

Supplementary figures

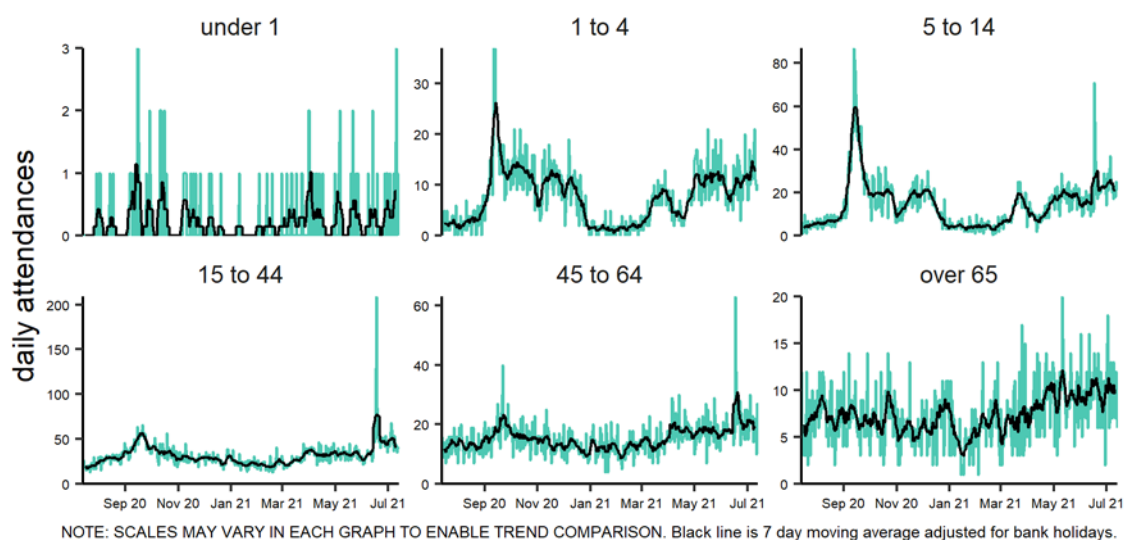


Figure S1. Emergency department asthma attendances (England) by age group (14/7/2020 – 13/7/2021).

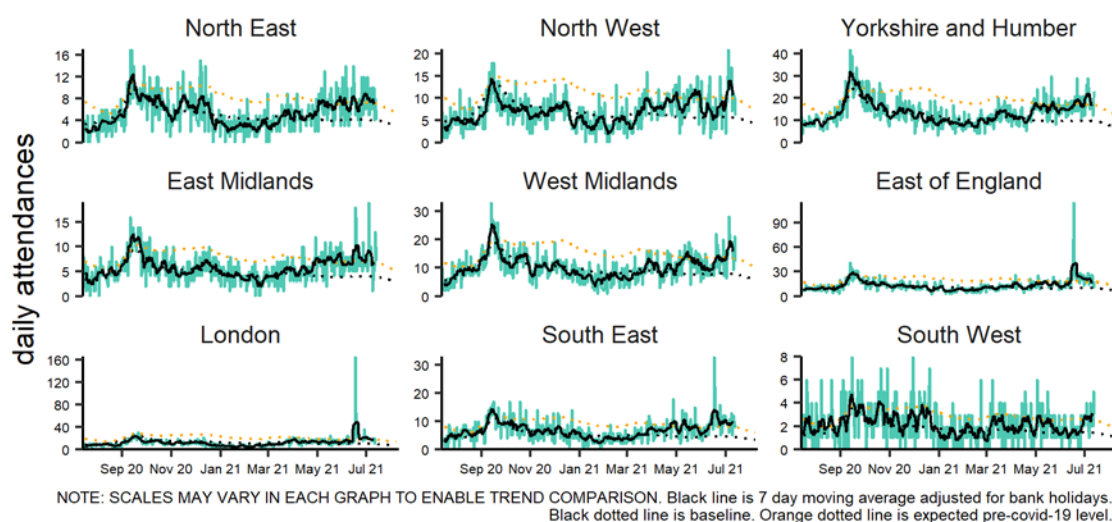


Figure S2. Emergency department asthma attendances (all ages) by region of England (14/7/2020 – 13/7/2021).

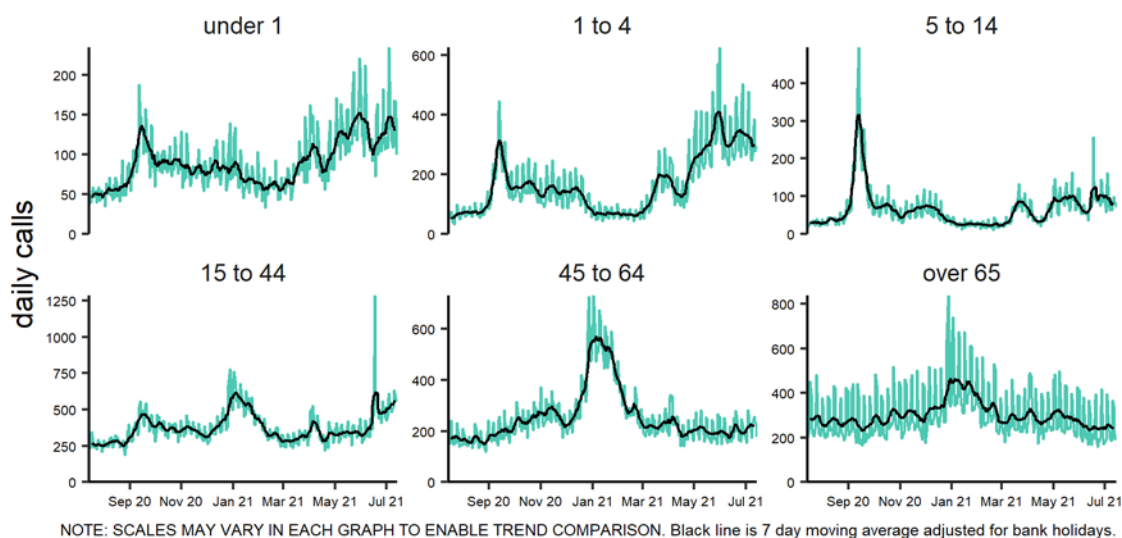


Figure S3. NHS 111 difficulty breathing calls (England) by age group (14/7/2020 – 13/7/2021).

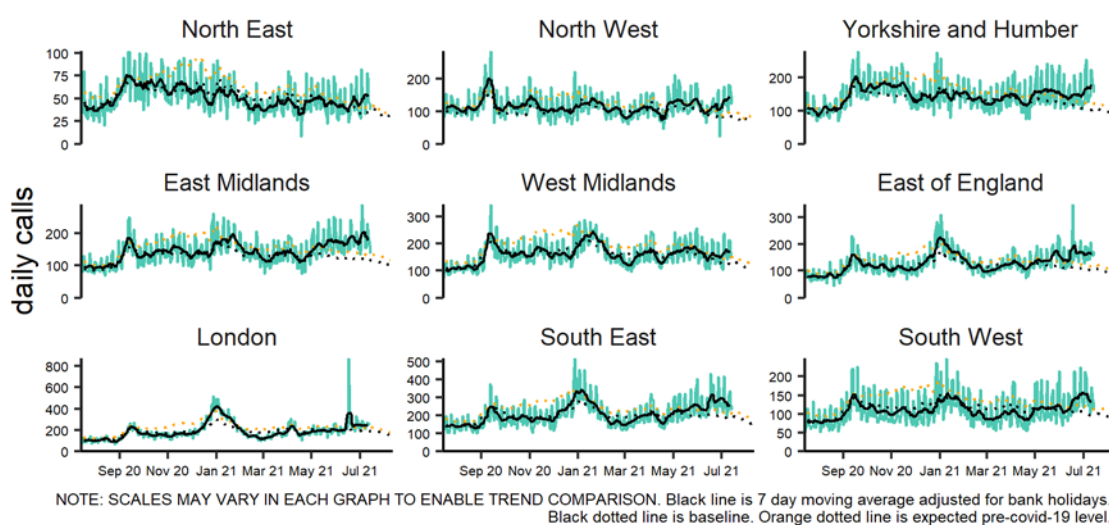


Figure S4. NHS 111 difficulty breathing calls (all ages) by region of England (14/7/2020 – 13/7/2021).

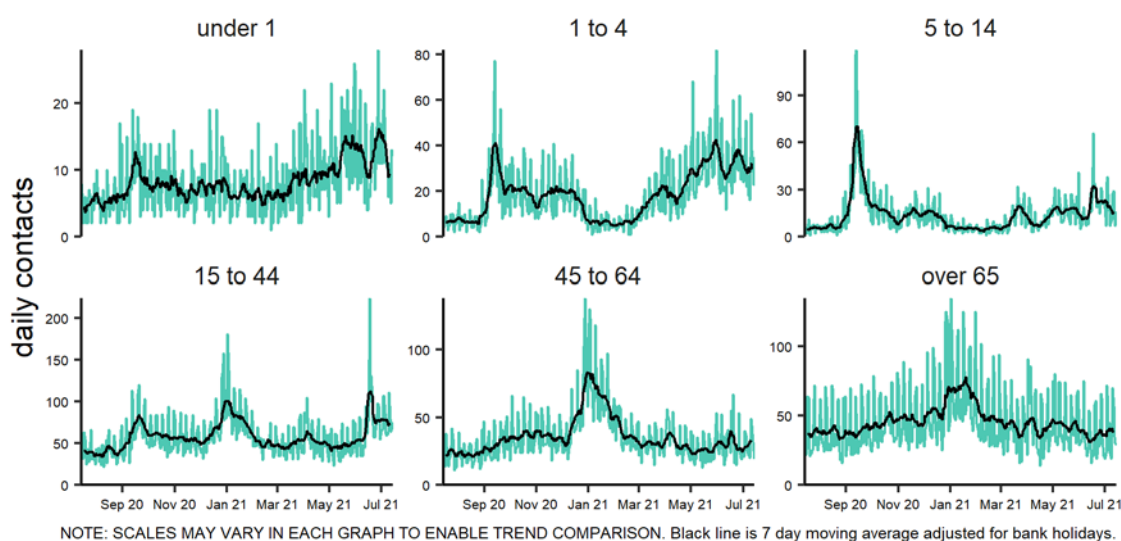


Figure S5. GP out of hours difficulty breathing/wheeze/asthma contacts (England) by age group (14/7/2020 – 13/7/2021).

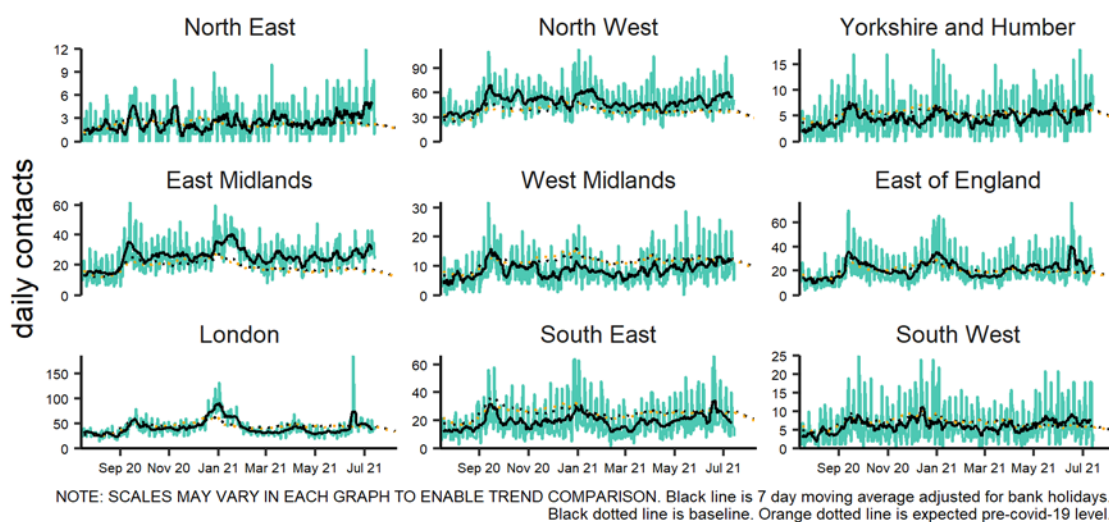


Figure S6. GP out of hours difficulty breathing/wheeze/asthma contacts (all ages) by region of England (14/7/2020 – 13/7/2021).

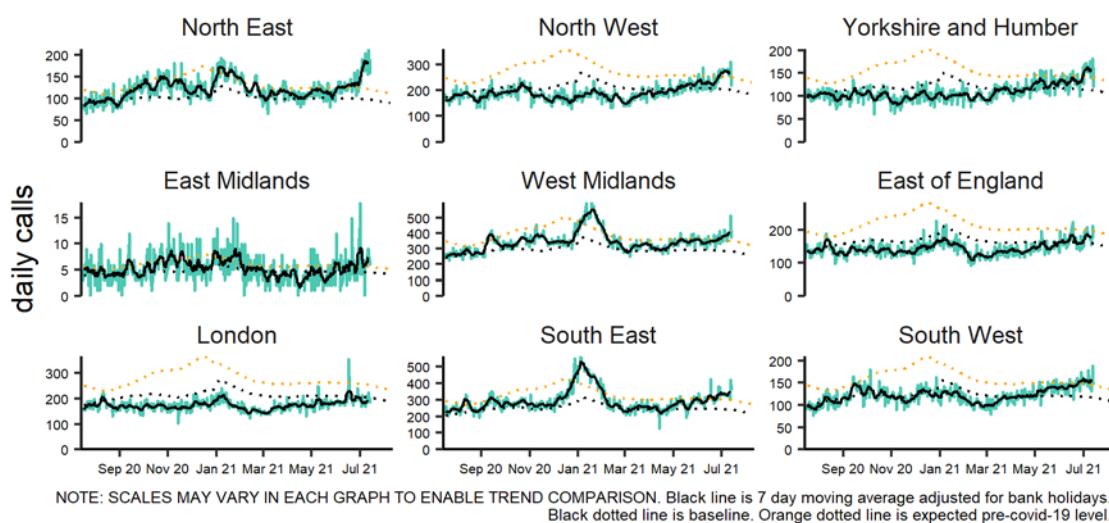


Figure S7. Ambulance breathing problems calls (all ages) by region of England (14/7/2020 – 13/7/2021).

Supplementary tables

Supplementary Table S1. Clinical coding systems and diagnostic codes mapped to the syndromic asthma and difficulty breathing indicators used in this study.

A. Emergency department: asthma

Codes Descriptor	Coding system
195967001 Asthma (disorder)	SnomedCT ^{1,2}
304527002 Acute Asthma	SnomedCT ^{1,2}
708038006 Acute exacerbation of asthma (disorder)	SnomedCT ^{1,2}
281239006 Exacerbation of asthma (disorder)	SnomedCT ^{1,2}
389145006 Allergic asthma	SnomedCT ^{1,2}
708090002 Acute severe exacerbation of asthma (disorder)	SnomedCT ^{1,2}
57546000 Asthma with status asthmaticus (disorder)	SnomedCT ^{1,2}
233678006 Childhood asthma (disorder)	SnomedCT ^{1,2}
445427006 Seasonal asthma (disorder)	SnomedCT ^{1,2}
394967008 Suspected asthma (situation)	SnomedCT ^{1,2}
708093000 Acute exacerbation of allergic asthma	SnomedCT ^{1,2}
1751000119100 Acute exacerbation of chronic obstructive airways disease with asthma (disorder)	SnomedCT ^{1,2}

B. General practitioner out of hours: difficulty breathing/wheeze/asthma

Codes Descriptor	Coding system
H333. Acute exacerbation of asthma	Read CTV ³
H33.. Asthma	Read CTV ³
H33z. Asthma unspecified	Read CTV ³
173.. Breathlessness	Read CTV ³
23B2. Bronchial breathing	Read CTV ³
1738. Difficulty breathing	Read CTV ³
2322. Dyspnoea	Read CTV ³
2326. Expiratory wheeze	Read CTV ³
232C. Noisy breathing	Read CTV ³
R061. Stridor	Read CTV ³
1737. Wheezing	Read CTV ³

C. NHS 111 calls and online assessments: difficulty breathing

Descriptor	Code system
Difficulty breathing pathway	NHS Pathways ⁴

D. Ambulance: breathing problems

Descriptor	Code system
Breathing problems chief complaint	NHS Pathways
Breathing problems chief complaint	Advanced Medical Priority Dispatch System (AMDPS) ⁵

¹SNOMED CT 2012. International Health Terminology Standards Development Organisation. Available online: <http://www.ihtsdo.org/snomed-ct/>; ²Emergency Care Dataset. NHS Digital. Available online: <https://digital.nhs.uk/data-and-information/data-collections-and-data-sets/data-sets/emergency-care-data-set-ecds>; ³Read codes. NHS Digital. Available online: <https://digital.nhs.uk/services/terminology-and-classifications/read-codes>; ⁴NHS Pathways. NHS Digital. Available online: <https://digital.nhs.uk/services/nhs-pathways>; ⁵Ambulance Response Programme. University of Sheffield. Available online: https://www.england.nhs.uk/wp-content/uploads/2017/07/ARPreport_Final.pdf. all accessed on 23 November 2021.

Supplementary Table S2. Observed and expected cases of asthma and difficulty breathing across age groups 17 June 2021.

Syndromic system	Indicator	<1			1-4			5-14			15-44			45-64			65+		
		Exp ¹	Obs ²	% inc ³	Exp	Obs	% inc	Exp	Obs	% inc	Exp	Obs	% inc	Exp	Obs	% inc	Exp	Obs	% inc
Emergency department	Asthma	0	0	-100	13	19	43	19	76	292	47	165	248	21	61	187	13	13	2
NHS 111 calls	Difficulty breathing	124	103	-17	313	250	-20	69	256	270	349	1286	268	175	251	44	220	217	-1
NHS 111 online	Difficulty breathing	N/A ⁴	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GP out of hours	Difficulty breathing/ wheeze/ asthma	10	6	-41	29	22	-24	15	66	347	49	224	354	25	53	112	32	23	-28
Ambulance	Breathing problems	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

¹'expected' – number of daily counts expected on a weekday (Monday to Friday) based upon activity recorded in the preceding four weeks (weekdays inclusive through 24 May to 16 June 2021); ²'observed' – average number of daily counts observed based upon activity on 17 June 2021; ³'percentage increase' observed on 17 June 2021; ⁴N/A – age specific data not available for the NHS 111 online and ambulance surveillance systems.