Fuel Poverty Evaluation in St. Helens and Knowsley

Effects on outcomes for the 12 months following an intervention

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Summary:

Objective: To investigate whether the fuel poverty pilot in St. Helens and Knowsley place led to a reduction in primary and or secondary care activity in the first 12 months following a patient intervention.

Method: A differences-in-differences analysis was applied to the cohort comparing outcomes in the 12 months (52 weeks) after intervention between people who had gone an intervention within the pilot and patients who did not.

Results:

GP Appointments 12 months post intervention: The fuel poverty pilot was associated with a 9.8% reduction in GP appointments (400 appointments avoided) in Knowsley and St. Helens place compared to what would've been otherwise expected.

Conclusion: The pilot appears to have had an impact on primary care activity by improving pressures on NHS services. Consequently, the pilot proved a further cost avoidance benefit to Cheshire and Merseyside ICB. This model of fuel poverty intervention provides an efficient way to manage patients living in fuel poverty and could potentially scaled up and implemented across Cheshire and Merseyside ICB as a whole. The cohort size for this intervention was however small and future evaluations with a bigger cohort could further add evidence to this project.

Introduction

Fuel poverty is a growing public health concern in Cheshire & Merseyside, with the proportion of households affected rising sharply in recent years. In 2020, 14% of the population—equivalent to 156,359 households—were estimated to be living in fuel poverty. By 2022, this figure was projected to increase to 42%, or 468,829 households, due to rising energy costs (OFGEM estimate). The impact of fuel poverty is particularly severe during winter, when cold temperatures exacerbate respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD), increasing the risk of hospital admissions.

The prevalence of asthma and COPD in Cheshire & Merseyside stands at 7% and 3% respectively. Many patients with these conditions are not optimally managed with medicines, leaving them vulnerable to poor health outcomes 1. Recognising this, the Cheshire & Merseyside Integrated Care Board (ICB), supported by NHS England's Innovation for Healthcare Inequalities Programme (InHIP), launched a targeted initiative in Q3 2022/23. This project brought together NHS organisations, voluntary and community sector (VCS) partners, and local authorities to develop new approaches to supporting people with respiratory illnesses who are living in fuel poverty.

Central to the project is the use of population health data to drive action. The Combined Intelligence for Population Health Action (CIPHA) platform, originally established to support the region's COVID-19 response, now integrates health and social care data across Cheshire & Merseyside. This enables NHS and partner organisations to map population health needs, design services, and monitor improvements more effectively. A bespoke fuel poverty dashboard within CIPHA was developed to identify cohorts at greatest risk, drawing on multiple data sources including primary care patient-level data, hospital data, local provider feeds, and national datasets on fuel poverty and energy efficiency.

The project's governance structure includes a fuel poverty steering group, established in November 2022, which brings together clinical and non-clinical experts from across the NHS, local authorities, housing sector, and VCS. This group set the strategic direction, prioritising interventions for patients with severe COPD and children with asthma—groups most susceptible to harm from cold, damp living conditions. Collaborative workshops involving local clinicians, care professionals, and Optum UK facilitated the co-production of care pathways, cohort segmentation, and targeted actions. These efforts led to the establishment of "trailblazer" sites across the integrated care system, each delivering tailored clinical and non-clinical interventions, such as medicines optimisation, pulmonary rehabilitation referrals, support for smoking cessation, and signposting to financial assistance.

This paper evaluates the initial phase of the CM Fuel Poverty project, focusing on the implementation and outcomes for patients with severe COPD in St Helens and Knowsley. It aims to assess the effectiveness of this targeted, data-driven approach, highlight key learnings, and outline next steps for long-term impact assessment.

Cohort characteristics:

The initial cohort consisted of 352 unique patients who had an intervention between April 2023 and October 2024 and who were identified in the ICB's data warehouse. The ages ranged from 38 to 93 and the vast majority (79%) lived in IMD Quintile 1 (most deprived). Finally, more than half of this cohort had an obesity, depression and hypertension. Details can be seen at the appendix (table 1). For later analyses, the patients who died were excluded (n = 77).

Further, when comparing the past 12-month activity of this fuel poverty cohort to everyone else who had COPD in Knowsley and St. Helens, this cohort had a higher service utilisation. More specifically, on average they had 5 GP appointments more per patient, 1 AE attendance more per person and 1 Emergency admission more per person. The COPD cohort consisted of any patients with a COPD flag.

12 month before intervention	Cases	Total COPD cohort
GP appointments	13.83 (12.70)	8.44 (7.93)
AE attendances	2.07 (3.10)	0.83 (1.85)
Emergency admissions	1.12 (1.61)	0.36 (0.91)

Table 2. Comparison for 12month pre-intervention activity between initial cohort and overall COPD cohort, showing mean (sd)

Matching:

The control cohort included patients in Knowsley and St Helens who had COPD, aligning with the criteria of the project. A 1:1 propensity score matching was utilised to find a control cohort from patients living in St Helens or Knowsley. The patients were matched on IMD Quintile, Intervention Date, Age, Sex, risk of emergency admission, patient need group, smoking flag, rural/urban classification, activity in the past 12 months as well as major condition flags (Obesity, Depression, Hypertension, Asthma, Cancer, Diabetes) to ensure that the control cohort would have the same characteristics as those in the intervention group. Each group had 254 patients after cleaning the data and matching. Characteristics can be seen at the appendix (table 3).

Analysis:

This study employed a 2x2 design with two groups (controls and cases) and two time periods (pre and post intervention). This study looked at the 12-month pre and post intervention for patient activity for interventions that took place between March 2023 – October 2024.

Outcomes:

1. GP Appointments: The GP appointments were extracted from the Combined Intelligence Population Health Into Action (CIPHA) tables in the ICB's data warehouse.
2. A&E Attendances: The A&E attendances were extracted from the Emergency Care Data Set (ECDS) tables from the ICB's data warehouse.
3. Emergency Admissions: Emergency Admitted Patent Care (APC) admissions were extracted from the ICB's data warehouse.
4. Prescriptions: Prescriptions were extracted from the Primary Care tables from the CIPHA tables in the ICB's data warehouse. These prescriptions are antidepressants and anxiolytics prescriptions that had been prescribed to patients in the primary care setting only.

Descriptive statistics:

254 patients were included in each group (cases / controls).

Periods show the 12-month post intervention activity.

Descriptives: mean(sd)	**Cases**		**Controls**	
Age	68.57 (10.48)		68.72 (10.82)	
IMD Quintile	1.37 (0.78)		1.36 (0.82)	
Activity	**Before**	**After**	**Before**	**After**
GP Appointments	13.93 (12.94)	14.63 (11.85)	12.28 (9.87)	14.44 (11.67)
AE attendances	1.98 (3.11)	1.97 (4.62)	1.78 (2.09)	1.79 (2.51)
Emergency Admissions	1.03 (1.46)	1.02 (1.97)	0.96 (1.35)	0.91 (1.51)
Mental health prescriptions (antidepressants & anxiolytics)	12.63 (22.65)	13.81 (23.95)	12.98 (22.11)	13.28 (19.42)

Table 4. *Descriptives*

Activity totals	**Cases**		**Controls**	
	Before	**After**	**Before**	**After**
GP Appointments	3,539	3,716	3,120	3,667
AE attendances	502	500	452	455
Emergency Admissions	262	260	245	231
Mental health prescriptions (antidepressants & anxiolytics)	3,209	3,507	3,298	3,372

Table 5. *Activity*

GP Appointments

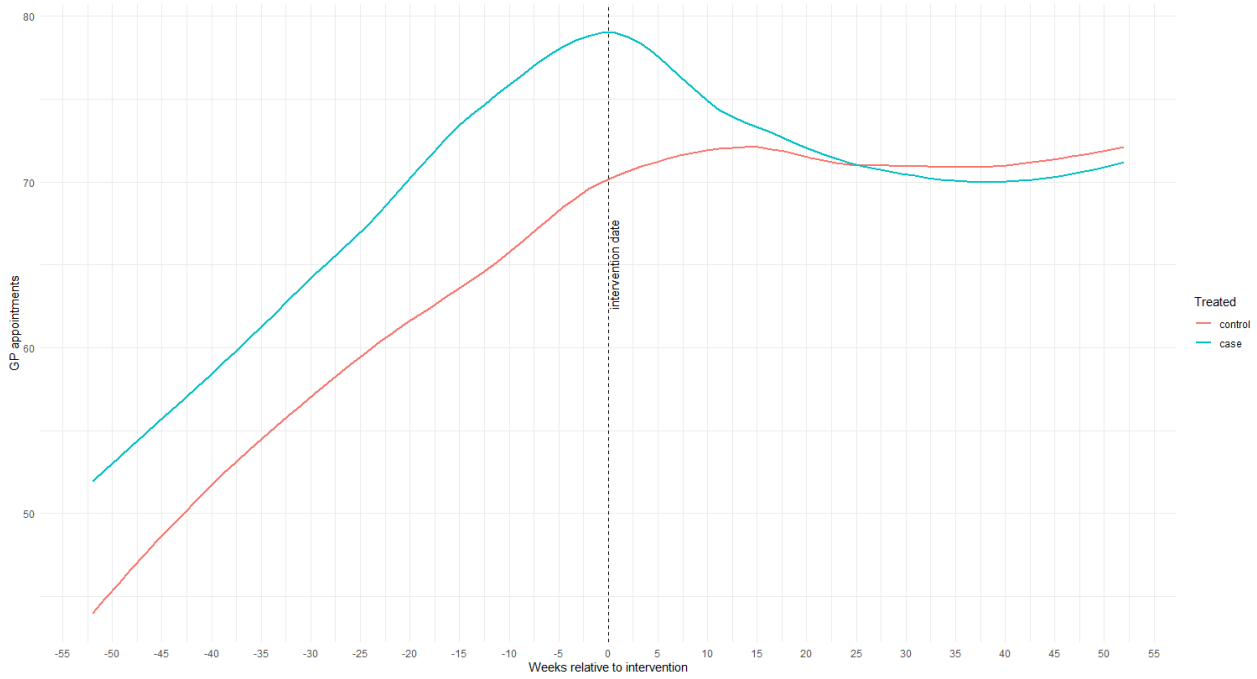

Figure 1. *GP Appointments before and after the fuel poverty intervention for 52 weeks (12 months), for people who had an intervention (cases) and those who did not (controls).*

Measure	Estimated effect	2.5% CI	97.5% CI	p-value
GP Appointments	**-0.10356**	**-0.18396**	**-0.02318**	**0.0016**

Table 6. *Regression output*

The GP consultations at the 12 months post discharge/intervention were used as the outcome variable. Using a quasi-poisson regression, the output shows that the intervention resulted in a 9.8% reduction in GP appointments in the intervention group compared to what would have been expected without the intervention.

In Knowsley and St. Helens, for the 254 patients who had gone through the intervention, the number of GP appointments were 3,667. Had the intervention not been introduced, there would've been an estimate total of 4,065 appointments – meaning the intervention is estimated to have avoided approximately 400 GP appointments in the treated cohort over the follow-up period of 12 months.

Emergency Admissions

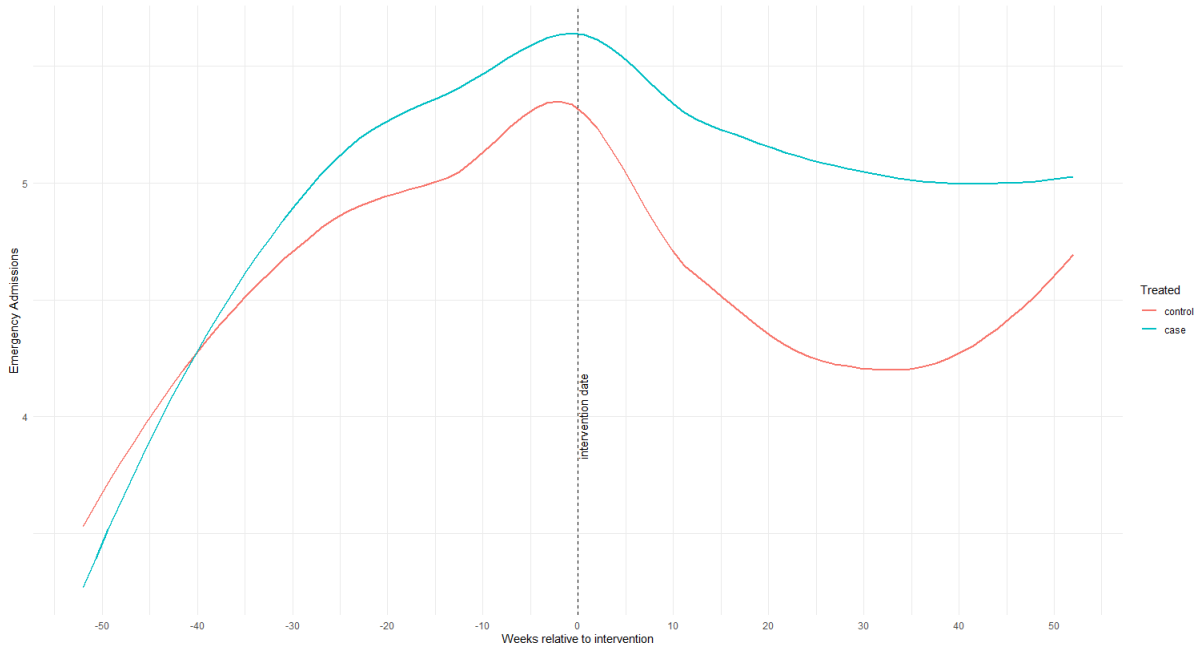

Figure 2. Emergency Admissions *before and after the fuel poverty intervention for 52weeks (12 months), for people who had an intervention (cases) and those who did not (controls).*

Measure	Estimated effect	2.5% CI	97.5% CI	p-value
Emergency Admissions	**0.05982**	**-0.19817**	**0.31799**	**0.650**

Table 7. *Regression output*

The Emergency admissions at the 12 months post discharge/intervention were used as the outcome variable. Using a quasi-poisson regression, the output shows that the intervention resulted in a small decrease in the intervention group compared to what would have been expected without the intervention – however this was **not statistically significant**. As a result, no impact was found in the Emergency Admissions due to the intervention.

AE attendances

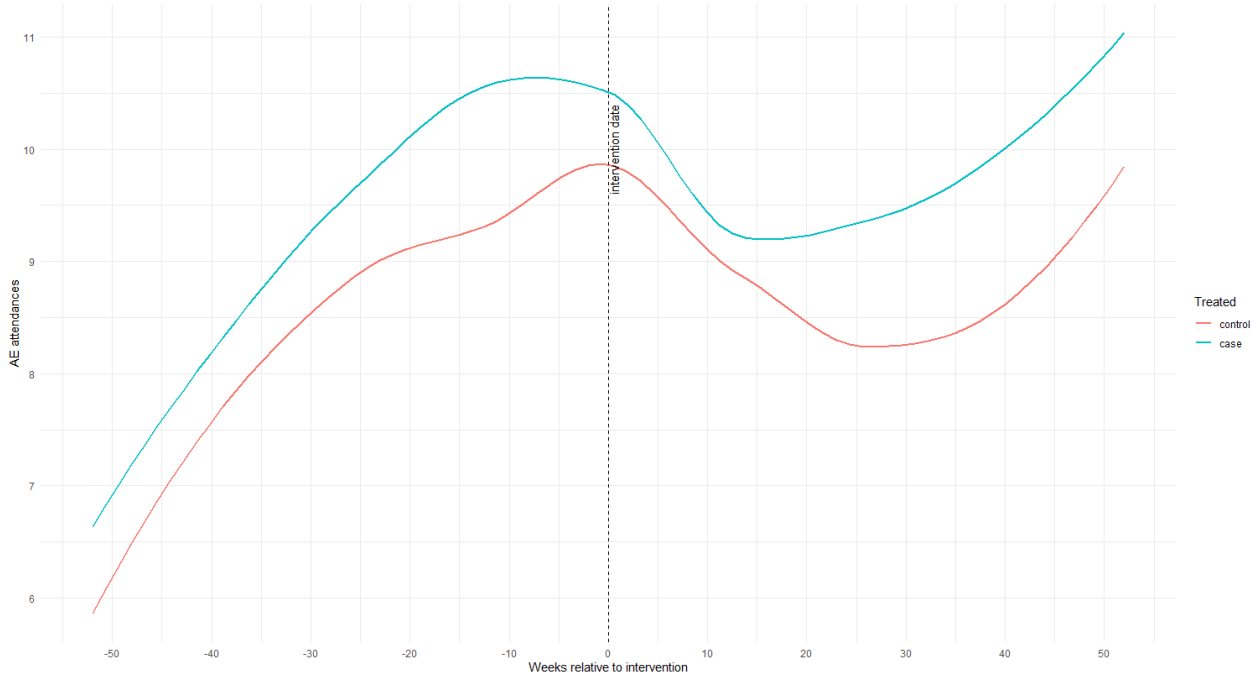

Figure 3. AE attendances *before and after the fuel poverty intervention for 52weeks (12 months), for people who had an intervention (cases) and those who did not (controls).*

Variable	Estimate effect	2.5% CI	97.5% CI	p-value
AE Attendances	**-0.008518**	**-0.21539**	**0.19834**	**0.936**

Table 8. *Regression output*

The AE attendances at the 12 months post discharge/intervention were used as the outcome variable. Using a quasi-poisson regression, the output shows that the intervention resulted in a small increase in the intervention group compared to what would have been expected without the intervention – however this was **not statistically significant**. As a result, no impact was found in the AE attendances due to the intervention.

Prescriptions (antidepressants & anxiolytics)

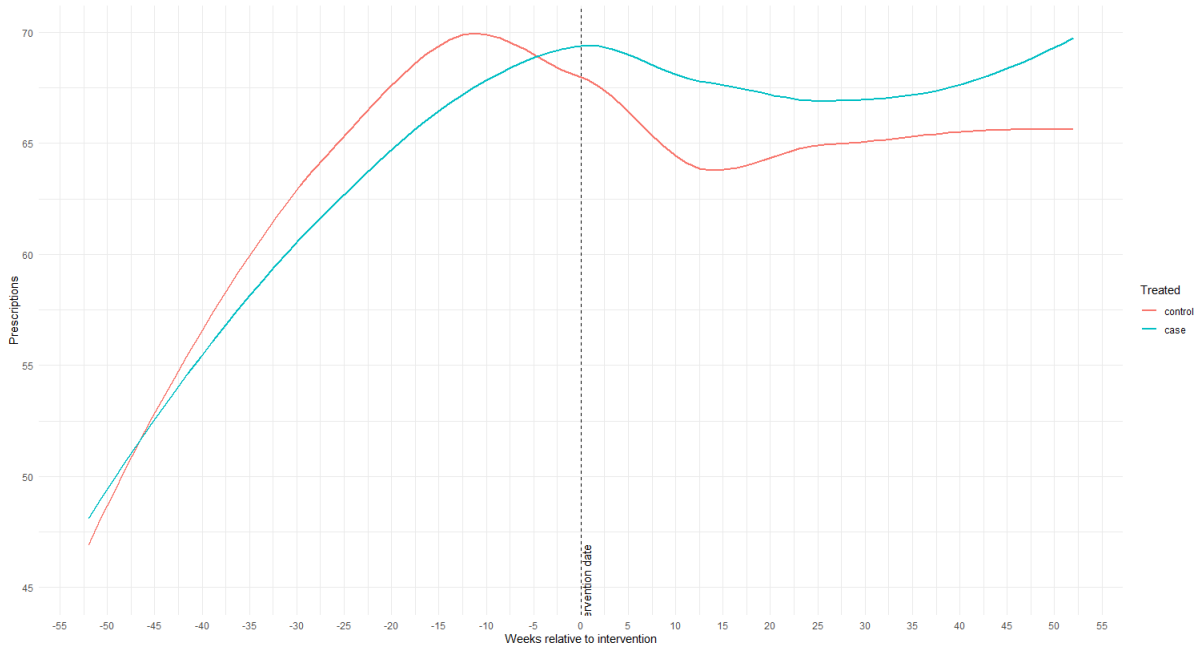

Figure 4. Antidepressants and anxiolytics prescribed in primary care *before and after the fuel poverty intervention for 52 weeks (12 months), for people who had an intervention (cases) and those who did not (controls).*

Variable	Estimate effect	2.5% CI	97.5% CI	p-value
AE Attendances	**0.05905**	**-0.004332**	**0.161447**	**0.258**

Table 9. *Regression output*

The antidepressants & anxiolytics prescribed at the 12 months post discharge/intervention were used as the outcome variable. Using a quasi-poisson regression, the output shows that the intervention resulted in a small increase in the intervention group compared to what would have been expected without the intervention – however this was **not statistically significant**. As a result, no impact was found in the primary care prescriptions due to the intervention.

CONCLUSIONS

The analysis shows that on the four outcome measures used to evaluate the effect of the fuel poverty pilot, the intervention was associated with an improvement in 1 out of 4 metrics. More specifically, the GP appointment saw a reduction, showing a positive impact on NHS primary and secondary care services. This is based on the number of patients we could identify in our system, whereas a higher number of patients had gone through the intervention.

In the first 12 months following the intervention, the patient activity saw a 9.8% reduction in GP appointments. Within the scope of activity for Knowsley and St Helens, for the 254 patients analysed, this is estimated to have avoided approximately **£14,800** from primary care in the first-year post intervention (*based on indicative GP consultation costing £37, as seen on King's Fund reports*). Scaled to 1000 patients, that would've avoided approximately 1,575 GP appointments or approximately £58,275

This shows that if this intervention is scaled up to Cheshire and Merseyside, a significant financial relief (i.e. cost avoidance) could be achieved in primary care settings, while also helping patients who are living in fuel poverty.

Caveats

A combination of CIPHA as well as COPD nurses was used to invite patients to the service. The recruitment via CIPHA dashboards was done with set criteria, including COPD flag, emergency admission risk score over 40% as well as IMD Quintile one. The COPD nurses would only look at COPD flags, which means that people with a lower emergency risk score and/or patients who don't live in the most deprived quintile went through the intervention.

Characteristic	ALL COPD Cohort (Eligible controls) N = 10,677	Initial Cohort (cases) N = 352
AGE	70 (62, 78)	71 (64, 79)
Sex		
Female	5,806 (54%)	170 (48%)
Male	4,871 (46%)	182 (52%)
Ethnicity		
Asian	18 (0.2%)	0
Black	7 (<0.1%)	0
Mixed	17 (0.2%)	2 (0.6%)
Other	67 (0.6%)	3 (0.9%)
Unknown	2 (<0.1%)	0
White	10,566 (99%)	347 (99%)
IMD Quintile		
1 - Most Deprived	7,097 (66%)	277 (79%)
2	1,718 (16%)	43 (12%)
3	1,025 (9.6%)	13 (3.7%)
4	610 (5.7%)	14 (4.0%)
5 - Least Deprived	227 (2.1%)	5 (1.4%)
Frailty Flag		
N	9,082 (85%)	220 (63%)
Y	1,595 (15%)	132 (38%)
Patient Need Group		
1 Non User	10 (<0.1%)	0
2 Low Need Child	8 (<0.1%)	0
3 Low Need Adult	180 (1.7%)	0
4 MultiMorbid Low Complexity	1,011 (9.5%)	3 (0.9%)
5 MultiMorbid Med Complexity	4,145 (39%)	57 (16%)
6 Pregnancy Low Complexity	3 (<0.1%)	0
7 Pregnancy High Complexity	4 (<0.1%)	0
8 Dominant Psych Behavioral Cond	450 (4.2%)	10 (2.8%)
9 Dominant Major Chronic Cond	1,936 (18%)	71 (20%)
10 MultiMorbid High Complexity	2,542 (24%)	172 (49%)
11 Frailty	388 (3.6%)	39 (11%)
Resource Utilization Band		
0 - No or Only Invalid Dx	10 (<0.1%)	0
1 - Healthy Users	81 (0.8%)	0
2 - Low	111 (1.0%)	0
3 - Moderate	3,932 (37%)	39 (11%)
4 - High	3,719 (35%)	108 (31%)
5 - Very High	2,824 (26%)	205 (58%)
Active Ingredient Count	9 (5, 13)	14 (10, 18)
Current Smokers	3,626 (34%)	127 (36%)
Depression	4,986 (47%)	228 (65%)
Asthma	8,531 (80%)	342 (97%)
Hypertension	6,395 (60%)	237 (67%)
Diabetes	2,503 (23%)	106 (30%)
CHF	924 (8.7%)	67 (19%)
CKD	2,250 (21%)	79 (22%)
Cancer	3,360 (31%)	109 (31%)
Dementia	411 (3.8%)	22 (6.3%)
Obesity	5,874 (55%)	193 (55%)
CHD	2,587 (24%)	123 (35%)
Palliative care	591 (5.5%)	76 (22%)
Stroke	1,073 (10%)	55 (16%)
Epilepsy	264 (2.5%)	12 (3.4%)
Heart Failure	938 (8.8%)	58 (16%)
Nondiabetic hyperglycaemia	2,439 (23%)	73 (21%)
Peripheral Arterial Disease	736 (6.9%)	49 (14%)
Mental Health	352 (3.3%)	18 (5.1%)
Rheumatoid Arthritis	333 (3.1%)	14 (4.0%)
Atrial Fibrillation	1,221 (11%)	60 (17%)
Cervical Screening	1,903 (18%)	54 (15%)

n (%); Median (Q1, Q3)

Table 1. Cohort characteristics of initial intervention cohort (cases) and COPD patients in Knowsley and St. Helens (eligible controls)

Fuel poverty project in St. Helens and Knowsley Place

Characteristic	CASES Post-matching N = 254	CONTROLS Post-matching N = 254
AGE	70 (63, 78)	71 (63, 78)
Sex		
Female	127 (50%)	137 (54%)
Male	127 (50%)	117 (46%)
Ethnicity		
Asian	0	0
Black	0	1 (0.4%)
Mixed	2 (0.8%)	0
Other	3 (1.2%)	1 (0.4%)
Unknown	0	0
White	249 (98%)	252 (99%)
IMD Quintile		
1 - Most Deprived	200 (79%)	196 (77%)
2	31 (12%)	34 (13%)
3	32 (13%)	28 (11%)
4	87 (34%)	79 (31%)
5 - Least Deprived	135 (53%)	147 (58%)
Frailty Flag		
N	165 (65%)	177 (70%)
Y	89 (35%)	77 (30%)
Patient Need Group		
1 Non User	0	0
2 Low Need Child	0	0
3 Low Need Adult	0	0
4 MultiMorbid Low Complexity	2 (0.8%)	1 (0.4%)
5 MultiMorbid Med Complexity	48 (19%)	40 (16%)
6 Pregnancy Low Complexity	0	0
7 Pregnancy High Complexity	0	0
8 Dominant Psych Behavioral Cond	8 (3.1%)	10 (3.9%)
9 Dominant Major Chronic Cond	55 (22%)	55 (22%)
10 MultiMorbid High Complexity	116 (46%)	125 (49%)
11 Frailty	25 (9.8%)	23 (9.1%)
Resource Utilization Band		
0 - No or Only Invalid Dx	0	0
1 - Healthy Users	200 (79%)	196 (77%)
2 - Low	31 (12%)	34 (13%)
3 - Moderate	32 (13%)	28 (11%)
4 - High	87 (34%)	79 (31%)
5 - Very High	135 (53%)	147 (58%)
Active Ingredient Count	14 (10, 18)	13 (9, 17)
Current Smokers	94 (37%)	86 (34%)
Depression	160 (63%)	162 (64%)
Asthma	249 (98%)	249 (98%)
Hypertension	168 (66%)	182 (72%)
Diabetes	79 (31%)	84 (33%)
CHF	39 (15%)	51 (20%)
CKD	58 (23%)	80 (31%)
Cancer	80 (31%)	80 (31%)
Dementia	12 (4.7%)	15 (5.9%)
Obesity	151 (59%)	155 (61%)
CHD	87 (34%)	92 (36%)
Palliative care	38 (15%)	28 (11%)
Stroke	35 (14%)	39 (15%)
Epilepsy	7 (2.8%)	18 (7.1%)
Heart Failure	33 (13%)	39 (15%)
Nondiabetic hyperglycaemia	59 (23%)	56 (22%)
Peripheral Arterial Disease	35 (14%)	26 (10%)
Mental Health	11 (4.3%)	20 (7.9%)
Rheumatoid Arthritis	11 (4.3%)	9 (3.5%)
Atrial Fibrillation	39 (15%)	42 (17%)
Cervical Screening	47 (19%)	50 (20%)

n (%); Median (Q1, Q3)

Table 3. Cohort characteristics for matched cases (intervention cohort) and controls.