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

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33 To the Editor,
34 Asthma affects 300 million people across all age-groups and ethnicities and is the most common
35 chronic condition affecting children^{1, 2}. In the UK, the health care costs associated with asthma are
36 estimated at £1.1 billion, however this amount typically excludes some societal costs (e.g. absence
37 from work to care for children)³. The total number of days missed from school in England in the
38 2017/18 academic year was 59.1 million of which 54.7% were due to illness⁴ although the reasons
39 for those illness-related absences are unknown. Given the high proportion of children with asthma
40 and the fact that school absences are associated with low levels of achievement⁶, the primary aim of
41 this study was to measure the proportion of asthma-related absences in school children and
42 describe the factors reported by parents that predispose their children to these school absences.
43 The secondary aim was to explore parents' and school staff views on extending an app currently
44 used for reporting school absences to one that might also provide tailored interventions.

45
46 Studybugs (studybugs.com) is a unique free online service and app currently used by parents of
47 60,000 children across 1,250 UK schools and rising. Registered schools can connect Studybugs to
48 their systems and invite parents to register at their choice. Parents are able report their child's
49 absence via Studybugs even if a school has not registered, and this is delivered to the school by
50 email. Once registered, parents are able to record the reason for their child's absence via Studybugs
51 and are provided with information based on Public Health England recommendations on the need to
52 remain off school dependent on the symptoms or illnesses provided. Studybugs complies fully with
53 all applicable privacy laws including General Data Protection Regulation (GDPR) which also applies to
54 health information. Personal health data is processed and shared with schools with parents' explicit
55 consent. The Studybugs app was adapted for the purposes of this study to prompt parents to answer
56 questions about the triggers for their child's asthma exacerbation and subsequent school absence,
57 and whether they planned to visit a General Practitioner. With parents' consent, answers were
58 collated by the project team in an anonymised form. A sub-sample of parents (n=8) and teachers
59 (n=6) consented to semi-structured telephone interviews to explore their views on the acceptability
60 and possible benefits of extending Studybugs to provide tailored interventions with the aim of
61 improving the management of their child's asthma.

62
63 This study analysed Studybugs 2017/2018 academic year (September to July) data from 492 schools
64 in England; 17% of which are based in largely rural constituencies (slightly lower than the 21%
65 reported in the most recent census)⁶, 63% of the schools are primary, 30% secondary with the
66 remainder preschools or colleges. For the purpose of reporting, an illness episode is defined as any

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

73

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

82

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

100

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

110

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

119

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

129

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

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

138

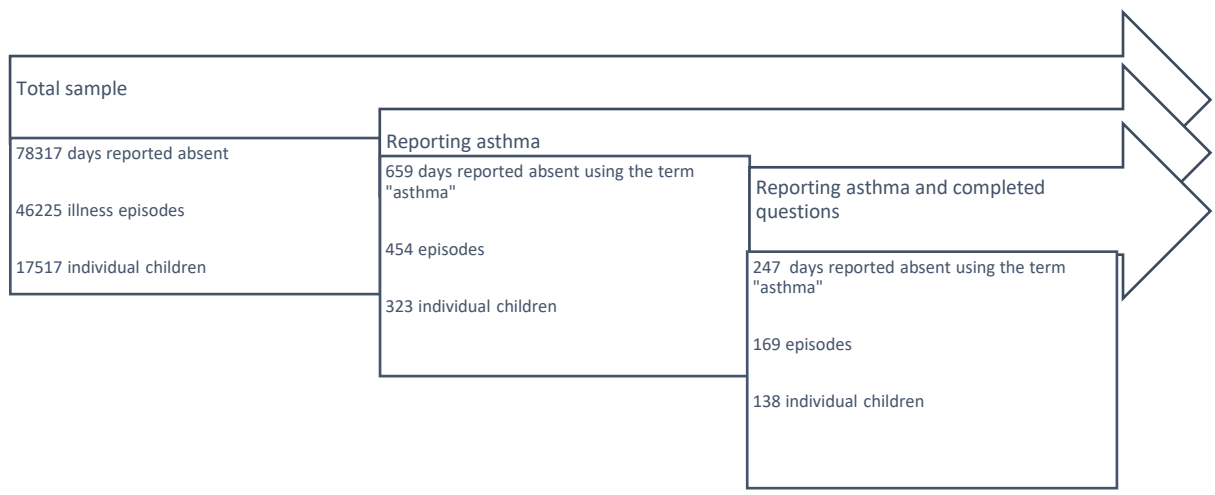
139 As evidence in the qualitative data, the Studybugs app could be used to provide tailored
140 advice/interventions to parents and staff based on specific symptoms or exacerbations recorded, to
141 help prevent further school absence. Examples could include automated interventions alerting
142 parents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

153

154

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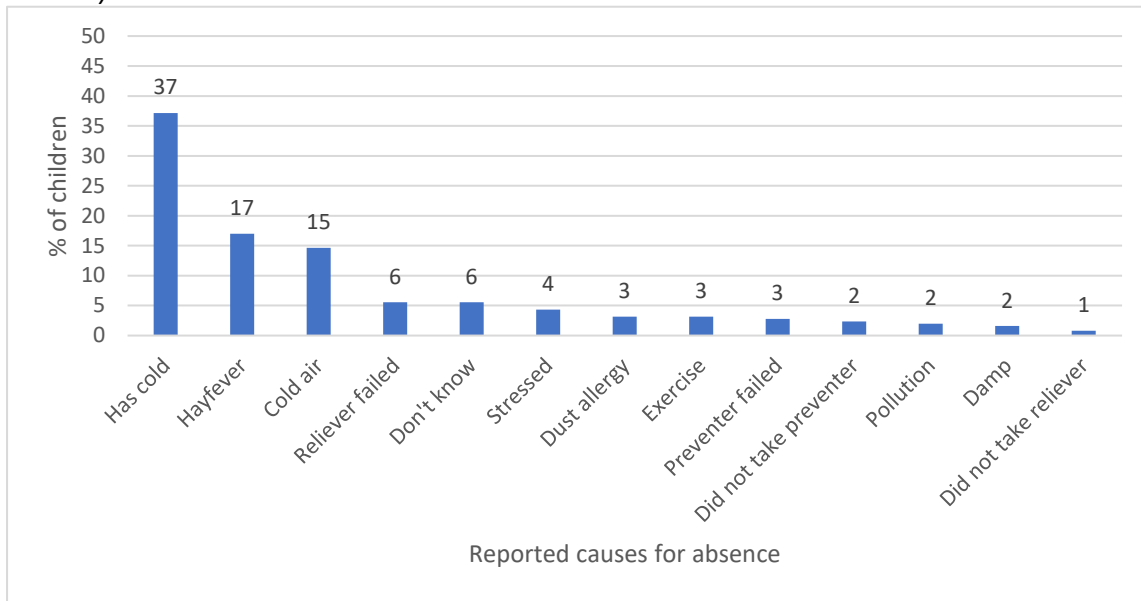
156 *Figure 1. Respondent flow through data collection period for 2017-2018 academic year*



157

158

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



161

162 Multiple choice; parents could select more than one option

163

164

165 Table 1. Demographics of children with asthma-related school absences responding to the
166 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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