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Impact of the SENTINEL programme on asthma care across six primary care networks in England.

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Introduction

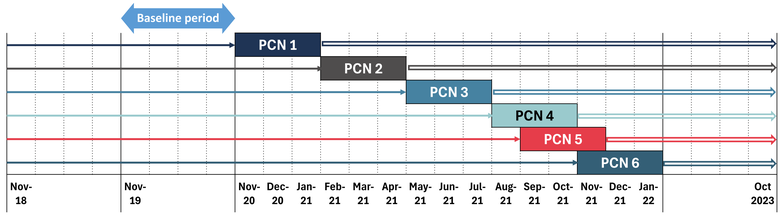
In the UK, short-acting β2-agonist (SABA) overuse in asthma remains common; however, this treatment approach fails to address underlying inflammation and is associated with increased risk of exacerbations and asthma-related deaths. The SENTINEL Program[1] aimed to identify and address SABA overuse through supported asthma guideline implementation within six English primary care networks (PCNs). Here we report on the effectiveness of SENTINEL to decrease SABA overuse and improve patient outcomes, building on previous data from the pilot site[2]. The intervention comprised of the following 5 pillars:

- HCP education
- Implementation of 'gold standard' prescribing practice
- Targeted asthma reviews
- Patient support and education
- Real-time data monitoring and reporting of asthma care metrics

Methods

Data were analysed for adult asthma patients within the six participating PCNs from November 2018 to October 2023. The analysis included three groups: i) the overall asthma population (Overall), ii) patients prioritized for clinic review due to SABA overuse (Review), and iii) patients newly prescribed MART during the review (MART). Outcomes (SABA use, exacerbations defined by acute OCS bursts) were assessed using electronic medical records (EMIS or SystmOne) before and after SENTINEL implementation. EMIS/SystmOne data were pooled where possible but reported separately for MART group and exacerbations due to coding differences. Descriptive statistics were used to describe prescription patterns. Three-level generalized linear mixed models were applied to evaluate changes pre- and post-implementation.

The SENTINEL Program deployed a co-designed intervention across 6 primary care networks in England using a stepped-wedge design to evaluate it impact on prescribing patterns, healthcare resource use and environmental impact.



Inclusion criteria
- Patients aged ≥18 years with an asthma diagnosis in a primary care record
- ≥1 prescription for an inhaled asthma medication in the baseline period (SABA, ICS, ICS/LABA and others)

Exclusion criteria
- Patients who had opted out of sharing their healthcare data for research
- A diagnosis of COPD at any time in the primary care record

Results

The **Overall, Review, and MART groups included 14,202, 3,208 and 878 patients, respectively.** The patient population is shown schematically in **figure 1**. The demographics and common-comorbidities among the overall asthma population, including split by electronic health record system, is displayed in table 1.

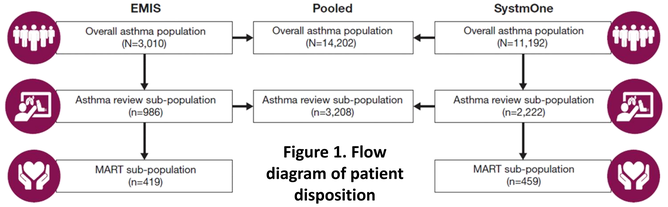


Figure 1. Flow diagram of patient disposition

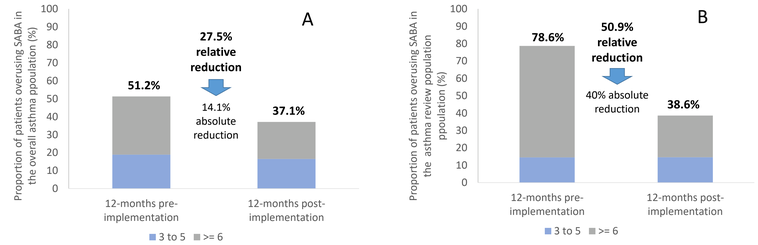
Table 1. Participant characteristics for the overall asthma population included in the SENTINEL evaluation (pooled and split by EHR system).

	Registered asthma patients from EMIS (n=3,010)	Registered asthma patients from SystmOne (n=11,192)	EMIS and SystmOne combined (n=14,202)
Age, years, mean (SD)	55.4 (18.0)	51.2 (17.8)	52.1 (17.9)
Missing data, n (%)	139 (4.6)	0	139 (1.0)
Sex, n (%)			
Female	1,809 (60.1)	6,563 (58.6)	8,372 (58.9)
Male	1,201 (39.9)	4,629 (41.4)	5,830 (41.1)
BMI, kg/m², mean (SD)	29.5 (6.5)	29.2 (6.6)	29.3 (6.6)
Outliers[a], n (%)	56 (1.9)	221 (2.0)	277 (2.0)
Missing data, n (%)	29 (1)	76 (0.7)	105 (0.7)
Smoking status, n (%)			
Current smoker	391 (13.0)	1,733 (15.5)	2,124 (15.0)
Former smoker	972 (32.3)	3,320 (29.7)	4,292 (30.2)
Never smoker	1,597 (53.1)	5,824 (52.0)	7,421 (52.3)
Missing data	50 (1.7)	315 (2.8)	365 (2.6)
Comorbidities, n (%)			
Stroke[b]	26 (0.9)	323 (2.9)	349 (2.5)
CHD[b]	214 (7.1)	690 (6.2)	904 (6.4)
Diabetes[b]	389 (12.9)	1,523 (13.6)	1,912 (13.5)
Osteoporosis[b]	75 (2.5)	300 (2.7)	375 (2.6)
Hypertension	843 (28.0)	3,057 (27.3)	3,900 (27.5)
Obesity	435 (14.5)	1,675 (15.0)	2,110 (14.9)
Frailty	417 (13.9)	1,745 (15.6)	2,162 (15.2)
CKD	143 (4.8)	585 (5.2)	728 (5.1)
Atrial fibrillation	124 (4.1)	419 (3.7)	543 (3.8)
Heart failure	60 (2.0)	212 (1.9)	272 (1.9)

Results ctd.

Reduction in SABA prescribing was observed, with adjusted mean (95% confidence interval [CI]) reductions of 1.94 (1.92–1.97) and 4.15 (4.10–4.21) prescriptions per patient per year in Overall and Review groups, respectively (p<0.01). In the MART subgroup, the reduction was 6.34 (6.19–6.48) in EMIS and 6.52 (6.38–6.67) in SystmOne (p<0.01) practices.

Figure 2. Proportion of patients overusing SABA (3 or more SABA prescriptions) during the 12-months pre- and 12-months post-SENTINEL in the overall asthma population (A) and asthma review sub-group (B) respectively.



Exacerbations decreased post-implementation in the Overall group by −7.6 (95% CI −5.8 to −9.4, p<0.01) events per 100 patients per year in EMIS practices, and −3.6 (95% CI −2.7 to −4.4, p<0.01) events per 100 patients per year in SystmOne practices.

Table 2. Changes in the number asthma exacerbations per 100 patients per year (95% CI; p-value) in the overall asthma population, asthma review sub population, and the MART sub-population in multi-level modelling.

	Overall asthma population (n=14,202)	Asthma review sub-population (n=3,208)	MART sub-population: EMIS (n=419) and SystmOne (n=459)
Asthma exacerbations			
Patients from EMIS	**−7.6** (−5.8 to −9.4; p<0.01)	**−10.0** (−7.0 to 14.0; p<0.01)	**−9.7** (−4.6 to −14.8; p<0.01)
Patients from SystmOne	**−3.6** (−2.7 to −4.4; p<0.01)	**−2.5** (−2.0 to −4.7; p<0.1)	**−6.0** (−1.1 to −10.9; p=0.02)

Results presented separately for participants from EMIS and SystmOne practices due to prescription data differences.

Conclusions

SENTINEL improved prescribing patterns and reduced exacerbations, supporting the importance of implementing evidence-based guidelines into practice to achieve clinical benefits.

References

1. Crowther L, et al. BMJ Open Respir Res. 2022;9(1) e001155
2. Crooks M et al, ERJ Open Research, 2023; 00685-2022

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