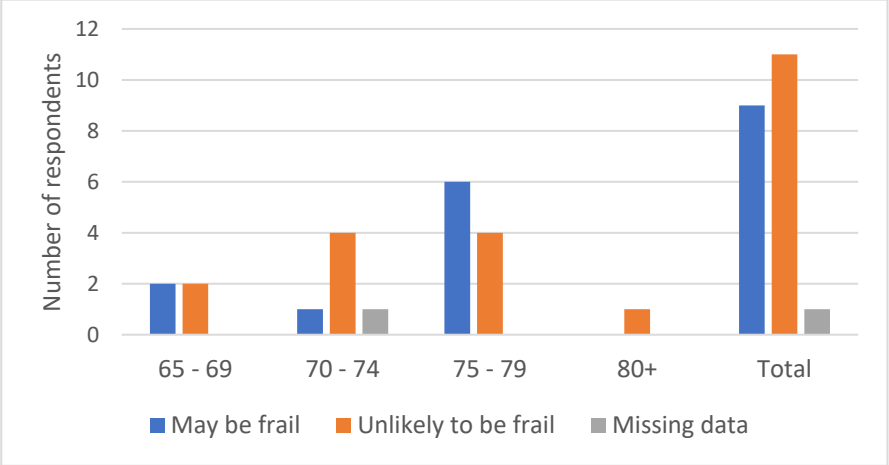

Figure 1: Age and likely frailty status of questionnaire respondents

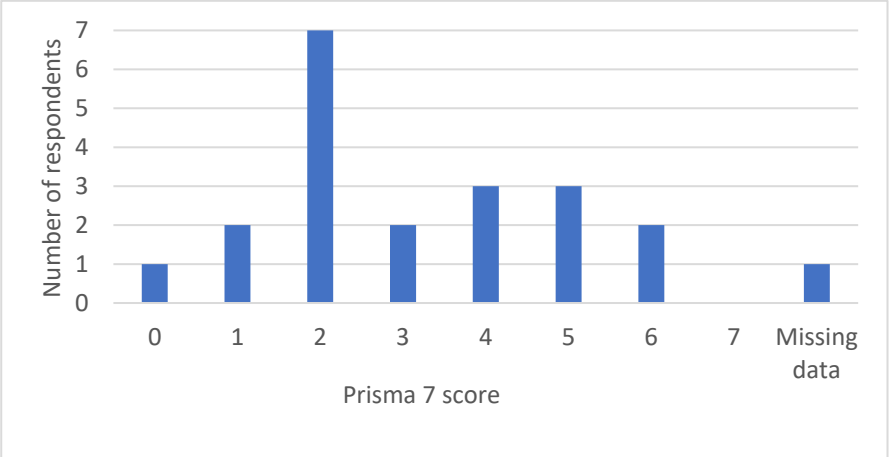

Figure 2: Prisma 7 scores of questionnaire respondents

Overall, questionnaire respondents were older than the myCOPD population registered with the app (Figure 3 and Figure 4) and a greater proportion were male (Figure 5 and Figure 6).

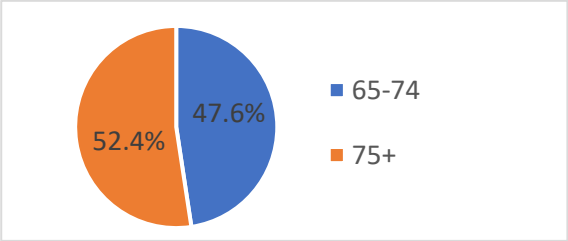

Figure 3: Age profile of questionnaire respondents

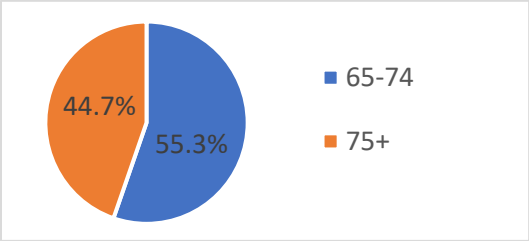

Figure 4: Age profile of registered individuals from SystmOne data

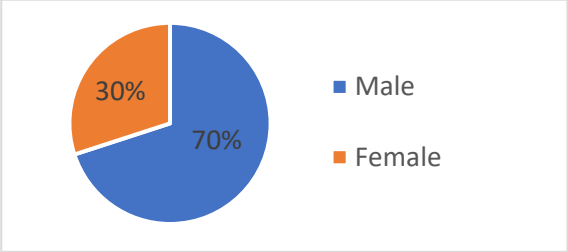

Figure 5: Gender profile of questionnaire respondents

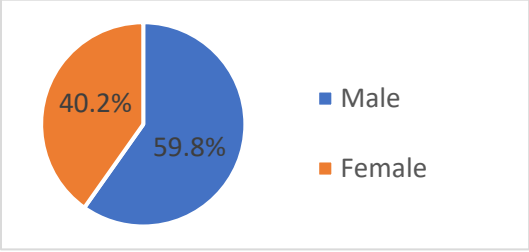

Figure 6: Gender profile of registered individuals from SystmOne data

The combined age and frailty profile of questionnaire respondents and the myCOPD population are shown in Figure 7 and Figure 8.

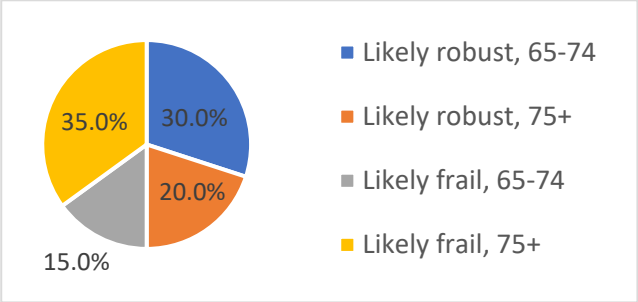

Figure 7: Age and frailty profile of questionnaire respondents

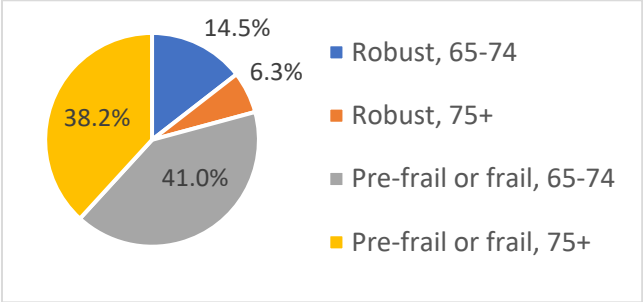

Figure 8: Age and frailty profile of registered individuals from SystmOne data

3.4 *Uptake of myCOPD app*

From SystmOne data, 8.4% (n=1268) of the eligible population (rising risk and highest risk, n=15108) had registered with the app. Registration by age and by frailty category is shown in Table 5 and Table 6.

Table 5: Proportion of myCOPD eligible population registered with the app by age range

	Aged <65		Aged 65-74		Aged 75-84		Aged 85+		Total population	
Registered	408	9.8%	476	10.2%	333	7.2%	51	3.0%	1268	8.4%
Not registered	3759	90.2%	4183	89.8%	4273	92.8%	1625	97.0%	13840	91.6%
TOTAL	4167	100.0%	4659	100.0%	4606	100.0%	1676	100.0%	15108	100.0%

Table 6: Proportion of myCOPD eligible population registered with the app by frailty category

	Robust		Pre (mild) frailty		Moderate frailty		Severe frailty		Total population	
Registered	361	8.8%	526	9.4%	241	7.8%	101	6.2%	1229	8.5%
Not registered	3761	91.2%	5074	90.6%	2848	92.3%	1532	93.8%	13215	91.5%
TOTAL	4122	100.0%	5600	100.0%	3089	100.0%	1633	100.0%	14444[2]	100.0%

Breakdown of the population registered with the app and the total eligible myCOPD population by age range is shown in Figure 9 and Figure 10. This is depicted by frailty category in Figure 11 and Figure 12.

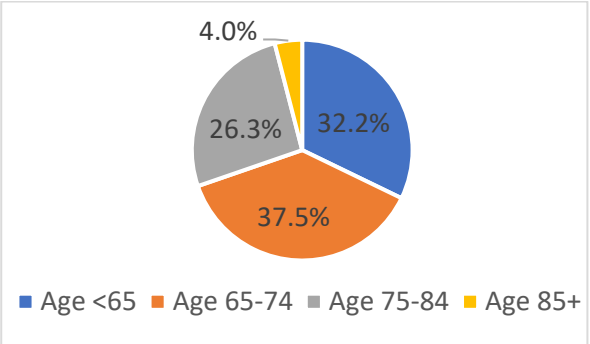

Figure 9: Breakdown of population registered with the app by age range

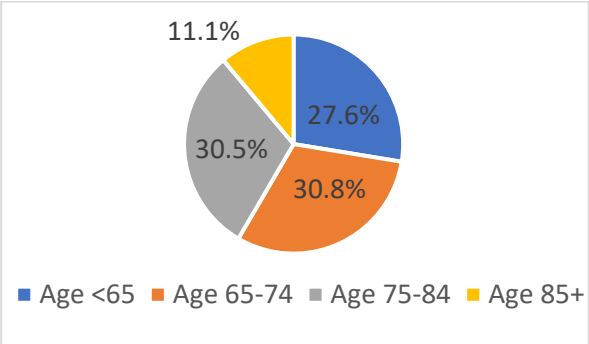

Figure 10: Breakdown of myCOPD eligible population by age range

[2] Valid population, excluding those for whom no frailty score recorded

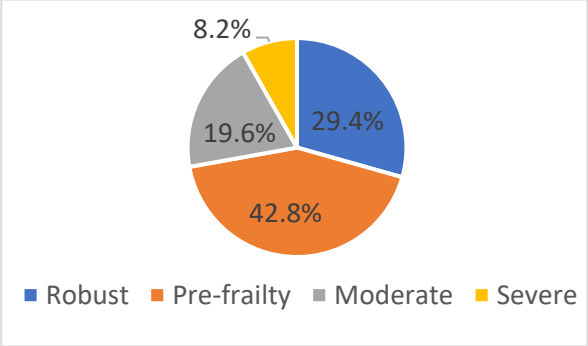

Figure 11: Breakdown of population registered with the app by frailty category

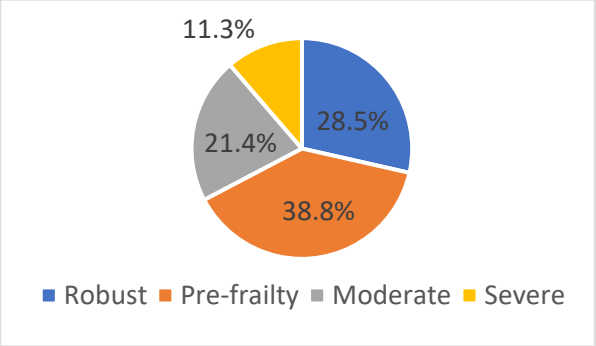

Figure 12: Breakdown of myCOPD eligible population by frailty category

Individuals aged 75 and over were significantly less likely to be registered with the app compared to those aged under 75 (X^2 = 72.72,1 d.f., p < 0.001). Individuals living with frailty (moderate and severe) were significantly less likely to be registered with the app compared to those categorised as robust or living with pre-frailty (mild frailty) (X^2 = 14.44, 1 d.f., p<0.001).

From SystmOne data, 1.5% (n=229) of the eligible population (rising risk and highest risk, n=15108) had declined the app. Decline of the app by age and by frailty category is shown in Table 7 and Table 8.

Table 7: Proportion of myCOPD eligible population who declined the app by age range

	Aged <65		Aged 65-74		Aged 75-84		Aged 85+		Total population	
Declined	44	1.1%	77	1.7%	86	1.9%	22	1.3%	229	1.5%
Did not decline[3]	4123	98.9%	4582	98.3%	4520	98.1%	1654	98.7%	14879	98.5%
TOTAL	4167	100.0%	4659	100.0%	4606	100.0%	1676	100.0%	15108	100.0%

Table 8: Proportion of myCOPD eligible population who declined the app by frailty category

	Robust		Pre (mild) frailty		Moderate frailty		Severe frailty		Total population	
Declined	44	1.1%	85	1.5%	56	1.8%	30	1.8%	215	1.5%
Did not decline	4078	98.9%	5515	98.5%	3033	98.2%	1603	98.2%	14229	98.5%
TOTAL	4122	100.0%	5600	100%	3089	100.0%	1633	100.0%	14444[4]	100.0%

Individuals aged 65 and over were significantly more likely to decline to use the app compared to those aged under 65 (X^2 = 8.15, 1 d.f., p=0.004). Individuals living with pre-frailty (mild frailty) or frailty (moderate and severe) were significantly more likely to decline to use the app compared to those categorised as robust (X^2 = 6.97, 1 d.f., p=0.008).

The number of the myCOPD eligible population (n=15108) who registered with the app by gender and by age range and gender are shown in Table 9 and Table 10. The percentage of the eligible population registered with the app by age range and gender is shown in Figure 13.

Table 9: Proportion of myCOPD eligible population registered with the app by gender

	Male		Female		Total	
Registered	736	7.4%	532	10.4%	1268	8.4%
Not registered	9269	92.6%	4571	89.6%	13840	91.6%
Total	10005	100%	5103	100%	15108	100%

[3] Includes both those who registered and those who have not been offered the app
[4] Valid population, excluding those for whom no frailty score recorded

Table 10: Counts for myCOPD eligible population registered with the app by age range and gender

	Aged <65		Aged 65-74		Aged 75-84		Aged 85+		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Registered	222	186	276	200	204	129	34	17	1268
Not registered	2343	1416	2762	1421	3033	1240	1131	494	13840
Total	2565	1602	3038	1621	3237	1369	1165	511	15108

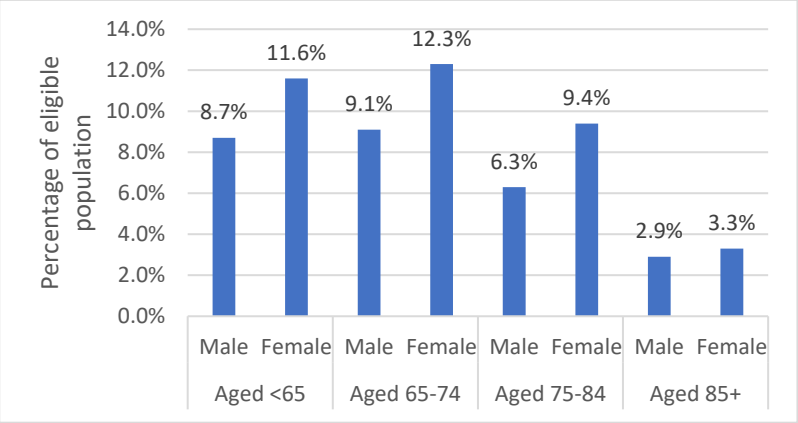

Figure 13: Registration with the app by age and gender

The number of the eligible population who declined the app by gender and by age range and gender are shown in Table 11 and Table 12. The percentage of the eligible population who declined the app by age range and gender is shown in Figure 14.

Table 11: Proportion of myCOPD eligible population who declined the app by gender

	Male		Female		Total	
Declined	111	1.1%	118	2.3%	229	1.5%
Did not decline	9894	98.9%	4985	97.7%	14879	98.5%
Total	10005	100.0%	5103	100.0%	15108	100.0%

Table 12: Counts for myCOPD eligible population who declined the app by age and gender

	Aged <65		Aged 65-74		Aged 75-84		Aged 85+		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Declined	26	18	33	44	42	44	10	12	229
Did not decline	2539	1584	3005	1577	3195	1325	1155	499	14879
Total	2565	1602	3038	1621	3237	1369	1165	511	15108

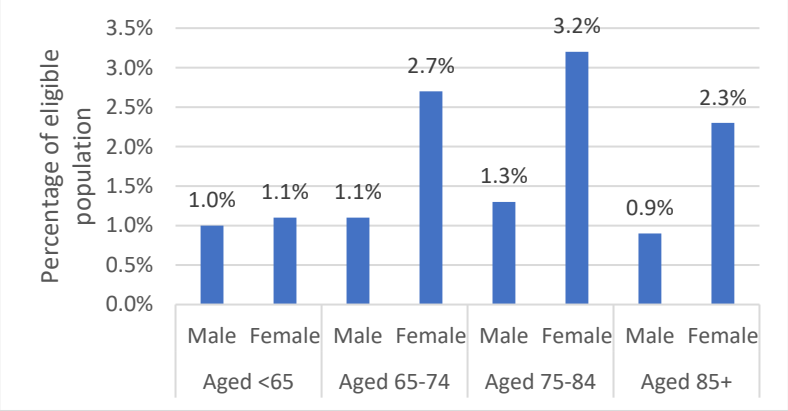

Figure 14: Decline of app by age and gender

Women were significantly more likely to register with the app than men (X^2 = 46.41, 1 d.f., p<0.001). Women were also significantly more likely to decline the app than men (X^2 = 21.36, 1 d.f., p<0.001).

The number of the myCOPD eligible population for whom the Index of Multiple Deprivation (IMD) was recorded (n=14452) who registered with the app (n=1195) is shown by IMD decile in Table 13. The percentage of this population registered with the app is shown by IMD decile in Figure 15.

Table 13: Counts for myCOPD eligible population registered with the app by IMD score

	IMD 1&2	IMD 3&4	IMD 5&6	IMD 7&8	IMD 9&10	Total
Registered	152	232	416	269	126	1195
Not registered	1899	2716	3606	3196	1940	13357
Total	2051	2948	4022	3465	2066	14552

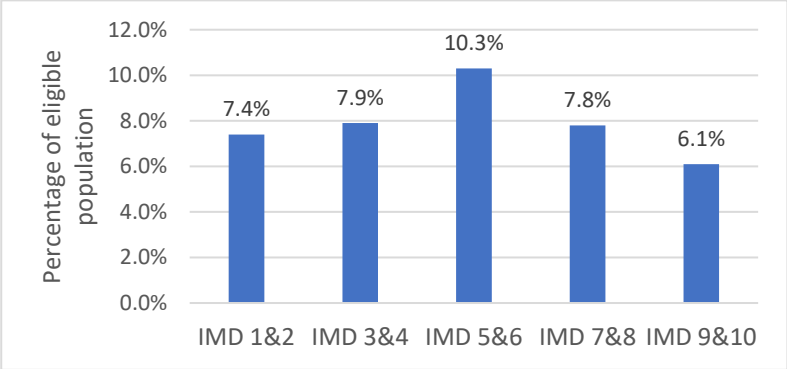

Figure 15: Registration with the app by IMD decile

Individuals living in areas with an IMD decile of 5 and 6 were significantly more likely to register with the app than those living in the areas with lower or higher IMD deciles (X^2 = 33.49, 1 d.f., p<0.001).

The number of the myCOPD eligible population for whom the IMD was recorded (n=14452) who declined the app (n=219) is shown by IMD decile in Table 14. The percentage of this population who declined the app is shown by IMD decile in Figure 16.

Table 14: Counts for myCOPD eligible population who declined the app by IMD score

	IMD 1&2	IMD 3&4	IMD 5&6	IMD 7&8	IMD 9&10	Total
Declined	16	62	78	49	14	219
Did not decline	2035	2886	3944	3416	2052	14333
Total	2051	2948	4022	3465	2066	14552

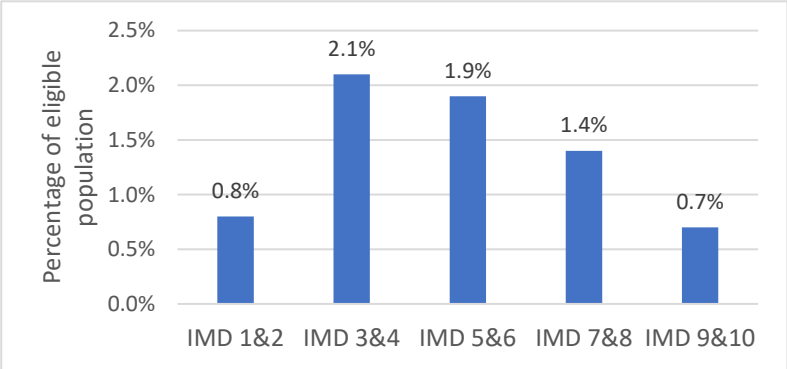

Figure 16: Decline of app by IMD decile

Those living in an area with an IMD decile of 1 and 2 were significantly less likely to decline the app than those living in areas with an IMD decile of 3 to 8 (X^2 = 11.28, 1 d.f., p<0.001). Those living in an area with an IMD decile of 9 and 10 were also significantly less likely to decline the app than those living in areas with an IMD decile of 3 to 8 (X^2 = 13.87, 1 d.f., p<0.001).

The questionnaire asked respondents to indicate how they heard about the app. Most respondents (n=20) heard about the app through a professional or through their GP surgery but with no specific professional stated. The questionnaire data suggests that there is no difference in approach to how the app is introduced between older people who might be living with frailty and older people generally, although the numbers are too small to draw robust conclusions (Figure 17). The data also suggests that the age of the individual did not influence how the app was introduced (Figure 18). Two respondents indicated that they heard about it via the questionnaire although the questionnaire was only sent to them because they were registered with the app. This suggests they were not aware that they were registered with the app.

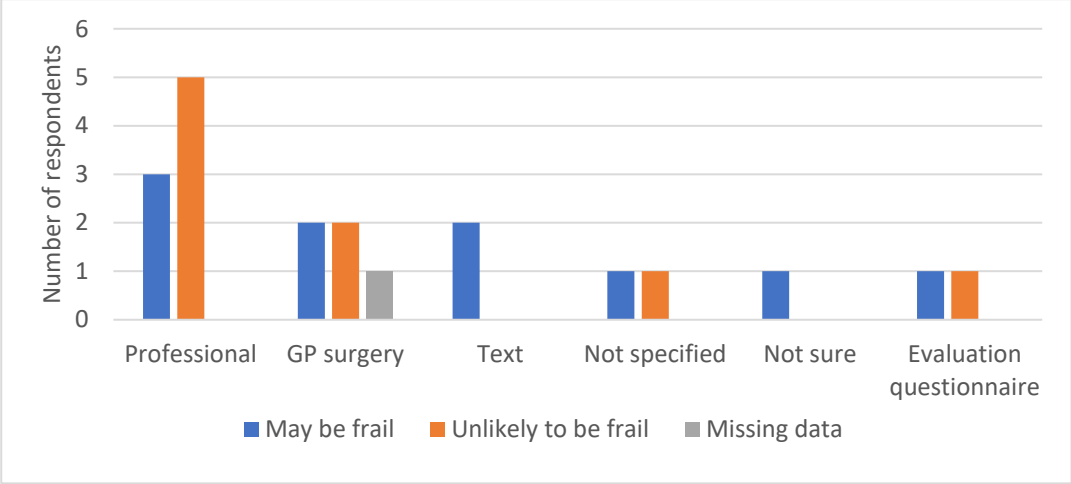

Figure 17: How questionnaire respondents heard about the app by frailty status

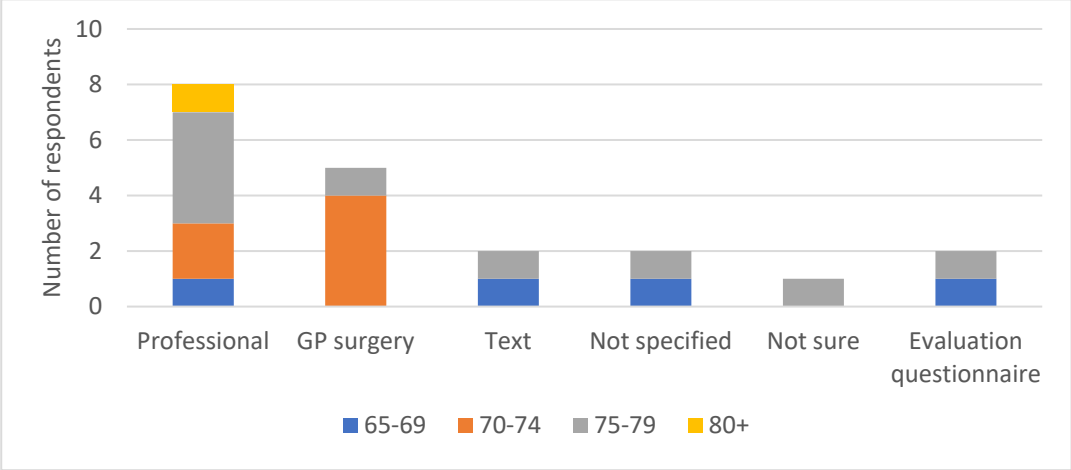

Figure 18: How questionnaire respondents heard about the app by age range

3.5 *Use of the myCOPD app*

3.5.1 Activation of the app

Mymhealth data showed that 63.1% of the population registered with the app (n=1599) had activated it (n=1009). Activation by age range, by frailty and by age and frailty is shown in Table 15, Table 16 and Figure 19.

Table 15: Proportion of the population registered with the app activating it by age range

	Aged <65		Aged 65-74		Aged 75-84		Aged 85+		Total population	
Activated	331	60.1%	382	65.2%	263	66.2%	33	50.8%	1009	63.1%
Not activated	220	39.9%	204	34.8%	134	33.8%	32	49.2%	590	36.9%
Total	551	100.0%	586	100.0%	397	100.0%	65	100.0%	1599	100.0%

Table 16: Proportion of the population registered with the app activating it by frailty category

	Robust		Pre (mild) frailty		Moderate frailty		Severe frailty		Total population	
Activated	270	57.2%	444	67.1%	188	66.4%	65	51.2%	967	62.6%
Not activated	202	42.8%	218	32.9%	95	33.6%	62	48.8%	577	37.4%
Total registered	472	100.0%	662	100%	283	100.0%	127	100.0%	1544[5]	100.0%

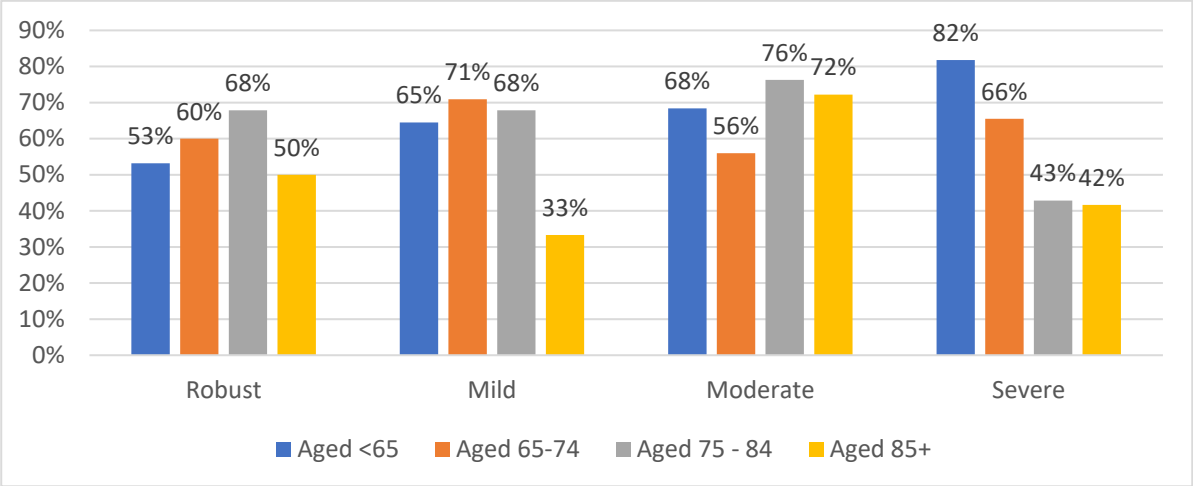

Figure 19: Percentage of individuals registered with the app who activated it by age range and frailty category

There was no statistical difference between individuals aged under 75 and those aged 75 and over in activation of the app (X^2 = 0.26, 1 d.f., p = 0.610). However, the difference between those aged under 85 and those aged 85 and over (Figure 20 and Figure 21) is statistically significant, with those aged 85 and older less likely to activate the app (X^2 = 4.43, 1 d.f., p= 0.035).

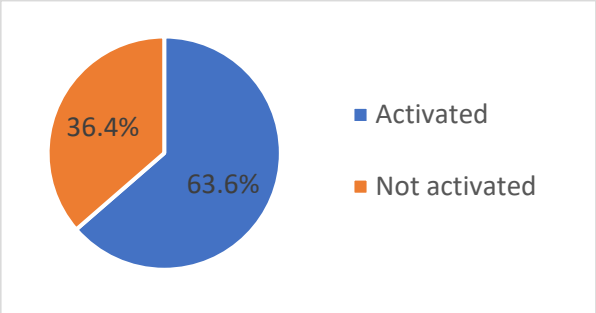

Figure 20: Percentage of the population registered with the app aged under 85 activating it

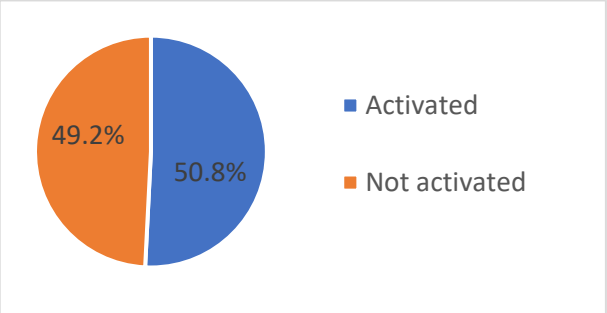

Figure 21: Percentage of the population registered with the app aged 85+ activating it

Individuals with severe frailty were significantly less likely to activate the app than individuals with moderate, mild or no frailty (X^2 = 7.75, 1 d.f., p= 0.005). Individuals categorised as robust and aged under

[5] Valid population, excluding those for whom no frailty score is recorded

65 were also significantly less likely to activate the app than those aged under 65 and living with pre-frailty or frailty (X^2 = 9.00, 1 d.f., p= 0.003).

The proportion of the population registered with the app who activated it is shown by gender in Table 17, by both gender and age range in Figure 22 and by both gender and frailty category in Figure 23.

Table 17: Proportion of the population registered with the app activating it by gender

	Male		Female		Total	
Activated	549	61.4%	460	65.2%	1009	63.1%
Not activated	345	38.6%	245	34.8%	590	36.9%
Total	894	100%	705	100%	1599	100%

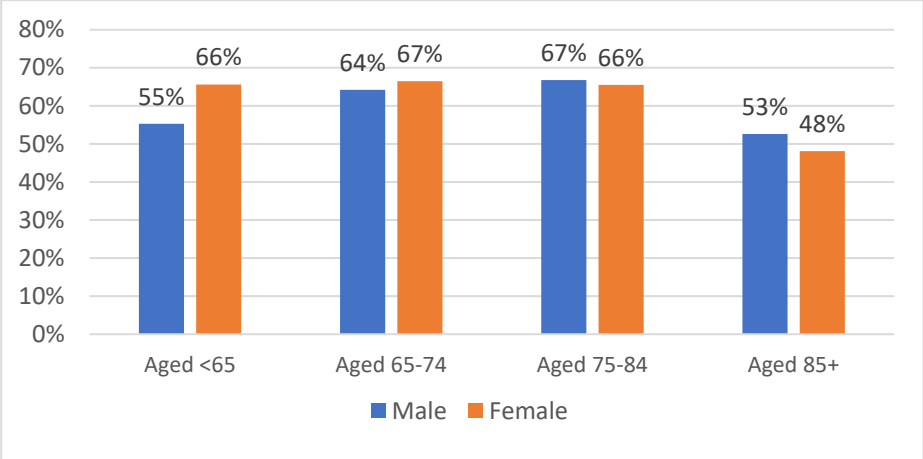

Figure 22: Percentage of population registered with the app who activated it by gender and age range

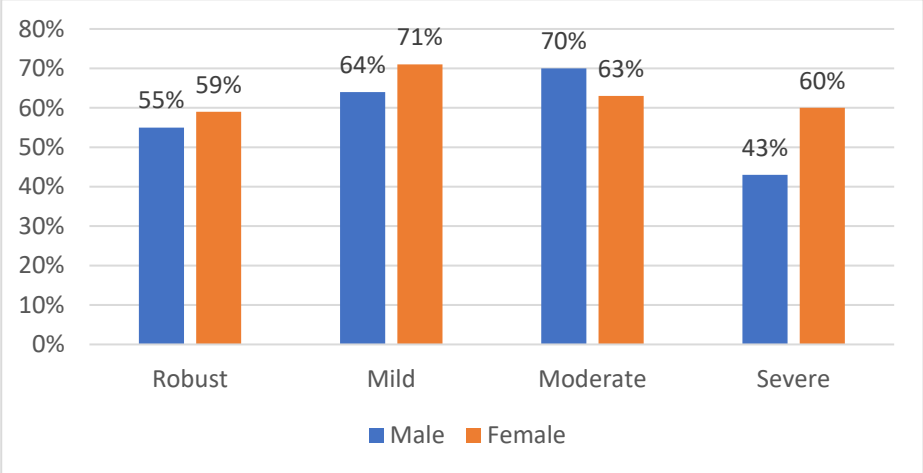

Figure 23: Percentage of population registered with the app who activated it by gender and frailty category

There was no statistical difference between men and women in activation of the app (X^2 = 2.49, 1 d.f., p=0.115). However, women aged under 65 years were statistically more likely to activate the app than men in the same age group (X^2 = 6.15, 1 d.f., p=0.013). The difference between men and women living with severe frailty is not statistically significant (X^2 = 3.54, 1 d.f., p=0.060).

The proportion of the population registered with the app for whom the Index of Multiple Deprivation (IMD) was recorded (n=1519) who activated it (n=968) is shown by IMD decile in Table 18, both IMD decile and age range in Figure 24 and by both IMD decile and frailty category in Figure 25.

Table 18: Proportion of the population registered with the app activating it by IMD decile

	IMD 1&2		IMD 3&4		IMD 5&6		IMD 7&8		IMD 9&10		Total	
Activated	100	50.5%	195	69.6%	291	61.3%	252	65.8%	130	71.0%	968	63.7%
Not activated	98	49.5%	85	30.4%	184	38.7%	131	34.2%	53	29.0%	551	36.3%
Total	198	100%	280	100%	475	100%	383	100%	183	100%	1519	100%

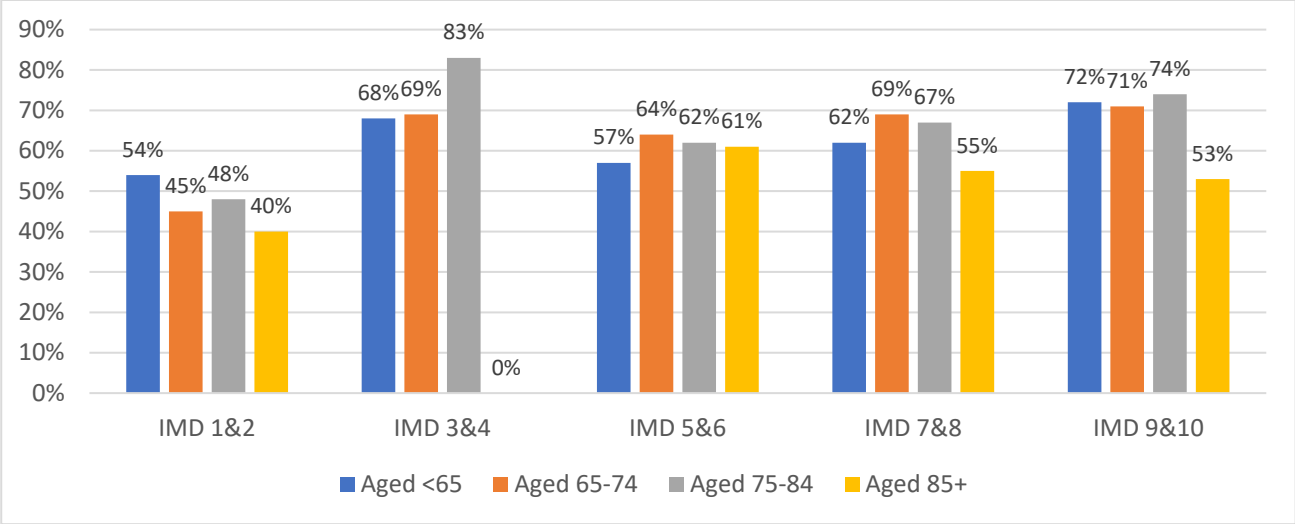

Figure 24: Percentage of population registered with the app who activated it by IMD decile and age range

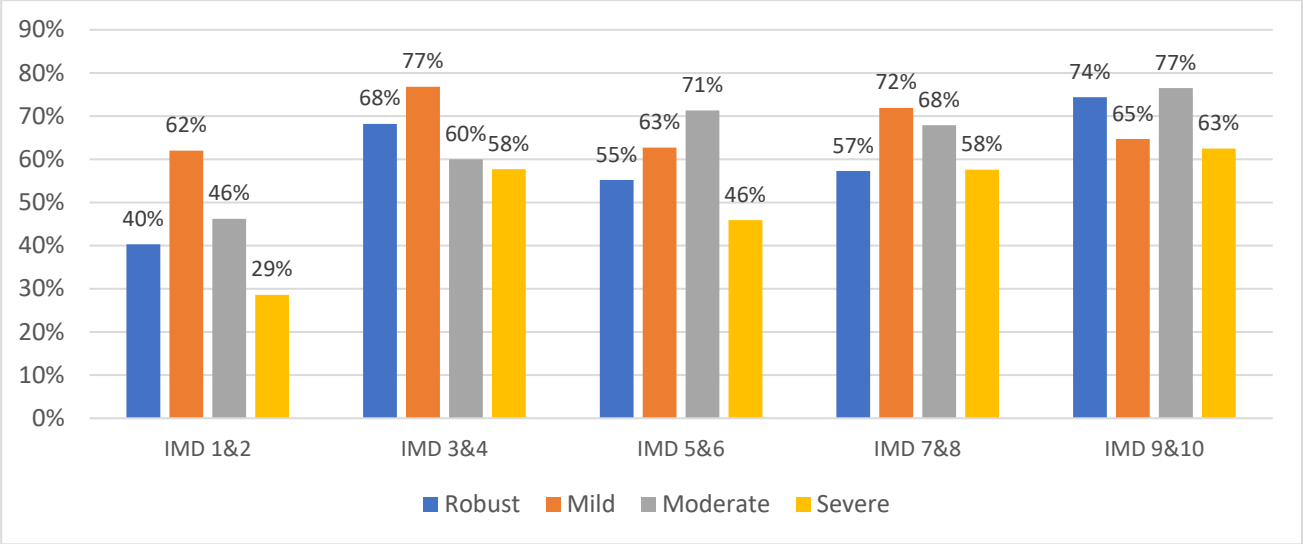

Figure 25: Percentage of population registered with the app who activated it by IMD decile and frailty category

Individuals registered to use the myCOPD app living in IMD 1 and 2 areas were significantly less likely to activate the app than those living in IMD 9 and 10 areas (X^2 = 16.76, 1 d.f., p<0.001).

There was no statistical difference between those aged 75 and older and those aged under 75 for those living in IMD 1 and 2 areas (X^2 = 0.20, 1 d.f., p=0.655). Nor was there a statistical difference between those categorised as robust or pre-frail and those categorised as living with moderate or severe frailty living in IMD 1 and 2 areas (X^2 = 2.23, 1 d.f., p=0.135).

There was no statistical difference between those aged 75 and older and those under 75 living in IMD 9 and 10 areas (X^2 = 0.02, 1 d.f., p=0.888). Nor was there a statistical difference between those categorised as

robust or pre-frail and those categorised as living with moderate or severe frailty living in IMD 9 and 10 areas (X^2 = 0.27, 1 d.f., p=0.603).

3.5.2 Use of the app by questionnaire respondents

Amongst the small sample of questionnaire respondents, there was no obvious correlation between method of introduction to the app and whether an older person had used the app (and therefore activated it) following registration. Although the small number of respondents limits the conclusions that can be drawn, a similar proportion of the questionnaire respondents indicated they had used the app (n=12/20) to the proportion of registered users activating the app identified from mymhealth data (60% and 63.1% respectively).

Four themes were identified through analysis of the qualitative data provided by respondents who completed the free text response questions. These related to how and why the respondents did or did not use the app.

3.5.2.1 *Lack of follow up after referral for app*

Respondents reported a lack of ongoing promotion of the app following receipt of information about the app. Its use did not appear to be actively encouraged and a lack of follow-up may have limited use of the app. As all respondents who were sent a questionnaire were registered to use the app, it is unclear why two respondents stated that they heard about the app through the questionnaire. It is possible that they may have been registered but had not actioned electronic communication about downloading the app or that they had been advised that they had been registered and forgotten, forgetfulness being more prevalent amongst the older population (Ponds *et al.*, 1997).

> Frankly I have been totally unaware of the app's existence, so no one really encouraged its use (P19, not frail, 75-79)

> Don’t get any help or follow ups (P08, not frail, 70-74)

> I was contacted about the app, replied that I would participate but was never offered the app (P17, not frail, 65-69)

3.5.2.2 *A need for support*

Of the respondents who had used the app (n=12), most considered it easy or fairly easy to use (67%; Figure 26). However, two respondents indicated that support to understand how to use it may have helped them, including one who had not used the app. Three respondents experienced either technical difficulties or concerns about how to work the app. Neither frailty status nor age of the respondent appeared to impact on ease of use or whether respondents used the app, although numbers were too small to draw conclusions.

> Relatively easy despite not being a computer wizz (P03, not frail, 75-79)

> Unable to make sense of it (P04, not frail, 70-74)

> If I knew how to use it, it would be good (P05, may be frail, 75-79)

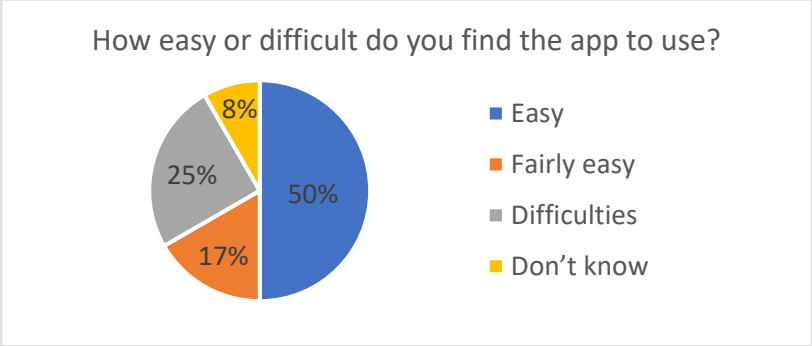

Figure 26: Ease of use of the app

3.5.2.3 *Usefulness of app*

No respondents used the app regularly and 42% (n=5/12) were either just setting it up or had stopped using it. All three respondents who had difficulties using the app had either stopped using the app or only used it once.

Of the respondents identified as current users of the app (n= 9, including those just starting with the app), eight reported that they did not have any worries about using it. The other respondent, a new user, reported being open minded about using it. However, a majority also had not experienced any benefits from using the app (89%; n = 8). The only benefit reported, by a respondent referred to the app via the pulmonary rehabilitation service, was:

> Knowing I have support at any time (P15, not frail, 70-74)

One respondent, not a current user, had stopped using the app due to concerns as to how the app operated, such as the time it took to set it up and the persistent reminders becoming "tiresome" (P06, may be frail, 75-79).

Of those respondents identified as current users (n=9), all reported only using the app infrequently. One respondent who reported only occasional use of the app provided the following reason:

> Haven't found it as useful as I had hoped (P03, not frail, 75-79)

3.5.2.4 *"Other things to do"*

There was not one factor that affected frequency of use. Reasons that could be associated with increasing age or living with frailty such as fatigue or functional deficits were not reported. Two respondents reported their use of the app being associated with how they feel or their symptoms. It is an expectation that app use will be led by symptom needs.

> I will look occasionally at exercising, including breathing, especially when airways are more restricted, say with a cold (P03, not frail, 75-79)

Three respondents indicated that their use of the app was something that needed to align with getting on with life. This may have been related to their current disease status, with two referring to their COPD as mild or minor. However, two respondents indicated that using the app could be time-consuming or could waste time. Two of the three respondents had PRISMA 7 scores indicating they may be living with frailty.

> It took time to complete as all degrees of copd severity slows the process (P06, may be frail, 75-79)

> I'm always concerned at "wasting" time on these things (P03, not frail, 75-79)

> Other things to do (P21, may be frail, 75-79)

4 Discussion

The age profile of the myCOPD eligible population reflects that the chance of developing COPD increases as people get older and that the proportion of people living with COPD increases with age (British Lung Foundation, 2022). The findings show that frailty (eFI categories of moderate and severe frailty) and pre-frailty (eFI category of mild frailty) is more prevalent in the myCOPD eligible population than is estimated for the general population. In 2020, the prevalence of frailty in adults aged 50 and above in England was estimated to be 8.1% (95% CI 7.3 – 8.8) and the prevalence of pre-frailty was estimated to be 9.9% (95% CI 9.1 – 10.6) (Sinclair *et al.*, 2022). The figures for the myCOPD population were 32.7% and 38.8% respectively. This highlights the importance of understanding use of the app by both the population aged over 65 years and people with frailty.

Although both those aged 75 and over and those living with moderate or severe frailty were found to be significantly less likely to register with the app, from the available data it is not possible to determine why this might be. It could potentially be related to a difference in whether the app is offered to this population. Negative and ageist attitudes of health care professionals towards older people using digital health technology could potentially influence decisions to offer such interventions (Mannheim *et al.*, 2021) and lead to difference in uptake. Data is not available to account for all individuals who have been offered the app, with complete data only available for those who registered with the app or for whom a decision to decline the app was recorded. There are likely to be many more who were offered the app, for example sent a text message invitation, but did not respond.

There are potential explanations for the seemingly contradictory finding that women were both more likely to register with the app and to decline the app. This could be due to known differences in health behaviour between genders (Deeks *et al.,* 2009; Thompson *et al.*, 2016), meaning women were more proactive in responding to use of the app or it could potentially be because women were more likely to be offered the app than men. Greater understanding of who the app is offered to and reasons for this could therefore assist adoption and spread of the app. However, the greater likelihood of those aged 65 and over and those living with mild, moderate or severe frailty to decline the app suggests that there is also a need to better understand patient factors.

The findings suggest that living in an area of high deprivation was not a clear indicator that an individual was less likely to register with or more likely to decline the app, despite this population more likely to have low or limited digital skills (Stone, Nuckley and Shapiro, 2020). However, deprivation did impact activation of the app. This could be because activation requires the individual to have access to a device such as a smart phone, tablet or computer, and internet access, which is more limited amongst lower-income households (Honeyman *et al.*, 2020; British Academy, 2022).

A factor potentially influencing activation identified from the questionnaire responses is that older people may need follow-up by professionals following referral for the app and ongoing support using the app. Encouragement to use the app or contact to provide practical or technical support to those facing difficulties could be of benefit. The lack of awareness of two respondents that they were even registered with the app highlights this. However further investigation is required to understand what the follow-up and assistance should look like. Although this evaluation focused on those aged 65 and older, given the interesting finding that those aged under 65 and categorised as robust were less likely than others to activate the app, better understanding as to what would support greater activation for all registered users would also be useful.

Although the reported infrequent use could indicate that the app has limited usefulness, it is not expected that everyone will use the app on a regular basis, rather that it is available to assist an individual when they

encounter symptoms or other problems. The numbers of responses are also too small to draw conclusions from and this requires further investigation. However, continued promotion of the app with those who are registered and provision of support to those using the app could increase both the registration to activation conversion rate and also continued use. Providing ongoing support may also assist collation of data to reveal reasons for lack of activation, which could be used to better understand the significant difference in activation between those aged 85 and older and younger adults, and between those living with severe frailty and those categorised as robust or living with mild or moderate frailty.

5 Conclusion, Implications and Limitations

The finding of this evaluation of a high prevalence of frailty in the population eligible for the app highlights the importance of understanding uptake and use of the myCOPD app by older people living with frailty. The findings also suggest that greater uptake and use may be possible through ongoing encouragement and support to those offered and registered with the app, although further investigation is required.

Cost-effective ways to provide ongoing support and encouragement, as part of routine care, should be explored, alongside investigation as to how this can be supported by roles such as community digital champions and coaches. Further investigation is also required to understand characteristics of those from the eligible population who are offered the app and what informs professional decisions to either offer or not offer the app.

A strength of the evaluation was the quantitative analysis of aggregated data for the entire myCOPD population, although access to complete data on who is offered the app would improve understanding further. However, the qualitative component of the evaluation was limited due to a need to restrict data collection to anonymous questionnaires to enable more rapid access to data than would have been possible with an interview design. This was exacerbated by the poor response rate.

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