

## Factors associated with decisions to step down asthma medications

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### Clinical Implications

- Stepping down asthma medication was a frequent occurrence (39% of responders in 1 year) in a community practice
- Having an asthma action plan may be an important factor in decisions to step down asthma medication

### TO THE EDITOR:

When asthma is stable, guidelines suggest that patients and providers consider stepping down the chronic asthma medications.<sup>1,2</sup> The current health care system, however, is ill-equipped to help patients make decisions about how and when to step down asthma medications.<sup>3</sup> Little is known about which factors are associated with decisions to step down asthma medication.

We conducted a survey among persons aged 5 to 50 years old with at least 2 asthma visits (based on the International Classification of Diseases billing code 493.xx) in the past 2 years and at least 1 asthma visit during the previous year. Persons were excluded if they were permanent nursing home residents, on hospice care, died, or had a diagnosis of chronic obstructive pulmonary disease, emphysema, cystic fibrosis, or acute respiratory failure. The participants were identified from within the Mayo Clinic Health System Southwest Minnesota Region. The study was approved by the Mayo Clinic Institutional Review Board.

The survey included questions that measured asthma control (Asthma Control Questionnaire, ACQ-6),<sup>4</sup> emergency department (ED) visits and hospitalizations for asthma, systemic corticosteroid use for asthma, whether patients had or used asthma action plans (AAPs) or the Patient Assessment of Chronic Illness Care (PACIC, a measure of the quality of health care delivery),<sup>5</sup> an estimate of treatment burden (scored according to an average of 5 burden-related questions),<sup>6</sup> and health literacy.<sup>7</sup> The questions for stepping down asthma medication read as follows: "Has the dosage of your everyday asthma medicines been *lowered* in the past 12 months?" and "Have you *stopped* any of your everyday asthma medicines in the past 12 months?"

Survey questions were developed and further refined by the investigators through an iterative review process, including input from patients with asthma. The survey was administered by US mail on December 16, 2011; nonresponders were sent a second mailing 1 month later and a third mailing May 1, 2012. No direct monetary incentives were included to complete the survey; however, participants were told that 1 of the survey responders would be randomly selected to win an iPad.

Data were summarized with frequencies and percentages or means and SDs. Persons who decreased or stopped their chronic asthma medications were grouped into a category of participants

**TABLE I.** Demographics of those responding to the Asthma Care Survey

|                                                          | Total<br>(n = 102) |
|----------------------------------------------------------|--------------------|
| Age (y), mean ± SD                                       | 28.9 ± 14.2        |
| Sex, female, no. (%)                                     | 55 (58.5)          |
| Race, white, no. (%)                                     | 95 (94.1)          |
| Education level                                          |                    |
| High school or less, no. (%)                             | 34 (34.7)          |
| Some college, no. (%)                                    | 31 (31.6)          |
| College degree or higher, no. (%)                        | 21 (21.4)          |
| Insurance                                                |                    |
| Employer with or without supplemental, no. (%)           | 62 (61.4)          |
| Government, no. (%)                                      | 19 (18.8)          |
| Individual, no. (%)                                      | 17 (16.8)          |
| No. of years with asthma, no. (%)                        |                    |
| <1                                                       | 1 (1.0)            |
| 1-5                                                      | 26 (25.5)          |
| 6-10                                                     | 23 (22.5)          |
| >10                                                      | 52 (51.0)          |
| No. of systemic steroid bursts, no. (%)                  |                    |
| 0                                                        | 57 (57.0)          |
| 1                                                        | 12 (12.0)          |
| 2                                                        | 15 (15.0)          |
| ≥3                                                       | 16 (16.0)          |
| ACQ-6 score, mean ± SD                                   | 1.4 ± 1.1          |
| ACQ-6 score ≤0.75, no. (%)                               | 30 (29.4)          |
| ED visits for asthma ≥1 in the past 12 mo, no. (%)       | 19 (20.0)          |
| Hospitalization for asthma ≥1 in the past 12 mo, no. (%) | 6 (6.0)            |
| Taking daily asthma controller medications, no. (%)      | 74 (72.5)          |

ED, Emergency department.

who "stepped down," and all others were grouped in participants who did not step down (only participants who responded that they used chronic asthma medication were included in this analysis). We next tested the decision to step down with other factors: age, gender, insurance type, PACIC score, having an AAP, treatment burden score, adherence as reported by survey responders, ACQ, asthma exacerbations, missed school/work days, health literacy, and number of years with asthma. These factors were compared between the groups with the use of 2-sample *t* tests (continuous data) or  $\chi^2$  tests (categorical data) with the use of SAS version 9 (SAS Institute, Cary, NC).

The response rate for the survey was 28% (102 of 367 returned the survey). Responders were slightly older than nonresponders (mean of 29 year vs 26 years;  $P = .04$ ) and did not differ by sex ( $P = .67$ ) or asthma control ( $P = .30$ ). Notably, most patients were taking daily asthma controller medications (73%) and most reported poor asthma control (71%). The demographic data are summarized in Table I. Forty responders either stopped or decreased their everyday asthma medicines (39%); 24 decreased dose and 28 stopped (including 12 who did both). Of those who decreased their every asthma medication dose, 6 (24%) decided on their own, 9 (38%) responded that their health care provider

**TABLE II.** Factors related to whether asthma medication was decreased or stopped

|                                                                             | Did not decrease or stop<br>asthma medications | Decreased or stopped<br>asthma medications | <i>P</i> value |
|-----------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------|----------------|
| Age 5-18 y (n = 28)                                                         | 15                                             | 13                                         | .36            |
| Age 19-55 y (n = 66)                                                        | 43                                             | 23                                         |                |
| Sex, female, no. (%)                                                        | 33 (57)                                        | 22 (61)                                    | .69            |
| Insurance, employer based, no. (%)                                          | 35 (57)                                        | 27 (68)                                    | .51            |
| PACIC score, mean $\pm$ SD                                                  | 2.9 $\pm$ 1.0                                  | 2.9 $\pm$ 1.0                              | .98            |
| Given an asthma plan by health care provider, no. (%)                       | 22 (36)                                        | 19 (48)                                    | .05            |
| Treatment burden score, mean $\pm$ SD                                       | 2.3 $\pm$ 2.6                                  | 1.9 $\pm$ 1.9                              | .28            |
| Adherence, 1 or more missed medication doses in past 7 d, no. (%)           | 25 (61)                                        | 15 (54)                                    | .54            |
| ACQ-6 $\leq$ 0.75 (n = 30)                                                  | 18                                             | 12                                         | 1.0            |
| AQ-6 >0.75 (n = 72)                                                         | 44                                             | 28                                         |                |
| Asthma exacerbations, 1 or more*, no. (%)                                   | 31 (52)                                        | 15 (38)                                    | .17            |
| Missed school/work days, 1 or more in past 12 mo, no. (%)                   | 19 (68)                                        | 15 (79)                                    | .51            |
| Health literacy, never having someone help read hospital materials, no. (%) | 39 (64)                                        | 28 (72)                                    | .47            |
| No. of years with asthma >10 y, no. (%)                                     | 33 (53%)                                       | 19 (48%)                                   | .48            |

\*Systemic corticosteroid courses, emergency department visits, or hospitalizations for asthma in the past 12 months.

decided, 7 (29%) decided together with their health care provider, and 2 (8%) were missing. Of those who stopped their everyday asthma medication, 17 (61%) decided on their own, 3 (11%) responded that their health care provider did, 5 (18%) decided together with their provider, and 3 were missing (11%).

Univariate analysis of factors associated between responders who stopped or decreased their everyday asthma medicines and responders who did not suggested no significant associations between age, gender, insurance type, PACIC score, adherence, health literacy, asthma control, asthma exacerbations, number of missed school/work days, or with the number of years with asthma. The only significant association we found among responders who stopped or decreased their everyday asthma medications was having been given an AAP by their provider ( $P = .05$ ), although this association was found to be not significant if responders who replied “don’t know” to the question about having an AAP were grouped with responders who answered “no” ( $P = .25$ ) (summarized in Table II). Responders who replied “don’t know” further responded that they had never heard of an AAP (n = 2), provider never recommended one (n = 1), did not think they needed one (n = 1), or other (n = 1).

In this survey of a community medical practice we found that 39% of responders either stopped or decreased their asthma medication during a 1-year period. Decisions to decrease asthma medication were made independently by patients, by the provider, or together in fairly equal fractions, whereas decisions to stop asthma medications were made primarily by patients independently. This finding suggests that stopping asthma medication may be a different type of decision than lowering asthma medication dosing, despite both events representing a step down. Having been given an AAP may be associated with an increased likelihood of stepping down asthma medications. We speculate that having an AAP may promote increased confidence in both patient and provider when deciding to step down asthma medication.

The strengths of the study were the community-based sample and the use of validated survey tools within the survey. The limitations are the sample size, the response rate, and the cross-sectional study design. A larger sample size would have allowed more power to analyze the subgroup of responders that stopped asthma medications; therefore, we cannot exclude that PACIC score, ACQ, or treatment

burden may be important factors in decisions to step down asthma medications. Despite these limitations, we have preliminary evidence that having an AAP may be important for patients and providers who are deciding on stepping down asthma medications. Larger studies, using prospective designs, are needed to better understand this important aspect of asthma management.

## Acknowledgment

The survey included an adaptation of the Diabetes Distress Scale<sup>6</sup> (used and adapted with the permission of Dr Lawrence Fisher) and a question about health care literacy<sup>7</sup> (used with the permission of Dr Lisa Chew).

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This work was funded by the Mayo Foundation.

Conflicts of interest: N. D. Shah has received travel support from IMS Health. The rest of the authors declare that they have no relevant conflicts of interest.

Received for publication January 4, 2013; revised February 15, 2013; accepted for publication February 19, 2013.

Available online April 11, 2013.

Cite this article as: Rank MA, Ziegenfuss JY, Shah KM, Jenkins SM, Lackore KA, Eton DT, et al. Factors associated with decisions to step down asthma medications. *J Allergy Clin Immunol: In Practice* 2013;1:312-4. <http://dx.doi.org/10.1016/j.jaip.2013.02.005>.

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<http://dx.doi.org/10.1016/j.jaip.2013.02.005>

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### Corrections

In the article by Bruce G. Bender, "Advancing the Science of Adherence Measurement: Implications for the Clinician," which appeared in the January 2013 issue of *THE JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY: IN PRACTICE* (*J Allergy Clin Immunol: In Practice* 2013;1:92-3), the following correction should be noted: the first reference was incorrectly cited. The citation for Bender's reference 1 refers to the third sentence in the first paragraph:

The article by Patel et al. sheds new light on an old topic and advances the science of measuring nonadherence. Treatment nonadherence continues to be a significant barrier to asthma control and contributes to costly asthma exacerbations. Remarkably, fewer than one-half of patients with a new inhaled corticosteroid prescription refill again in the year after an initial fill.<sup>1</sup>

The article by Mitesh Patel, Janine Pilcher, Justin Travers, Kyle Perrin, Dominick Shaw, Peter Black, et al, "Use of Metered-Dose Inhaler Electronic Monitoring in a Real-World Asthma Randomized Controlled Trial," appeared before Bender's editorial in the January 2013 issue of *THE JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY: IN PRACTICE* (*J Allergy Clin Immunol: In Practice* 2013;1:83-91).