

Asthma Control—Time to Rethink Definitions and Criteria



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Asthma control, today, is commonly assessed by either Expert Panel Report 3, Guidelines for the Diagnosis and Management of Asthma (EPR 3)¹ criteria or a survey tool, such as the Asthma Control Test (ACT).² In the clinical setting, this information is then used to initiate or adjust controller medications to reduce future risk of exacerbations and achieve asthma control. The report by Kochis et al³ in this journal demonstrates the additional and independent value of caregiver assessment of asthma control to predict the risk of an asthma exacerbation. The article highlights the discordance between provider and caregiver assessment of asthma control, and this underscores a fundamental communication issue in disease understanding and divergent goals of disease management. Importantly, this report highlights that the EPR 3 assessment of control does not address the imminent risk of disease worsening. Although once daily use of a rescue medication may identify underlying inflammation that puts a patient at increased risk of an asthma exacerbation during a viral infection several months later, it fails to identify the patient likely to be in the emergency department tomorrow. Rather than detecting patients at immediate risk from uncontrolled asthma, the EPR 3 focuses on identifying undertreated asthma.

It is important to stress that EPR 3 has served the asthma community well in identifying appropriate controller therapy for patients. Based on current impairment (eg, daytime and nighttime symptoms, rescue medication use, activity limitations, and lung function) and exacerbations over the past year, the EPR 3

provides a framework for determining the level of asthma control and the future risk of an exacerbation. The level of control is then used to determine “at follow-up” whether “to maintain or adjust therapy.”¹ The ACT and other survey tools were developed as simple methods for “quantifying asthma control by both patient and physician.”² These tools mirror EPR 3 impairment domain of control, frequently contain a global assessment of control, and are validated against clinician assessment of control. As Kochis et al demonstrated, potential limitations of this validation include that providers and patients are not aligned in their global assessment of asthma control. Furthermore, the EPR 3 control determination is dependent on patient recall and was designed primarily to determine appropriate controller therapy to prevent future risk.

Although asthma is “characterized by *variable* and recurring symptoms,” the EPR 3 and ACTs are performed at a single, and usually predetermined, time point and reflect symptoms from the prior 2 to 4 weeks. Patients complete these assessments at a scheduled office visit or as part of a monthly request to complete an asthma control questionnaire. In the real-world setting, these assessments are rarely performed as a patient enters the “yellow zone”—a time that could best serve patients and health care professionals to take action to prevent an exacerbation. Dinakar and Reddy⁴ in 2004 named this the “gray zone” and suggested that a “clearer and more patient friendly definition” of the “yellow zone” was needed to determine appropriate interventions.

Well-designed clinical trials have been completed to determine the appropriate treatment for patients in the “yellow zone.” Unfortunately, the criteria for the “yellow zone” are incomplete and interpreted differently by patient and provider. Because there is no consensus regarding the threshold of when a patient enters the yellow zone, it is difficult to assess therapeutic strategies for treatment. Identifying patients at risk for severe asthma exacerbations requires the use of epidemiological, clinical, and physiological data that are personalized to identify the high-risk patient.⁵ In 2017, Puranik et al⁶ evaluated various predictive tools and concluded that the strongest signal of future asthma risk was a prior severe exacerbation. The failure to improve therapies for patients at high risk of imminent exacerbation may be due to the inability to identify these patients and potentially not the efficacy of the treatment.⁷ The approval of biologics for severe asthma⁸ required establishing and validating a new primary outcome, reduction in asthma exacerbations, and selecting appropriate patients with a history of recurrent asthma exacerbations. Similarly, improving our understanding of asthma control status may require adopting measures that reflect acute disease progression in patients who are likely to experience an imminent exacerbation.

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No funding was received for this work.

Conflicts of interest: G. Mosnaim receives research grant support from AstraZeneca, GlaxoSmithKline, and Propeller Health; owns stock options in Electrocore; and serves as a consultant and/or member of a scientific advisory board for Electrocore, GlaxoSmithKline, Sanofi, Regeneron, Teva, Novartis, Astra Zeneca, Boehringer Ingelheim, and Propeller Health. H. Stempel declares no relevant conflicts of interest. S. J. Szeffler has received payments to his institution from Aerocrine, AstraZeneca, Boehringer Ingelheim, Daiichi Sankyo, GlaxoSmithKline, Genentech, Novartis, Propeller Health, Regeneron, and Sanofi; and has received research support from GlaxoSmithKline. D. A. Stempel is an employee of Propeller Health.

Received for publication February 1, 2019; accepted for publication February 1, 2019.

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J Allergy Clin Immunol Pract 2019;7:1522-3.
2213-2198

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<https://doi.org/10.1016/j.jaip.2019.02.001>

The development and validation of a predictive algorithm that incorporates objective assessment of clinical asthma status to predict imminent risk is needed. Components for an effective algorithm include 1 or more data streams, timely collection of objective data with prognostic value, free of recall bias, and focus on passive data collection that places minimal burden on the patient or health care team. It should be highly sensitive and have an acceptable specificity. Digital technology allows for incorporation of objective real-time data thereby adding new potential parameters. Tools should be personalized and accepted by patients through shared decision-making. Digital biomarkers may include activity, heart rate, respiratory rate, electronic medication monitoring, and patient-reported outcomes. Changes in these parameters could potentially trigger additional requests for home spirometry or FeNO, to validate these observations. Although the list of potential measures is long, and each requires testing for validity, other chronic illnesses—such as diabetes—have successfully started incorporating digital tools.⁹

Kochis et al identified a new parameter to assess the adequacy of treatment, caregiver assessment, and identified the highly discordant assessment of control between providers and caregivers. This reveals the limitations of both the present assessment tools and demonstrates a need for effective communication to bridge this gap. The determination of asthma control, a highly variable parameter, must reflect the patient's real-time status and provide actionable information that alerts the patient and provider if there is a need for timely intervention. For example, imagine a grandmother bringing her 5-year-old grandson into clinic for a 1-week follow-up visit after an acute asthma emergency department visit requiring oral corticosteroids. The childhood ACT,¹⁰ which frames questions over the past 4 weeks, reveals poorly controlled asthma despite the child feeling better, not needing any rescue medication for the past 3 days, and demonstrating a normal forced expiratory volume in 1 second. Or, consider another patient who had nighttime cough during a cold several weeks ago but is now feeling better: they are still considered poorly controlled using our current assessments. The quality of patient-provider communication is important to

consider when the assessment tool is not an accurate reflection of the patient's present control status.

Perhaps, it is now appropriate to rethink the definition of asthma control. It is time to separate the assessment of appropriate controller therapy and imminent risk of an asthma exacerbation. One focus needs to establish and confirm the criteria for assessing adequacy of therapy. The second area of research needs to identify and test criteria to determine when a patient enters the "yellow zone" and is at imminent risk of an exacerbation. Kochis et al³ raised this question and provide the stimulus for this research.

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