

Online Supplement

Impact of Proactive Integrated Care on Chronic Obstructive Pulmonary Disease

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Supplementary Table 1. Completers *Versus* Non-Completers*

Characteristics	Non-Completers N = 122	Completers N = 389	p-value
Age, yr	68.0 (9.8)	68.4 (8.6)	0.67
Gender, % female	41.0	38.8	0.67
Race & Ethnicity			
White, %	87.7	92.8	
Non-White, %	12.3	7.2	0.08
Asian, %	0.8	0.3	
Black, %	8.2	3.6	
Hispanic, %	3.3	2.3	
Native American, %	0	0.5	
Other, %	0	0.5	
BMI	26.4 (5.4)	26.4 (6.0)	0.96
FEV ₁ , % predicted	36.9 (13.7)	36.7 (13.4)	0.89
mMRC dyspnea score	2.0 (1.0)	1.9 (1.0)	0.24
Six minute walk distance, m	255.7 (117.5)	274.9 (116.2)	0.11
BODE index	4.9 (2.1)	4.7 (2.0)	0.55
Current smoker, %	32.0	17.7	0.0008
Smoking history, pack-yr	56.8 (31.4)	58.9 (33.3)	0.54
Current or prior pulmonary rehabilitation, %	21.3	35.7	0.003
Lives alone, %	27.0	30.1	0.52
Education, yr	13.0 (2.5)	13.5 (2.5)	0.04
Influenza vaccination, %	89.3	94.3	0.06
Pneumococcal vaccination, %	76.2	83.8	0.06
Long-term O ₂ therapy, %	82.0	81.5	0.91
Resting O ₂ , L	1.8 (1.5)	1.8 (1.6)	0.87

Post-exercise O ₂ , L	2.5 (2.1)	2.7 (2.0)	0.53
Sleep O ₂ , L	2.1 (1.3)	2.1 (1.5)	0.91
Resting SpO ₂ , %	93.3 (2.9)	92.7 (2.9)	0.049
Post-exercise SpO ₂ , %	87.6 (5.4)	87.8 (4.9)	0.72
Medications			
SABA, %	90.2	92.3	0.46
LABA, %	54.1	56.0	0.71
SAMA, %	54.1	40.1	0.007
LAMA, %	39.3	46.5	0.16
ICS, %	63.1	72.2	0.06
Theophylline, %	4.1	9.0	0.08
Co-morbidities			
Hypertension, %	54.9	56.3	0.79
Congestive heart failure, %	27.9	15.4	0.002
Diabetes, %	16.4	15.2	0.74
Obstructive sleep apnea, %	16.4	16.5	0.99
Prior year health care utilization (COPD)			
ED visits, visits/patient	1.07 (1.91)	0.58 (1.20)	0.003
Hospitalizations, visits/patient	0.79 (1.53)	0.42 (1.07)	0.002
ICU hospitalizations, visits/patient	0.19 (0.54)	0.10 (0.41)	0.03
ICU hospitalizations with ventilation, visits/patient	0.15 (0.57)	0.07 (0.32)	0.22
Hospital LOS, days	3.70 (7.75)	1.97 (5.36)	0.002
Urgent office visits, visits/patient	1.17 (2.45)	0.99 (1.99)	0.91
Prior year health care utilization (non-COPD)			
ED visits, visits/patient	0.18 (0.56)	0.21 (0.52)	0.19
Hospitalizations, visits/patient	0.15 (0.49)	0.13 (0.40)	>0.99
Hospital LOS, days	0.64 (2.71)	0.61 (2.71)	0.80
Urgent office visits, visits/patient	0.39 (1.31)	0.25 (0.65)	0.91
SGRQ Scores			
Total	49.3 (16.8)	47.7 (16.4)	0.34
Symptom	57.2 (21.2)	56.0 (21.0)	0.60
Activity	67.4 (20.4)	67.6 (19.7)	0.91
Impact	36.5 (19.0)	33.7 (17.2)	0.13

* Data are presented as mean (SD) unless otherwise stated. Percentages may not total 100% due to rounding.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid, ED = emergency department, ICU = intensive care unit, LOS = length of stay, SGRQ = St. Georges Respiratory Questionnaire

P-values shown for the comparison between completers and non-completers. T-tests (or Wilcoxon tests) were used for continuous variables and chi-square tests (or Fisher's exact tests) were used for categorical variables.

Supplementary Table 2. Baseline Characteristics for Completers*

Characteristics	Usual Care N = 140	Proactive iCare N = 249	p-value
Age, yr	68.8 (9.0)	68.2 (8.5)	0.47
Gender, % female	32.9	42.2	0.07
Race & Ethnicity			
White, %	93.6	92.4	
Non-White, %	6.4	7.6	0.66
Asian, %	0.7		
Black, %	2.9	4.0	
Hispanic, %	1.4	2.8	
Native American, %	0.7	0.4	
Other, %	0.7	0.4	
BMI, units	26.1 (5.4)	26.6 (6.3)	0.39
FEV ₁ , % predicted	37.5 (14.2)	36.3 (13.0)	0.43
mMRC dyspnea score, units	1.9 (1.0)	1.9 (1.0)	0.65
Six minute walk distance, m	276.8 (128.3)	273.8 (109.1)	0.82
BODE index, units	4.6 (2.1)	4.8 (2.0)	0.52
Current smoker, %	16.4	18.5	0.61
Smoking history, pack-yr	56.4 (34.6)	58.6 (32.6)	0.82
Current or prior pulmonary rehabilitation, %	31.4	38.2	0.18
Lives alone, %	28.6	30.9	0.63
Education, yr	13.5 (2.6)	13.5 (2.5)	0.90
Influenza vaccination, %	94.3	94.4	0.97
Pneumococcal vaccination, %	87.1	81.9	0.18
Long-term O ₂ therapy, %	76.4	84.3	0.054
Resting O ₂ , L	1.8 (1.7)	1.8 (1.6)	0.83
Post-exercise O ₂ , L	2.5 (2.0)	2.8 (2.0)	0.16
Sleep O ₂ , L	2.0 (1.5)	2.2 (1.5)	0.36
Resting SpO ₂ , %	92.6 (2.4)	92.8 (3.2)	0.48
Post-exercise SpO ₂ , %	87.9 (4.7)	87.7 (5.1)	0.69
Medications			
SABA, %	90.7	93.2	0.38
LABA, %	50.0	59.4	0.07
SAMA, %	49.3	34.9	0.006
LAMA, %	38.6	51.0	0.02
ICS, %	63.6	77.1	0.004
Theophylline, %	9.3	8.8	0.88
Co-morbidities			
Hypertension, %	55.7	56.6	0.86
Congestive heart failure, %	18.6	13.7	0.20
Diabetes, %	14.3	15.7	0.72
Obstructive sleep apnea, %	12.9	18.5	0.15
Prior year health care utilization (COPD)			
ED visits, visits/patient	0.47 (1.19)	0.63 (1.20)	0.03
Hospitalizations, visits/patient	0.34 (0.79)	0.47 (1.19)	0.21

ICU hospitalizations, visits/patient	0.08 (0.42)	0.12 (0.41)	0.17
ICU hospitalizations with ventilation, visits/patient	0.07 (0.39)	0.07 (0.27)	0.58
Hospital LOS, days	1.64 (4.57)	2.17 (5.76)	0.24
Urgent office visits, visits/patient	0.67 (1.15)	1.16 (2.32)	0.03
Prior year health care utilization (non-COPD)			
ED visits, visits/patient	0.23 (0.57)	0.20 (0.49)	0.88
Hospitalizations, visits/patient	0.13 (0.38)	0.12 (0.41)	0.76
Hospital LOS, days	0.46 (1.76)	0.69 (3.12)	0.82
Urgent office visits, visits/patient	0.26 (0.68)	0.25 (0.63)	0.97
SGRQ Scores			
Total	45.4 (18.2)	48.9 (15.2)	0.06
Symptom	53.7 (22.7)	57.3 (20.0)	0.10
Activity	65.4 (21.2)	68.8 (18.7)	0.11
Impact	31.5 (18.9)	35.0 (16.1)	0.07

* Data are presented as mean (SD) unless otherwise stated. Percentages may not total 100% due to rounding.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid, ED = emergency department, ICU = intensive care unit, LOS = length of stay, SGRQ = St. Georges Respiratory Questionnaire

P-values shown for the comparison between Proactive iCare and Usual Care groups. T-tests (or Wilcoxon tests) were used for continuous variables and chi-square tests (or Fisher's exact tests) were used for categorical variables.

Type of COPD Health care	Costs per Type of Health care	Reduced Health care Utilization per 100 Enrollees per Year	Cost Savings per 100 Enrollees per Year
Hospitalizations	\$5,021	10	\$ 50,210
ICU Hospitalizations	\$40,542	8	\$324,336
ICU Hospitalization with Ventilation	\$64,878	4	\$259,512
ED Visits	\$647	17	\$ 10,999
Urgent Office Visits	\$274	76	\$ 20,824
Total Cost Savings per 100 enrollees per Year			\$665,881

Definition of abbreviations: ED = emergency department, ICU = intensive care unit

Supplementary Table 4. Comparison of Urban and Rural Baseline Differences*

Characteristics	Urban N = 403	Rural N = 108	p-value
Age, yr	68.3 (9.0)	68.4 (8.8)	0.87
Gender, % female	39.2	39.8	0.91
Race & Ethnicity			
White, %	90.8	94.4	
Non-White, %	9.2	5.6	0.23
Asian	0.5		
Black	6.0		
Hispanic	2.2	3.7	
Native American	0.3	0.9	
Other	0.3	0.9	
BMI, units	26.5 (5.9)	26.3 (5.8)	0.78
FEV ₁ , % predicted	36.7 (13.1)	37.1 (14.8)	0.77
mMRC dyspnea score, units	1.9 (0.9)	1.9 (1.1)	0.83
Six minute walk distance, m	272.9 (115.0)	261.0 (123.1)	0.35
BODE index, units	4.7 (2.0)	4.8 (2.3)	0.79
Current smoker, %	19.6	26.9	0.10
Smoking history, pack-yr	58.1 (32.6)	59.5 (33.9)	0.72
Current or prior pulmonary rehabilitation, %	35.7	19.4	0.001
Lives alone, %	26.8	38.9	0.01
Education, yr	13.6 (2.3)	12.5 (3.0)	0.0003
Influenza vaccination, %	94.3	88.9	0.048
Pneumococcal vaccination, %	81.9	82.4	0.90
Long-term O ₂ therapy, %	82.4	78.7	0.38
Resting O ₂ , L	1.8 (1.6)	1.7 (1.5)	0.31
Post-exercise O ₂ , L	2.7 (2.0)	2.3 (1.9)	0.04
Sleep O ₂ , L	2.2 (1.4)	2.0 (1.5)	0.47
Resting SpO ₂ , %	93.0 (2.6)	92.5 (3.8)	0.16
Post-exercise SpO ₂ , %	87.8 (4.9)	87.5 (5.5)	0.54
Medications			
SABA, %	93.5	85.2	0.005
LABA, %	56.1	53.7	0.66
SAMA, %	46.9	30.6	0.002
LAMA, %	44.4	46.3	0.73
ICS, %	71.7	63.9	0.11
Theophylline, %	7.9	7.4	0.85
Co-morbidities			
Hypertension, %	56.3	54.6	0.75
Congestive heart failure, %	17.1	23.1	0.15
Diabetes, %	16.1	13.0	0.42
Obstructive sleep apnea, %	15.1	21.3	0.13
Prior year health care utilization (COPD)			
ED visits, visits/patient	0.69 (1.35)	0.69 (1.64)	0.56
Hospitalizations, visits/patient	0.49 (1.00)	0.59 (1.77)	0.65

ICU hospitalizations, visits/patient	0.14 (0.49)	0.05 (0.21)	0.07
ICU hospitalizations with ventilation, visits/patient	0.10 (0.43)	0.04 (0.19)	0.17
Hospital LOS, days	2.33 (5.74)	2.60 (7.12)	0.78
Urgent office visits, visits/patient	1.04 (1.99)	0.98 (2.50)	0.13
Prior year health care utilization (non-COPD)			
ED visits, visits/patient	0.18 (0.47)	0.28 (0.69)	0.58
Hospitalizations, visits/patient	0.12 (0.36)	0.17 (0.59)	0.67
Hospital LOS, days	0.50 (2.20)	1.04 (4.06)	0.74
Urgent office visits, visits/patient	0.32 (0.92)	0.16 (0.53)	0.03
SGRQ Scores			
Total	48.1 (16.4)	47.8 (16.9)	0.88
Symptom	55.6 (21.4)	59.0 (19.7)	0.14
Activity	68.2 (19.5)	65.1 (21.0)	0.16
Impact	34.3 (17.7)	34.6 (17.8)	0.88

* Data are presented as mean (SD) unless otherwise stated. Percentages may not total 100% due to rounding.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid, ED = emergency department, ICU = intensive care unit, LOS = length of stay, SGRQ = St. Georges Respiratory Questionnaire

P-values shown for the comparison between Urban and Rural groups. T-tests (or Wilcoxon tests) were used for continuous variables and chi-square tests (or Fisher's exact tests) were used for categorical variables.

Supplementary Table 5. Urban Baseline Characteristics*

Characteristics	Usual Care N = 130	Proactive iCare N = 273	p-value
Age, yr	68.1 (9.5)	68.4 (8.7)	0.81
Gender, % female	32.3	42.5	0.0502
Race & Ethnicity			
White, %	92.3	90.1	
Non-White, %	7.7	9.9	0.48
Asian	0.8	0.4	
Black	6.2	5.9	
Hispanic	0.8	2.9	
Native American		0.4	
Other		0.4	
BMI, units	26.0 (5.4)	26.7 (6.1)	0.23
FEV ₁ , % predicted	36.7 (14.3)	36.7 (12.6)	0.99
mMRC dyspnea score, units	1.9 (0.9)	2.0 (0.9)	0.63
Six minute walk distance, m	274.2 (133.2)	272.2 (105.5)	0.88
BODE index, units	4.7 (2.1)	4.8 (1.9)	0.57
Current smoker, %	22.3	18.3	0.35
Smoking history, pack-yr	56.3 (31.9)	59.0 (33.0)	0.45
Current or prior pulmonary rehabilitation, %	35.4	35.9	0.92
Lives alone, %	24.6	27.8	0.49
Education, yr	13.6 (2.3)	13.7 (2.3)	0.63
Influenza vaccination, %	94.6	94.1	0.85
Pneumococcal vaccination, %	83.9	81.0	0.48
Long-term O ₂ therapy, %	76.9	85.0	0.047
Resting O ₂ , L	1.9 (1.8)	1.8 (1.5)	0.56
Post-exercise O ₂ , L	2.7 (2.2)	2.8 (2.0)	0.74
Sleep O ₂ , L	2.2 (1.5)	2.2 (1.4)	0.98
Resting SpO ₂ , %	92.7 (2.6)	93.2 (2.7)	0.09
Post-exercise SpO ₂ , %	88.0 (4.5)	87.8 (5.1)	0.73
Medications			
SABA, %	92.3	94.1	0.48
LABA, %	51.5	58.2	0.21
SAMA, %	56.2	42.5	0.01
LAMA, %	36.2	48.4	0.02
ICS, %	63.9	75.5	0.02
Theophylline, %	10.0	7.0	0.29
Co-morbidities			
Hypertension, %	56.9	56.0	0.87
Congestive heart failure, %	21.5	15.0	0.10
Diabetes, %	16.2	16.1	0.99
Obstructive sleep apnea, %	13.1	16.1	0.43
Prior year health care utilization (COPD)			
ED visits, visits/patient	0.55 (1.25)	0.76 (1.40)	0.06
Hospitalizations, visits/patient	0.39 (0.85)	0.54 (1.06)	0.17
ICU hospitalizations, visits/patient	0.11 (0.45)	0.16 (0.50)	0.25

ICU hospitalizations with ventilation, visits/patient	0.09 (0.41)	0.11 (0.44)	0.49
Hospital LOS, days	1.87 (4.71)	2.55 (6.17)	0.21
Urgent office visits, visits/patient	0.73 (1.27)	1.19 (2.24)	0.04
Prior year health care utilization (non-COPD)			
ED visits, visits/patient	0.22 (0.56)	0.17 (0.43)	0.50
Hospitalizations, visits/patient	0.12 (0.35)	0.12 (0.37)	0.87
Hospital LOS, days	0.34 (1.25)	0.53 (2.53)	0.90
Urgent office visits, visits/patient	0.25 (0.69)	0.35 (1.02)	0.46
SGRQ Scores			
Total	45.6 (18.1)	49.3 (15.5)	0.051
Symptom	53.6 (22.7)	56.6 (20.7)	0.19
Activity	65.7 (21.1)	69.3 (18.6)	0.08
Impact	31.7 (19.2)	35.6 (16.9)	0.04

* Data are presented as mean (SD) unless otherwise stated. Percentages may not total 100% due to rounding.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid, ED = emergency department, ICU = intensive care unit, LOS = length of stay, SGRQ = St. Georges Respiratory Questionnaire

P-values shown for the comparison between Proactive iCare and Usual Care groups. T-tests (or Wilcoxon tests) were used for continuous variables and chi-square tests (or Fisher's exact tests) were used for categorical variables.

Supplementary Table 6. Baseline Characteristics for Urban Completers*

Characteristics	Usual Care N = 115	Proactive iCare N = 191	p-value
Age, yr	68.8 (9.0)	68.4 (8.5)	0.66
Gender, % female	31.3	41.9	0.06
Race & Ethnicity			
White, %	94.8	91.1	
Non-White, %	5.2	8.9	0.24
Asian	0.9	0	
Black	3.5	5.2	
Hispanic	0.9	2.6	
Native American	0	0.5	
Other	0	0.5	
BMI, units	26.1 (5.5)	26.5 (6.2)	0.54
FEV ₁ , % predicted	36.0 (13.7)	36.4 (12.5)	0.79
mMRC dyspnea score, units	1.9 (0.9)	2.0 (0.9)	0.49
Six minute walk distance, m	277.9 (130.6)	275.9 (106.1)	0.89
BODE index, units	4.7 (2.0)	4.8 (1.9)	0.64
Current smoker, %	18.3	14.7	0.41
Smoking history, pack-yr	56.8 (33.3)	59.8 (32.3)	0.45
Current or prior pulmonary rehabilitation, %	37.4	41.4	0.49
Lives alone, %	26.1	27.2	0.83
Education, yr	13.6 (2.4)	13.8 (2.3)	0.45
Influenza vaccination, %	94.8	94.2	0.84
Pneumococcal vaccination, %	87.0	82.2	0.27
Long-term O ₂ therapy, %	76.5	85.9	0.04
Resting O ₂ , L	1.8 (1.8)	1.8 (1.5)	0.97
Post-exercise O ₂ , L	2.6 (2.1)	2.9 (2.0)	0.26
Sleep O ₂ , L	2.1 (1.5)	2.2 (1.4)	0.75
Resting SpO ₂ , %	92.6 (2.5)	93.0 (2.7)	0.13
Post-exercise SpO ₂ , %	87.8 (4.4)	87.8 (5.1)	0.99
Medications			
SABA, %	91.3	95.8	0.10
LABA, %	50.4	59.7	0.11
SAMA, %	53.9	37.7	0.006
LAMA, %	36.5	51.8	0.009
ICS, %	64.3	79.6	0.003
Theophylline, %	10.4	8.4	0.55
Co-morbidities			
Hypertension, %	54.8	56.0	0.83
Congestive heart failure, %	18.3	10.5	0.05
Diabetes, %	14.8	16.2	0.74
Obstructive sleep apnea, %	12.2	16.8	0.28
Prior year health care utilization (COPD)			
ED visits, visits/patient	0.50 (1.28)	0.764(1.09)	0.03
Hospitalizations, visits/patient	0.34 (0.82)	0.45 (0.94)	0.23
ICU hospitalizations, visits/patient	0.09 (0.45)	0.14 (0.45)	0.11
ICU hospitalizations with ventilation,	0.08 (0.42)	0.08 (0.30)	0.39

visits/patient			
Hospital LOS, days	1.63 (4.60)	2.04 (4.69)	0.28
Urgent office visits, visits/patient	0.70 (1.15)	1.14 (2.06)	0.049
Prior year health care utilization (non-COPD)			
ED visits, visits/patient	0.23 (0.56)	0.19 (0.46)	0.92
Hospitalizations, visits/patient	0.13 (0.36)	0.13 (0.40)	0.87
Hospital LOS, days	0.38 (1.32)	0.69 (2.89)	0.95
Urgent office visits, visits/patient	0.28 (0.72)	0.29 (0.66)	0.79
SGRQ Scores			
Total	45.2 (18.3)	49.3 (15.0)	0.047
Symptom	53.4 (22.6)	56.5 (20.2)	0.22
Activity	65.4 (21.7)	69.8 (17.9)	0.07
Impact	31.2 (19.1)	35.3 (16.1)	0.054

* Data are presented as mean (SD) unless otherwise stated. Percentages may not total 100% due to rounding.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid, ED = emergency department, ICU = intensive care unit, LOS = length of stay, SGRQ = St. Georges Respiratory Questionnaire

P-values shown for the comparison between Proactive iCare and Usual Care groups. T-tests (or Wilcoxon tests) were used for continuous variables and chi-square tests (or Fisher's exact tests) were used for categorical variables.

Supplementary Table 7. Urban Quality of Life Measured by the St. George's Respiratory Questionnaire

Variable	Usual Care Group				Proactive iCare Group				Between Group Difference
	N	Baseline Score	Time-point Score	Change from Baseline	N	Baseline Score	Time-point Score	Change from Baseline	
Total Score									
3-mth	120	45.9 (17.9)	48.3 (17.1)	2.34 (0.05, 4.63)	224	48.9 (15.1)	42.9 (15.1)	-5.96 (-7.35, -4.56)	-8.29 (-10.97, -5.61)
6-mth	110	45.5 (17.9)	47.6 (18.9)	2.14 (-0.49, 4.78)	196	49.4 (14.9)	41.4 (15.0)	-8.05 (-9.63, -6.48)	-10.20 (-13.26, -7.14)
9-mth	115	45.2 (18.3)	47.4 (18.4)	2.12 (-0.30, 4.55)	191	49.3 (15.0)	41.6 (14.8)	-7.69 (-9.26, -6.12)	-9.82 (-12.70, -6.94)
Symptom									
3-mth	120	53.6 (22.3)	54.3 (21.7)	0.68 (-2.60, 3.95)	224	56.4 (20.4)	47.5 (20.5)	-8.91 (-11.38, -6.43)	-9.58 (-13.71, -5.45)
6-mth	110	53.7 (22.8)	51.8 (22.3)	-1.83 (-5.71, 2.05)	196	56.0 (20.6)	45.3 (20.1)	-10.66 (-13.40, -7.93)	-8.83 (-13.48, -4.18)
9-mth	115	53.4 (22.6)	53.1 (21.8)	-0.36 (-4.19, 3.48)	191	56.5 (20.2)	46.9 (18.4)	-9.57 (-12.47, -6.68)	-9.22 (-13.97, -4.47)
Activity									
3-mth	120	66.3 (20.6)	68.7 (19.2)	2.41 (-0.48, 5.30)	224	69.1 (18.0)	64.6 (18.3)	-4.56 (-6.36, -2.76)	-6.97 (-10.20, -3.74)
6-mth	110	65.4 (20.6)	65.8 (21.5)	0.40 (-2.76, 3.56)	196	70.1 (17.8)	62.8 (18.5)	-7.33 (-9.32, -5.34)	-7.73 (-11.45, -4.01)
9-mth	115	65.4 (21.7)	65.9 (20.1)	0.49 (-2.35, 3.32)	191	69.8 (17.9)	62.2 (20.0)	-7.53 (-9.51, -5.56)	-8.02 (-11.37, -4.67)
Impact									
3-mth	120	31.9 (19.2)	34.8 (18.3)	2.84 (0.29, 5.38)	224	35.1 (16.4)	29.2 (15.9)	-5.83 (-7.34, -4.32)	-8.67 (-11.62, -5.72)
6-mth	110	31.6 (19.2)	36.0 (19.7)	4.37 (1.43, 7.32)	196	35.5 (16.1)	28.0 (15.8)	-7.50 (-9.31, -5.68)	-11.87 (-15.31, -8.43)
9-mth	115	31.2 (19.1)	35.0 (20.4)	3.81 (0.89, 6.74)	191	35.3 (16.1)	28.1 (15.3)	-7.27 (-9.03, -5.51)	-11.08 (-14.49, -7.67)

Baseline and time-point scores are presented as mean (SD), and changes and differences are presented as mean (95% CI).

P-values shown for the comparison between Proactive iCare and Usual Care groups. T-tests were used.

Supplementary Table 8. Urban Smoking, Symptoms, Exercise Capacity and Guideline-based Care

Measurement/ Treatment	Usual Care			Proactive iCare		
	Baseline	9 Months	Change from Baseline	Baseline	9 Months	Change from Baseline
FEV ₁ , % predicted	36.0 (13.7)	35.9 (14.3)	-0.38 (-2.12, 1.37)	36.4 (12.5)	32.9 (13.0)	-3.52 (-4.88, -2.16)
mMRC dyspnea scale	1.9 (0.9)	2.1 (1.0)	0.22 (0.05, 0.39)	2.0 (0.9)	1.9 (0.9)	-0.03 (-0.15, 0.10)
6MWD, m	277.9 (130.6)	284.5 (126.8)	4.00 (-16.26, 24.18)	275.9 (106.1)	328.1 (132.4)	50.27 (35.40, 65.14)
BODE index	4.7 (2.0)	4.8 (2.1)	0.19 (-0.06, 0.45)	4.8 (1.9)	4.5 (2.0)	-0.26 (-0.48, -0.04)
Sputum, %	44.3	51.3		46.6	40.8	
Post-exercise SpO ₂ , %	87.8 (4.4)	87.9 (4.0)	-0.02 (-0.79, 0.75)	87.8 (5.1)	89.6 (3.3)	1.53 (0.78, 2.30)

Baseline and 9-month data are presented as mean (SD), and changes and differences are presented as mean (95% CI) unless otherwise stated.

Definition of abbreviations: mMRC = modified medical research council, 6MWD = 6 minute walk distance, LAMA = long-acting muscarinic antagonist, SAMA = short-acting muscarinic antagonist, LABA = long-acting beta-agonist, ICS = inhaled corticosteroid.

P-values shown for the comparison between Proactive iCare and Usual Care groups. T-tests were used for continuous variables, and logistic regression and chi-square tests were used for dichotomous variables.

Supplementary Table 9. Urban Health care Utilization Pre-post Difference*, per Patient

Variable	Usual Care N=115	Proactive iCare N=191	Difference	p-value
COPD Health care				
Hospitalizations, visits/patient	-0.08 (-0.24, -0.08)	-0.16 (-0.31, -0.02)	-0.08 (-0.30, 0.14)	0.51
ICU hospitalizations, visits/patient	-0.01 (-0.10, 0.09)	-0.11 (-0.18, -0.05)	-0.11 (-0.22, 0.00)	0.053
ICU hospitalizations with ventilation, visits/patient	-0.02 (-0.10, 0.06)	-0.08 (-0.12, -0.03)	-0.06 (-0.15, 0.04)	0.17
Hospital LOS, days	-0.38** (-1.51, 0.75)	-1.02 (-1.64, -0.40)	-0.64 (-1.92, 0.64)	0.27
ED visits, visits/patient	-0.18 (-0.38, 0.02)	-0.30 (-0.47, -0.14)	-0.12 (-0.39, 0.01)	0.12
Urgent office visits, visits/patient	0.15 (-0.10, 0.40)	-0.62 (-0.99, -0.32)	-0.77 (-1.16, -0.39)	<0.0001
Non-COPD Health care				
Hospitalizations, visits/patient	0.03 (-0.08, 0.15)	0.05 (-0.03, 0.13)	0.02 (-0.12, 0.15)	0.75
Hospital LOS, days	0.49 (-0.29, 1.26)	-0.04 (-0.54, 0.47)	-0.52 (-1.44, 0.40)	0.81
ED visits, visits/patient	-0.02 (-0.13, 0.10)	0.16 (0.02, 0.29)	0.17 (-0.00, 0.35)	0.29
Urgent office visits, visits/patient	0.15 (-0.01, 0.31)	0.15 (-0.01, 0.30)	-0.01 (-0.23, 0.21)	0.74

Data are presented as mean (95% CI).

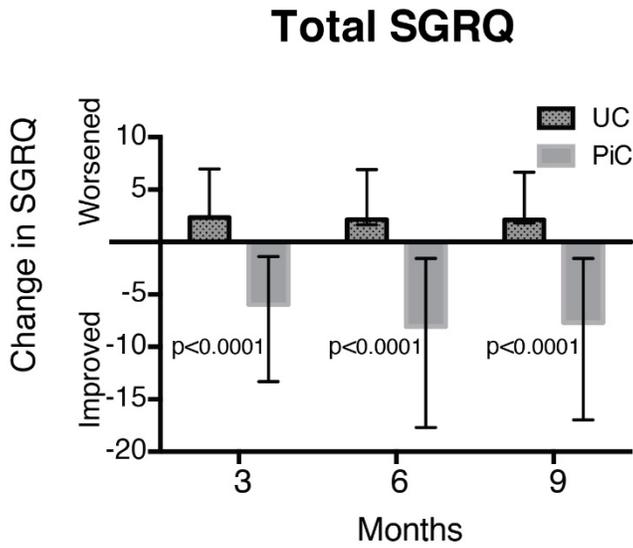
Definition of abbreviations: ED = emergency department, ICU = intensive care unit, LOS = length of stay.

*12-month post utilization was extrapolated from 9-month data. **Excluding one patient with pre-post difference = 195 days

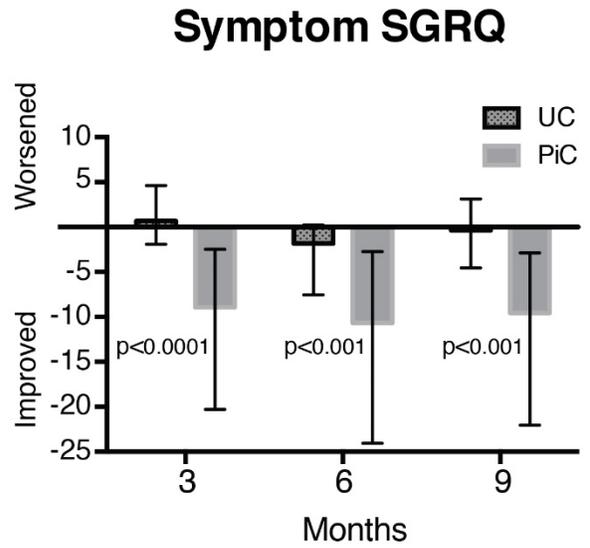
P-values shown for the comparison between Proactive iCare and Usual Care groups. Wilcoxon tests were used for continuous variables.

Supplementary Figure 1

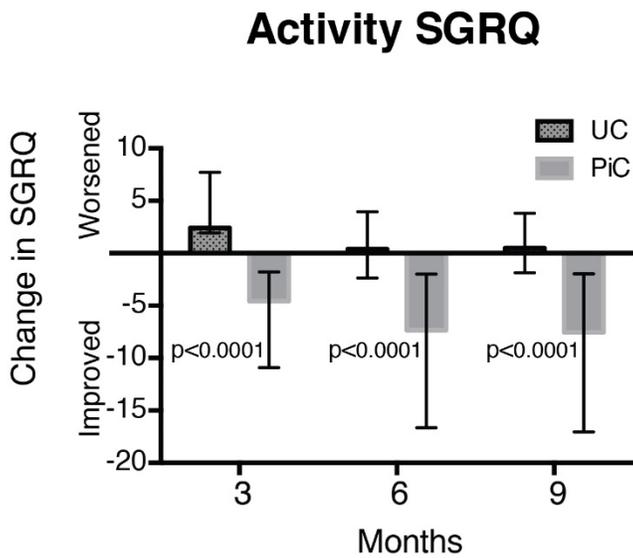
A



B



C



D

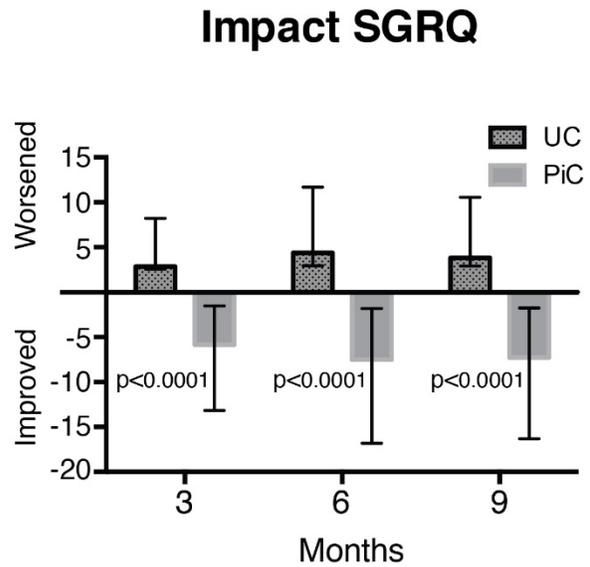


FIGURE LEGENDS

Supplementary Figure 1. Urban Cohort Quality of Life. This figure shows how quality of life changed from baseline at 3, 6 and 9 months in the Usual Care (UC) and Proactive Integrated Care (PiC) groups of the urban cohort. Quality of life measured by the A) total, B) symptom, C) activity and D) impact domains of the St. George's Respiratory Questionnaire (SGRQ) are shown \pm 95% CI. T-tests were used to compare differences in the change from baseline for the UC and PiC groups at each time-point.