

## BRIEF COMMUNICATION

OPEN

# “Tossing a coin:” defining the excessive use of short-acting beta<sub>2</sub>-agonists in asthma—the views of general practitioners and asthma experts in primary and secondary care

Shauna McKibben  <sup>1</sup>, Andy Bush <sup>2</sup>, Mike Thomas <sup>3</sup> and Chris Griffiths <sup>1</sup>

The National Review of Asthma Deaths (NRAD) identified high prescribing of short-acting beta<sub>2</sub>-agonists (SABAs) as a key factor in over 40% of deaths. We interviewed asthma experts from both a hospital background ( $n = 5$ ) and a primary care background ( $n = 8$ ), and general practitioners delivering asthma care ( $n = 8$ ), to identify how SABA use is defined and perceived. We identified disparity in how acceptable SABA use is defined, ranging from 0.5 (100 doses/year) to 12 SABA inhalers (2400 doses/year), and complacency in the perception that over-use did not represent a marker for risk of asthma death. Despite current evidence, these findings suggest clinicians of various backgrounds are complacent about excessive SABA use.

*npj Primary Care Respiratory Medicine* (2018)28:26 ; doi:10.1038/s41533-018-0096-4

## INTRODUCTION

Over the past three decades enquiries into asthma deaths in the UK including most recently the National Review of Asthma Deaths “Why asthma still kills,”<sup>1</sup> (NRAD) have all concluded that the majority of UK asthma deaths are potentially preventable. UK asthma guidelines state that using SABA at least three times a week (300 activations or less than 2 canisters/year) is a marker for potentially poor control and a predictor of future risk of asthma attacks and death.<sup>2</sup> The NRAD recommended that prescription of more than one SABA per month should trigger an asthma review.<sup>1</sup> Furthermore, risk of hospital admission has been associated with the prescription of more than three SABAs a year,<sup>3</sup> whilst morbidity and mortality rise progressively with increasing numbers of SABA dispensed per year.<sup>4,5</sup> As part of evaluating the use of electronic alerts to highlight excessive SABA prescribing<sup>6</sup> our aim was to identify how SABA overuse is defined and perceived by general practitioners (GPs) and asthma experts in both community and hospital based practice (Table 1).

## RESULTS

We interviewed 21 clinicians; eight general practitioners (GPs) delivering asthma care, eight asthma experts in general practice and five asthma experts in hospital based care. There were wide variations in how excessive SABA use was defined by clinicians with no consensus in regards to how much SABA was excessive. The threshold for acceptable SABA use varied between 0.5 (100 doses) and 12 SABA inhalers (2400 doses) a year. The setting of a SABA use threshold to “tossing a coin” (Expert 3, primary care). Table 2 details the data derived SABA use that clinicians defined acceptable.

Opinions on the duration of time needed to determine SABA overuse varied between daily and weekly doses and/or monthly inhaler count. One expert commented “GPs in their heart of hearts know that patients shouldn’t have too many SABAs but they really don’t know what too many is” (Expert 1, primary care).

Despite current evidence<sup>1,2,4,5</sup> some experts questioned the risk of morbidity and mortality associated with high SABA use. Additional factors such as low inhaled corticosteroid use, and markers of asthma attacks such as oral steroid use, hospital admissions and emergency department attendances were deemed necessary to prompt clinical intervention. This suggests a more nuanced approach to identifying and managing those at risk of asthma attacks is necessary.

Asthma guidelines were deemed “stringent” (Expert 10, primary care) whilst guideline recommended SABA use was perceived as “silly” (Expert 3, primary care). One GP commented that guidelines did not reflect the “real world” and that SABA prescribing practice was unlikely to change until someone can “prove” the patient is at increased risk (GP 3).

## DISCUSSION

The challenge of implementing clinical guidelines into practice has been widely documented. However the dismissal of guideline recommended SABA use is surprising, considering the NRAD identified that up to half of the asthma deaths reviewed could have been avoided had asthma guidelines been implemented. There is widespread variation in definitions of excessive SABA use in both research<sup>7,9</sup> and in practice. Our findings highlight the contrasting perceptions of excessive SABA use among GPs delivering asthma care and those with a specialist interest in asthma.

<sup>1</sup>Asthma UK Centre for Applied Research, Barts Institute for Population Health Sciences, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK; <sup>2</sup>Asthma UK Centre for Applied Research, Imperial College and Royal Brompton Hospital, Biomedical Research Unit at the Royal Brompton & Harefield NHS Foundation Trust and Imperial College London, London, UK and <sup>3</sup>Asthma UK Centre for Applied Research, Primary Care and Population Sciences, University of Southampton and NIHR Southampton Biomedical Research Centre, Southampton, UK  
Correspondence: Shauna McKibben (s.m.mckibben@qmul.ac.uk)

Received: 16 February 2018 Revised: 11 June 2018 Accepted: 12 June 2018  
Published online: 18 July 2018

**Table 1.** Participant characteristics

Participant characteristics	General practitioners (n = 8)	Experts in general practice (n = 8)	Experts in hospital care (n = 5)
Age	<35	2	0
	35–49	5	1
	>50	1	7
Sex	Male	5	6
	Female	3	2
Location	UK	8	3
	Europe	–	3
	International	–	2
		2	1

**Table 2.** Definitions of acceptable SABA use

SABA threshold	General practitioners (n = 8)	Experts in general practice (n = 8)	Experts in hospital care (n = 5)
<3 times/week or <2 SABA/year	0	3	2
1/month	1	–	2
1/6 months	–	2	–
3–4/year	1	1	–
12/year	2	1	1
Unsure	2	–	–
Did not define	2	1	–

## STRENGTHS AND LIMITATIONS

The representativeness of the clinicians is a potential limitation due to location and dispersion of roles, therefore it cannot be assumed that data saturation was achieved. However the lack of consensus is itself of real significance and not necessarily a manifestation of inadequate sample size. Further research should address wider national and international perspectives.

## CONCLUSION

Despite a large body of evidence, there was shocking complacency about SABA over-use and a disregard of current evidence. Unless attitudes can be challenged and changed, it is difficult to see how asthma deaths can be reduced; certainly new guidelines are not the answer.

## MATERIALS AND METHODS

As the study did not involve patients or the use of patient data, it did not require ethical approval by Queen Mary University of London (QMUL; QMERC2061a) and the Health Research Authority. Using convenience and snowball sampling, 14 primary care practices in Tower Hamlets, an ethnically diverse borough in east London, were approached via email inviting GPs delivering routine asthma care to participate. Practices were identified with the assistance of the Clinical Effectiveness Group (CEG) at QMUL. Using well-established data sharing networks, the CEG leads and collaborates on research with GP practices in east London.

Following co-author discussion, "Asthma Experts" in both community and hospital practice were identified using convenience sampling and invited via email to participate. Asthma Experts were defined as primary or secondary care clinicians who have contributed specifically to asthma care at a national or international level. Semi-structured interviews were carried out in-person (GPs) or via telephone (asthma experts) until no new responses were elicited. The topic guide excluded questions on pre-exercise SABA use (see supplementary material). Written informed consent was obtained from GPs and verbal consent obtained from asthma experts prior to interview. Interviews were audio recorded, transcribed anonymously and analyzed thematically using the Framework Method.<sup>10</sup> The coding framework underwent six revisions with the assistance of an independent coder.

## Data availability

Authors confirm that all relevant data are included in the paper.

## ACKNOWLEDGEMENTS

This work forms part of an Asthma UK Center for Applied Center PhD Studentship being undertaken by SM. With thanks to Christina Pearce for independent coding.

## AUTHOR CONTRIBUTIONS

S.M., A.B., M.T., and C.G. contributed to the plan and design of the study. S.M. carried out data collection, analysis, interpretation and lead writing. The coding framework was developed and revised with the assistance of C.P. A.B., M.T., and C.G. commented on each manuscript draft. All authors read and approved the final manuscript.

## ADDITIONAL INFORMATION

**Supplementary information** accompanies the paper on the *npj Primary Care Respiratory Medicine* website (<https://doi.org/10.1038/s41533-018-0096-4>).

**Competing interests:** C.G. is an assistant editor of *npj Primary Care Respiratory Medicine* and M.T. is an associate editor of *npj Primary Care Respiratory Medicine* but were involved in neither the editorial review of, nor any decision to publish or not publish this article. The remaining authors declare no competing interests.

**Publisher's note:** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## REFERENCES

1. Royal College of Physicians. *Why Asthma Still Kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry Report*. (RCP, London, 2014).
2. British Thoracic Society/Scottish Intercollegiate Guidelines Network. *British Guideline on the Management of Asthma*. (Scottish Intercollegiate Guidelines Network, Edinburgh, 2016).
3. Hull, S., McKibben, S. & Homer, K. et al. Asthma prescribing, ethnicity and risk of hospital admission: an analysis of 35,864 linked primary and secondary care records in East London. *NPJ Prim. Care Respir. Med.* **26**, 16049, (2016).
4. Spitzer, W. O., Suissa, S. & Ernst, P. et al. The use of beta-agonists and the risk of death and near death from asthma. *N. Engl. J. Med.* **326**, 501–506, (1992).
5. Suissa, S., Blais, L. & Ernst, P. et al. Patterns of increasing beta-agonist use and the risk of fatal or near-fatal asthma. *Eur. Respir. J.* **7**(9), 1602–9 (1994).
6. McKibben, S., De Simoni, Bush A, et al. The use of electronic alerts in primary care computer systems to identify the excessive prescription of short-acting beta<sub>2</sub>-agonists for people with asthma: a systematic review. *NPJ Prim. Care Respir. Med.* <https://doi.org/10.1038/s41533-018-0080-z> (2018).
7. Silver, H. S., Blanchette, C. M. & Kamble, S. et al. Quarterly assessment of short-acting β<sub>2</sub>-adrenergic agonist use as a predictor of subsequent health care use for asthmatic patients in the United States. *J. Asthma* **47**(6), 660–6, (2010).
8. Zeiger, R. S., Schatz, M. & Li, Q. et al. Real-time asthma outreach reduces excessive short-acting β<sub>2</sub>-agonist use: a randomized study. *J. Allergy Clin. Immunol. Pract.* **2** (445–456), e1–5, (2014).

9. Tamblyn, R., Ernst, P. & Winslade, N. et al. Evaluating the impact of an integrated computer-based decision support with person-centered analytics for the management of asthma in primary care: a randomized controlled trial. *J. Am. Med Inform. Assoc.* **22**, 773–783, (2015).
10. Ritchie, J. & Spencer, L. ‘Qualitative data analysis for applied policy research’. In: B. Bryman, R. Burgess (eds.). *Analyzing Qualitative Data* (pp. 173–194). Routledge, London and New York, 1994.



**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2018