

Measuring the proportion of and reasons for asthma-related school absence in England

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To the Editor,

Asthma affects 300 million people across all age-groups and ethnicities and is the most common chronic condition affecting children^{1,2}. In the UK, the health care costs associated with asthma are estimated at £1.1 billion, however this amount typically excludes some societal costs (e.g. absence from work to care for children)³. The total number of days missed from school in England in the 2017/18 academic year was 59.1 million of which 54.7% were due to illness⁴ although the reasons for those illness-related absences are unknown. Given the high proportion of children with asthma and the fact that school absences are associated with low levels of achievement⁶, the primary aim of this study was to measure the proportion of asthma-related absences in school children and describe the factors reported by parents that predispose their children to these school absences. The secondary aim was to explore parents' and school staff views on extending an app currently used for reporting school absences to one that might also provide tailored interventions.

Studybugs (studybugs.com) is a unique free online service and app currently used by parents of 60,000 children across 1,250 UK schools and rising. Registered schools can connect Studybugs to their systems and invite parents to register at their choice. Parents are able report their child's absence via Studybugs even if a school has not registered, and this is delivered to the school by email. Once registered, parents are able to record the reason for their child's absence via Studybugs and are provided with information based on Public Health England recommendations on the need to remain off school dependent on the symptoms or illnesses provided. Studybugs complies fully with all applicable privacy laws including General Data Protection Regulation (GDPR) which also applies to health information. Personal health data is processed and shared with schools with parents' explicit consent. The Studybugs app was adapted for the purposes of this study to prompt parents to answer questions about the triggers for their child's asthma exacerbation and subsequent school absence, and whether they planned to visit a General Practitioner. With parents' consent, answers were collated by the project team in an anonymised form. A sub-sample of parents (n=8) and teachers (n=6) consented to semi-structured telephone interviews to explore their views on the acceptability and possible benefits of extending Studybugs to provide tailored interventions with the aim of improving the management of their child's asthma.

This study analysed Studybugs 2017/2018 academic year (September to July) data from 492 schools in England; 17% of which are based in largely rural constituencies (slightly lower than the 21% reported in the most recent census)⁶, 63% of the schools are primary, 30% secondary with the remainder preschools or colleges. For the purpose of reporting, an illness episode is defined as any

absence reported within 14 days of each other. There were 323 children who reported at least one absence for asthma in the 2017-18 school year. Asthma accounted for 0.98% (n=454) of overall episodes affecting 1.84% (n=323) of children (Figure 1). The majority (74%) of children reporting asthma as a reason for school absence had only one episode (n=239), but 9% (n=30) had at least three episodes over the academic year. Almost two-thirds of children reporting asthma absences were male (64%) and half were of primary school age (52%).

Among the parents reporting their child absent with asthma, 138/323 (43%) responded to the questionnaire sent automatically by Studybugs (Table 1). The most frequently reported trigger for the asthma exacerbation and consequent school absence was due to the child having a respiratory infection (37%) followed by hayfever (17%) (Figure 2). The top three triggers were the same for those reporting multiple asthma-related episodes (23% respiratory infection, 23% cold air, 16% hayfever). However, for 9% of children with 3 or more absences, parents cited stress as the trigger. Almost half of all parents (47%) reporting asthma-related school absence said their child would visit their GP due to this exacerbation.

Semi-structured interviews with parents and staff were transcribed verbatim and analysed by thematic analysis by two authors independently⁷ (supplementary file 1 for topic guide). Three major themes were identified. Although parents were aware of their child's **asthma triggers**, reminders were seen to be beneficial from a preventative perspective: *"I think it would be useful, if there was a reminder that there was a high pollen count today....you know that you could do a preventative puff... you could say to a teacher at drop-off, I think she might need a couple of blue puffs before she goes outside"*. Staff also thought that information on **asthma triggers** would improve their understanding: *"I don't know much about asthma myself, nobody in my family has it... it would be really helpful for me to know triggers, especially if, I have got children in my class, as I would understand more why they would be continuously going off sick or why they become more wheezy on certain days"*. Some teachers reported that this sort of information would help them understand the authenticity of the symptoms *"especially in tech, the fumes can be quite strong and the kids complain about it all the time, and they will sometimes specifically say, it is because I have got asthma, but you know, I'd like to know if that is genuine or not"*. Parents reported that **medication prompts** via the app would improve unintentional non-adherence: *"It is easy to forget these things, so a gentle little reminder I think would be really helpful"* and *"We are terrible on checking whether the inhaler is in date, so that's something that is massively important"*.

Parents and staff also reported that an app could improve relationships between parents and schools specifically in terms of managing sensitive conversations about attendance: *“his report mentioned his absences, except there was no understanding or empathy he had had asthma”* and *“I think that would be useful as a teacher to understand... as a teacher you don’t always find out why are they are off sick”*. This was identified by both parents and staff as a factor which might improve communication and trust between parents and schools with the ultimate aim of improving attendance: *“Maybe they’d feel the school would understand it better. Sometimes parents are quite nervous that the school won’t take it seriously... so they keep the kids off as they are too worried the school won’t send them home if they are ill as schools are so worried about their absences”*.

To our knowledge, this is the first study to look at school data in England on the proportion of asthma-related school absenteeism and the precipitating factors which led to the exacerbation. Further analysis could begin to address some of the research priorities identified by the European Asthma Research and Innovation Partnership on triggers and exacerbations (for example, to understand the impact of exposure to substances known to trigger asthma and develop tools to assess self-management)⁸. Despite asthma being highly prevalent, from our data it is encouraging that less than 2% of parents report that their children experienced an illness episode and missed school because of asthma.

One potential limitation of the study is the use of illness episodes rather than total days absent. This was used because despite prompting, not all parents report each day a child is unwell. The use of illness episodes may underestimate the total number of days absent. In this study parents reported a total of 659 days absent due to asthma, which equates to 2.04 days per child; less than the global estimates of 4-5 days⁹. Another explanation for lower estimates could be that the children in our sample have well-controlled asthma. It could also indicate selection bias or uncertainty around the use of the diagnostic label of “asthma”. Despite lower estimates, almost half of our sample intended visiting their GP indicating potentially high NHS resource implications, when asthma already accounts for 6.3m primary care consultations³.

The strengths of this project are that data were collected over a full academic year to account for the seasonal variation in asthma. A wide distribution of schools use Studybugs although possible reporting bias needs to be acknowledged; individual-level data on social determinants of health such as race, ethnicity, parental education level or socioeconomic status are not recorded which may be possible in future research, nor do all parents in all schools have smartphones, which may affect the

representativeness. However, in many schools the proportion of pupils where at least one parent has the app is greater than 90% meaning that data from these schools are likely to be highly representative.

As evidence in the qualitative data, the Studybugs app could be used to provide tailored advice/interventions to parents and staff based on specific symptoms or exacerbations recorded, to help prevent further school absence. Examples could include automated interventions alerting parents of high pollen counts, pollution levels, reminders to ensure asthma medication is taken and information on community prevalence of significant respiratory illnesses. The bidirectional functionality of the Studybugs app means it could be used as a communication tool for school staff (including school nurses) to alert parents to their child's school-based asthma exacerbation or need for rescue medication. The Studybugs app could also help identify children who repeatedly miss school and target advice and potential healthcare resources, such as school nurse or asthma nurse care, towards this more vulnerable population. Nurses and other health care professionals could use the information on triggers to tailor advice and guidance, such as reviewing medication and inhaler technique. This project demonstrates the potential for Studybugs to collect community-wide data on school absence, to identify triggers and potentially to deliver tailored interventions that could improve children's health and reduce illness-related school absence.

Figure 1. Respondent flow through data collection period for 2017-2018 academic year

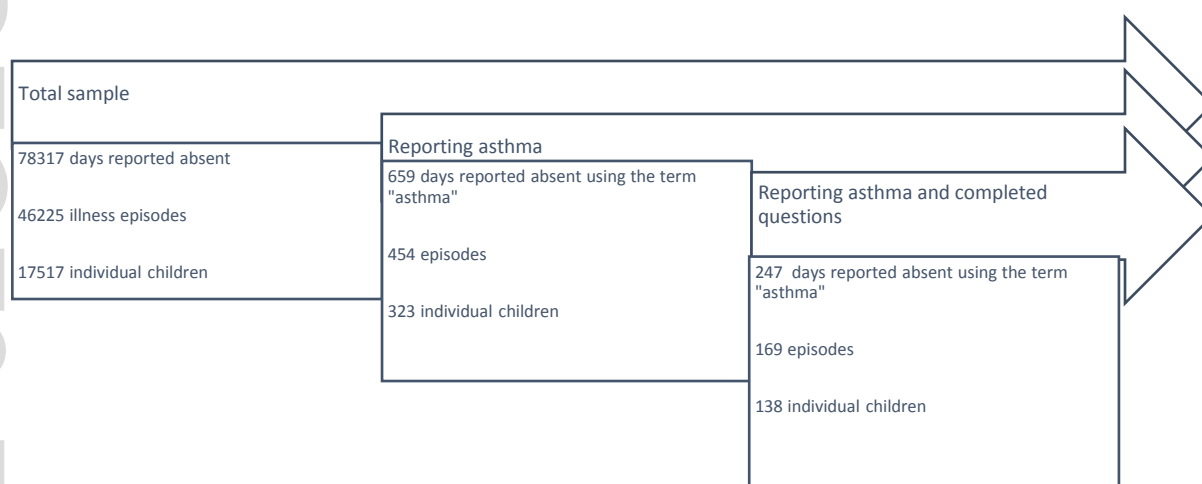
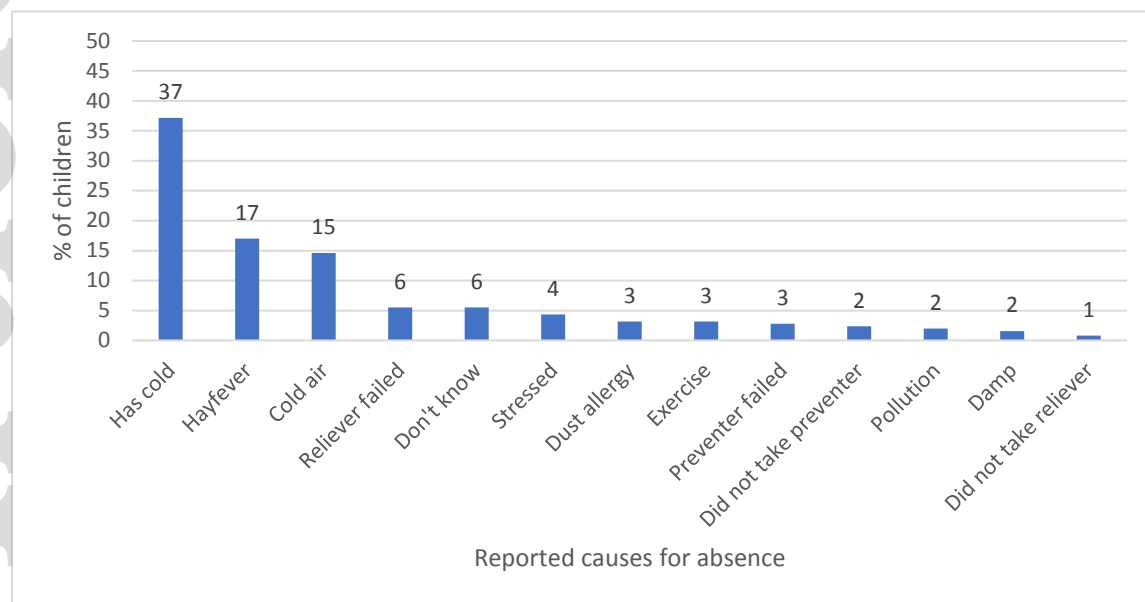


Figure 2. Parent-reported reasons for asthma-related school absence (Totals: 138 parents;253 reasons)



Multiple choice; parents could select more than one option

Table 1. Demographics of children with asthma-related school absences responding to the questionnaire

		N (n = 138)	%
Age groups (in years)	0-4	7	5
	5-7	47	34
	8-10	25	18
	11-13	35	25
	14-16	22	16
	17+	2	1
Sex	Male	87	63
	Female	51	37
Region	East of England	23	17
	London	7	5
	South East	98	71
	South West	9	7
	Yorkshire and the Humber	1	1

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Supplementary file 1 – topic guides

School staff

- In your experience, how often do children report absences from school as a result of asthma?
- What do you think about extending the Studybugs app to provide guidance on asthma management according to a child's specific triggers?
- How likely do you think parents/caregivers would be to look at and take in the information provided by Studybugs on asthma management at the time of reporting their child's absence?
- How might this approach lead to reduced school absences?
- What benefits/drawbacks do you see in this approach?
- What information would benefit you or your school?
- What types of interventions would you like to see?
- What do you think about using this approach to treating other children's illnesses which lead to school absences?

Parents and caregivers

- How would you describe your child's asthma? (i.e. duration, severity etc)
- How often has your child been absent from school as a result of their asthma?
- When reporting an absence from asthma, what terminology would you use to describe this? (e.g. wheeze, tight chest etc)
- What do you think triggers or exacerbates your child's asthma?
- What do you think about extending the Studybugs app to provide guidance on asthma management according to your child's specific triggers?
- At the time of reporting your child's absence, how likely would you be to look at and take in the information provided by Studybugs on asthma management?
- How might this approach lead to reduced school absences?
- What benefits/drawbacks do you see in this approach?
- What information would benefit you?
- What types of interventions would you like to see?
- What do you think about using this approach to treating other children's illnesses which lead to school absences?