Asthma Control Tools User's Guide: An IPCRG Initiative

By Andrew J Cave, Lana L Atkinson, Jaime Correia de Sousa, and Niels H Chavannes

Introduction

Asthma control in clinical practice refers to the extent to which the effects of asthma can be seen in the patient, or have been reduced or removed by treatment. Like most diseases, the way in which asthma presents is patient-specific, where attention to numerous physiological, life-style and environmental factors need to be considered. Therefore, achieving asthma control can be an extremely complicated and arduous process. Once a patient has managed to gain control, *maintaining* control over a period of time, is yet another challenge. Since the clinical manifestations of asthma vary in frequency and intensity, a standardized approach to the assessment of asthma control is necessary (Bime et al., 2012).

Project Objectives

Ongoing research resulting in practical improvements to asthma care and control over the past 8 years, have prompted the IPCRG team to revise the 2007 User's Guide to measuring asthma control in primary practice. Preliminary work on an update to the 2007 Guide began in the spring 2013 and was completed in mid 2016. Specifically, project objectives at that time were to:

1. review, refine and execute a targeted literature search to investigate and update the validated tools used for assessing clinical control of asthma [in adult patients] in primary care practice;
2. evaluate results from the data extracted from the literature;
3. narrow down the number of tools down to a manageable level;
4. administer a survey to IPCRG member to score and provide qualitative feedback and expert opinion;
5. update the current Users' Guide (2007) to assist health care professionals in clinical practice using a simple, descriptive approach; and
6. co-author manuscript for publication in an online journal to disseminate findings and results to a wider audience.

Methodology

Search

The first phase of the project, or **Phase I**, involved a targeted literature search that was completed in three phases. First, an initial search was conducted using keywords identified from the core literature to identify tools used to measure asthma control in primary care (MEDLINE search; limits: 1946 to present). The keywords used and their associated variants include: "asthma", "control", "primary care", "questionnaire", "tool", and "measure". This approach identified a total of 32 tools; however, after reviewing each of the **32** tools against a set of predetermined inclusion and exclusion criteria (see **Table 1** below), the number of potentially relevant tools was reduced to **19**. The authors then decided to evaluate each of the 19 tools using a simple, descriptive approach, based on a tabular set of

categories considered relevant to health care practitioners most likely to use the Guide in primary practice.

Table 1. Evaluation Criteria

Inclusion Criteria	Exclusion Criteria
• Measured some aspect of asthma control • Intended for adult populations • English speaking (although studies published in other languages were also considered) • Considered the following key measurement properties: validity, reliability, responsiveness, and interpretability. • Cost and copyright considerations were not prohibitive for use in primary care practice	• Specifically intended for child populations • Measured disease severity • Measured asthma impairment to predict future exacerbations • Measured Quality of Life • Specific tools that measured biomarkers as aspects of asthma control

Evaluation and Survey

Phases 2 of the search and selection process invited members of the IPCRG research committee to participate in a simple survey to help narrow the list to a more manageable number of tools to include in the updated Guide (see **Appendix A**). Participants were given the list of 19 tools to review, along with a description of each tool, and the referenced resource(s) for further inquiry. After reviewing the list of tools, the participants were asked to answer five questions in which a simple "yes" or "no" response was required, with the option to offer suggestions, feedback and expert advice, based on the participants' specialized skills and experience. Participant feedback was encouraged as it would help guide the design and implementation of a "new" and innovative guide with the purpose of considering a simple, yet effective grassroots perspective, supported by the best available evidence, rather than a standardized resource lacking in any real practical application. It is believed that this select group of participants would add significant value to our efforts to design a User's Guide for primary care physicians committed to offering the best care to their patients living with asthma, and their ongoing challenge to maintain control of their condition.

Results

Even though our response rate was low (5 participants completed the survey), the feedback that was provided was helpful in identifying key measures that had previously been overlooked. For example, one measure in particular was in the process of being validated for use in clinical practice during the initial search phase of the project. Access to the validation results of this tool in the research literature had not yet been published, and therefore, were not readily available until later, during the survey phase of the project.

Based on our survey results and feedback from the IPCRG team, we narrowed our list of asthma control measures from **19** to **7**. Furthermore, based on the descriptive input received, we decided to improve upon the previous Guide by utilizing a simple *descriptive approach* (see **Appendix B**). This approach is a move away from the previous, less ambiguous system whereby "smiley faces" were implemented. It is hoped that this revised and updated version will provide physicians with a better sense of the key points necessary when selecting the most appropriate tools for use in practice.

Discussion

The newly updated Guide incorporates the best features of the previous Guide, while also using a simple and practical descriptive approach to help primary care physicians select the best guide for their patients. At a glance, physicians can quickly decide which tool to select to measure and in turn, better manage asthma control in their patients. See the tables below for a list of the combined approached used to enhance the new Guide:

A. Criteria for 2007 User's Guide to Asthma Control Tools

	Criteria	Description
1	Fully validated	Does it have face and content validity? Has it been validated for use in all ages? Is it responsive?
2	Clinically meaningful	Would the result of the test give you sufficient information to help you make a clinical decision?
3	Practical for use in primary practice	Could you use the test in a standard primary care consultation?
4	Flexible administration	Can the test be self-administered? Completed in print or electronically? Submitted by post or telephone?
5	Suitable for a range of patients	Can the test be used for and by children with and adults with a range of literacy levels?
6	Available in different languages	Is the test suitable for a range of nationalities? Has it been translated into a range of languages and validate in those languages? Has allowance been made for cultural differences?

B. Additional Descriptive Points Included for updated User's Guide to Asthma Control Tools (if available)

1	Number of items in each test
2	Location/permissions
3	Fee or free
4	Time required to complete the test
5	Language availability
6	Suitable for adults, children, or both
7	Responsive

Unfortunately, given our objective to create a simple, go-to Guide, we were unable to include a list of all the available tools. If, however, you would like to have a list of all the tools identified in the literature that measure asthma control, you can contact the authors (or IPCRG) directly.

Conclusion

The goal of the updated *User's Guide* is to provide primary care physicians with a range of user-friendly and informative tools that they can choose from, given specific needs and conditions, to measure asthma control in their patients. The *Guide* is not intended to rank the tools from best to worst, but rather to highlight the strengths and weaknesses of each tool, in relation to the others,

according to the criteria outlined. Each tool is different and has its own set of strengths and weaknesses. For example, the 30s Asthma Test may be quick to administer, but is not readily available in languages other than English and French. All these variables should be considered when selecting the most appropriate tool to measure control for individual patients, within the context of the health care resources available. Continuous review of the literature is required and ongoing, based on a set of pre-defined evaluation and inclusion criteria.

Efforts by researchers and health care professionals to create and/or enhance already available tools to measure asthma control is also ongoing. We applaud these efforts. It is our hope that this newly revised Guide will highlight and expose these critical contributions intended to improve the overall health and wellness of the asthma patients who are learning to better manage their disease.

September 2016

APPENDIX A: Survey

The Asthma Control Tools User's Guide (updated): An IPCRG Initiative

About the Guide

The International Primary Care Respiratory Group (IPCRG) is updating a User's Guide to help primary care physicians better assess asthma control in their patients.

After a comprehensive review of the literature, the IPCRG team identified **8 tools** to measure asthma control in adult patients (see attached Table 1). This Guide is intended as an update to the 2007 Guide. These tools were carefully selected according to the well-established tools previously evaluated, according to preexisting inclusion and exclusion criteria, such as: proven validity and reliability; the setting and original population studied during initial development (e.g., acute vs. primary care); general vs. disease-specific measures; and the inclusion of relevant and emerging tools identified in the research literature associated with managing asthma control. The team decided to evaluate each tool using a simple, descriptive approach based on a set of categories that are believed to be relevant to the health care practitioners who will likely use the Guide in primary practice. This move away from the previous system whereby "smiley faces" were implemented. It is hoped that this revised and updated version will provide practitioners with a better sense of the key points necessary when selecting the most appropriate tools for use in practice.

Why you?

As a member of the IPCRG team, we have invited you to participate in a survey as part of a select group of researchers and/or practitioners, whom we have identified as having specialized skills and experience that will add significant value to our ongoing efforts to design a practical user's guide for primary care physicians committed to offering the best care to their patients living with asthma, and their ongoing challenge to main control of their condition.

The Survey

This simple, electronic survey consists of 5 "yes" or "no" questions, as well as the opportunity to comment on the questions asked. You will also be invited to offer suggestions and/or guidance based on your specialized experience, to help further develop the User's Guide. **The survey should only take between 5 and 20 minutes to complete.**

We would like to thank you in advance for your time and feedback with this IPCRG project. **Please return the completed, saved survey to Lana Atkinson (**acubed@shaw.ca**) by Friday, December 5th, 2014.** If you have any questions, please feel free to contact: Dr. Andrew Cave (Andrew.cave@ualberta.ca) or Lana Atkinson (acubed@shaw.ca).

APPENDIX A: Survey

A User's Guide to Asthma Control Tools:

An IPCRG Initiative

Questions	Answers (Yes or No)	Comments
1. Upon review of the attached table, can you identify any additional tools that should be included in the User's Guide that we may have overlooked?		
2. Upon review of the attached table, can you identify any key articles or studies that we may have missed to support our analysis and description?		
3. Do you prefer the newly designed descriptive approach to evaluate the tools, compared to the "smiley faces" approach previously used by IPCRG to rate asthma control tools?		
4. Do you agree on the list of categories used to describe each tool?		
5. Do you have any further comments or suggestions?		

Completed by (optional):_____

APPENDIX B: Descriptive Table of Selected Tools

The Asthma Control Tools User's Guide (updated): An IPCRG Initiative

By Andrew J Cave, Lana L Atkinson, Jaime Correia de Sousa, Niels H Chavannes

	Tool	Description
1	30s Thirty Second Asthma Test	***Standout Feature:*** • Takes 30 seconds to complete; research supports the use of this Test as a brief screening tool for asthma control ***Key Elements:*** • 6 items (not including lung function test); each with Y/N responses; if patient answers yes to ≥ 1 item, poor control is considered • Can be used with or without airway function testing to evaluate control • Assess control over different periods for various items • Based on, used and recommended by the Canada's Asthma Guidelines for 5 years • Children's version is available in both English and Canadian French • Available at: http://pert.ucalgary.ca/asthma/30%20Second%20Test%20for%20Control.pdf or www.asthmaguidelines.com ***Potential Limitations:*** • Not validated • Limited information; it was included in the original 2007 *IPCRG Asthma User's Guide*, but not observed in the research literature since • Cannot find evidence that this tool has been used in recent years (last published article was in 2007) • Website disbanded and no longer available www.asthmaincanada.ca

2	ACT Asthma Control Test	***Standout Feature:*** • Simple measure; requires only 2-3 minutes to complete ***Key Elements:*** • Adults (12yrs and over) • 5 items, each with 5 possible responses • If the score is 19 or less, asthma symptoms may not be well controlled • Control is calculated from adding the score of each of the 5 items • Assesses control using data from the past 4 weeks • Good validation; meets standards for responsiveness • c-ACT (for children 4-11yrs) is availble • Developed by Glaxo-Smith Kline (GSK) • Freely available at: http://www.asthmacontroltest.com/ (2014) ***Potential Limitations:*** • 80+ languages, but only validated in some languages (eg., Spanish) • Should be completed *before* consultation
3	ACQ Asthma Control Questionnaire	***Standout Feature:*** • Can be completed in 2-3 minutes ***Key Elements:*** • Simple, 7 items, multi-dimensional construct assessing symptoms (5 items--self-administered) and rescue inbronchodilator use (1 item-self-administered), and FEV1% (1 item) completed by clinic staff • 7 point scale (0=no impairment, 6= maximum impairment for symptoms and rescue use; and 7 = categories for FEV1%) • Strong discriminative and evaluative properties • Control level, as well as changes in asthma control (either spontaneously or via treatment), is calculated from mean score • Symptoms data is collected with 1 week recall • Scores range between 0 (totally controlled) and 6 (severely uncontrolled) • Validated for paper and phone administration, and available in over 60 different languages, with cultural adaptations

		• Available at: http://www.qoltech.co.uk/index.htm • Formats include paper, interactive web, and various electronic devices • Required permission from author, Professor Elizabeth Juniper: juniper@qoltech.co.uk ***Potential Limitations:*** • Results cannot be analyzed by "eyeballing" • Not designed to differentiate between daytime and nighttime asthma control • A fully validated, interviewer-administered version of the adult ACQ has been developed for children 6-10 years, but not for children less than 6 years of age; this version must be administered by a trained interviewer • All 3 dimensions (self-administered questionnaire, rescue bronchodilator use and FEV1%) must be measured; otherwise, there is a risk of estimating asthma control inaccurately in individual patients
4	ACSS Asthma Control Scoring System	***Standout Feature:*** • Uses a percent score, which is a familiar and easily understood quantification figure ***Key Elements:*** • This measure evaluates three types of parameters: clinical, psychological and inflammatory • Each parameters is quantified to obtain a maximal score of 100% • A global scale is calculated as the mean of these scores • Adequate measurement properties both as an evaluative and as a discriminative instrument, that is, is can be helpful in assessing both asthma control as well as treatment needs • Useful in both clinical practice and for research purposes • Good test-retest reliability • Cross-sectional and longitudinal construct validity were supported between ACSS and 2 other instruments • This instrument was designed to meet the Canadian Asthma Guidelines criteria for asthma control • May be completed by either the patient or health care professional • Available at: LeBlanc A, Robichaud P, Lacasse Y, Boulet LP. Quantification of asthma control: validation of the Asthma Control Scoring System. Allergy 2007;62:120-125. ***Potential Limitations:*** • Limited information is available for analysis in other settings

		• Strictly based on the Canadian asthma control criteria, albeit very close to other national and international guidelines, may have limitations in this particular population and context
5	ATAQ Asthma Therapy Assessment Questionnaire	***Standout Feature:*** • Recommended by the NHLBI as a validated method for assessing asthma control ***Key Elements:*** • Includes 7 items used to assess asthma control based on: 1) self-perception of asthma control; 2) missed work, school, or normal daily activities; 3) nighttime waking due to symptoms; 4) use of relief medications • Each of the 4 areas is scored as "0" (no control problem) or "1" (control problem), generating an overall score from 0-4, with 4 indicating worse control • Cross-sectional and longitudinal validity have been demonstrated in the research literature • Adult versions (18 yrs and over) with 2 or 6 question with "Y/N" or "unsure" options • Child version available and avalidated (5-17yrs) with 3 or 6 questions with "Y/N" or "unsure" options • Available at: https://evidencebasedpractice.osumc.edu/Documents/Guidelines/ATAQChecklist.pdf • Copyrighted by Merck & Co. (must be acknowledged in any presentation) ***Potential Limitations:*** • Available in English and Spanish • MID has not been established • Although the instrument can prove responsiveness, the smallest difference that can be measured over time is 1
6	CARAT 10 Control of Allergic Rhinitis and Asthma Test	***Standout Feature:*** • First and only tool capable of assessing simultaneously the control of upper and lower airway diseases, as recommended by Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines ***Key Elements:*** • Brief, self-administered questionnaire to quantify the degree of control of allergic rhinitis and asthma • 10 questions addressing upper and lower airway symptoms, sleep interference, activity limitation, and the need to increase medication over four-week period. • Answers are rated on a 4-point scale, with a total possible score ranging from 0 (minimum control) to

		30 (maximum control • Validated and translated into >20 languages • Free, open access available at: http://www.respiratory-research.com/content/10/1/52 • Can be used in both clinical studies and clinical practice, allowing for comparison between groups and the evaluation of individual patients over time. • Users can print the questionnaire online and print the results; paper versions can also be downloaded, with links to smartphone applications ***Potential Limitations:*** • Cross-cultural validation is underway • CARAT questionnaire for children aged 6-12, CARAT Kids, is now fully developed and validated.
7	RCP- 3Qs Royal College of Physicians 3 Questions	***Standout Feature:*** • Takes only 30 seconds to complete ***Key Elements:*** • 3 items only (not lung function), each with Y/N • No to all three questions indicates and can confirm "good" control • Yes to 2 or 3 questions indicates poor control • Yes to 1 question indicates that further inquiry is needed to assess level of asthma control • Assesses asthma control over the past week/month • Very good face validity • Self-administered, paper format, as well as via telephone and electronically • Validated for use in UK English • The receive further information about the questions, as well as view the questions themselves, go to: http://www.guidelinesinpractice.co.uk/nov_99_bucknall_asthma_nov99#.VliASa1dHIU ***Potential Limitations:*** • Used only for adults • Used for confirming "good control" only, and does not assess the specific reasons why control is lacking. Further inquiry by using another validated questionnaire or by asking more specific questions is required as follow-up. • It is only used in English speaking countries

References

30 Second Asthma Test

Ahmed A, Ernst P, Tamblyn R, Coleman N. Validation of The 30 Second Asthma Test™ as a measure of asthma control. Can Respir J 2007;14:105-109.

Bime et al. Measures of asthma control [review]. Current Opinion in Pulmonary Medicine 2012; 18:48-56.

Cloutier MM, Schatz M, et al. Asthma outcomes: composite scores of asthma control. J Allergy Clin Immunol 2012;129:S24-S33.

GINA. 2015. Pocket guide for asthma management and prevention (for adults and children older than 5 years). Global Initiative for Asthma

ACSS

Bime et al. Measures of asthma control [review]. Current Opinion in Pulmonary Medicine 2012; 18:48-56.

Halbert et al. Measuring asthma control is the first step to patient management: a literature review. Journal of Asthma 2009;46:659-664.

Hoskins et al. Assessing asthma control in UK primary care: use of routinely collected prospective observational consultation data to determine appropriateness of a variety of control assessment models. BMC Family Practice 2011;12:105.

LeBlanc A, Robichaud P, Lacasse Y, Boulet LP. Quantification of asthma control: validation of the Asthma Control Scoring System.

Tavares et al. The Asthma Control Scoring System: translation and cross-cultural adaptation for use in Brazil. Journal Brasileiro De Pneumologia: Publicacao Oficial Da Sociedade Brasileira De Pneumologia E Tisilogia 2010;36:683-92.

ACT

Bime et al. Measures of asthma control [review]. Current Opinion in Pulmonary Medicine 2012; 18:48-56.

Cloutier MM, Schatz M, et al. Asthma outcomes: composite scores of asthma control. J Allergy Clin Immunol 2012;129:S24-S33.

Halbert et al. Measuring asthma control is the first step to patient management: a literature review. Journal of Asthma 2009;46:659-664.

Nathan RA, Sorkness CA, Kosinski M, Schatz M, Li JT, Marcus P, Murray JJ, Pendergraft TB. Development of the asthma control test: a survey for assessing asthma control. *Journal of Allergy & Clinical Immunology* 2004;113:59-65.

Pinto Pereira et al. Evaluation of asthma control using patient based measures and peak expiratory flow rate. West Indian Medical Journal 2009; 58:214-18.

ACQ

Bime et al. Measures of asthma control [review]. Current Opinion in Pulmonary Medicine 2012; 18:48-56.

Cloutier MM, Schatz M, et al. Asthma outcomes: composite scores of asthma control. J Allergy Clin Immunol 2012;129:S24-S33.

Halbert et al. Measuring asthma control is the first step to patient management: a literature review. Journal of Asthma 2009;46:659-664.

Juniper EF, Bousquet J, Abetz L, Bateman ED. Identifying 'well-controlled' and 'not well-controlled' asthma using the Asthma Control Questionnaire. Respir Med 2006; 100: 616- 621.

Juniper EF, Gruffydd-Jones K, Ward S, Svensson K. Validation, measurement properties and interpretation of the Asthma Control Questionnaire in children. Eur Respir J 2010: 36: 1410-1416.

Juniper EF, O'Byrne PM, Guyatt GH, Ferrie PJ, King DR. Development and validation of a questionnaire to measure asthma control. Eur Respir J 1999; 14: 902-7.

Juniper EF, Svensson K, Mörk AC, Ståhl E. Measurement properties and interpretation of three shortened versions of the asthma control questionnaire. Respir Med 2005; 99: 553-8.

ATAQ

Bime et al. Measures of asthma control [review]. Current Opinion in Pulmonary Medicine 2012; 18:48-56.

Cloutier MM, Schatz M, et al. Asthma outcomes: composite scores of asthma control. J Allergy Clin Immunol 2012;129:S24-S33.

Distler et al. Access Carroll: Community Asthma education initiative. Journal of the American Academy of Nurse Practitioners 2011;23:357-60.

Halbert et al. Measuring asthma control is the first step to patient management: a literature review. Journal of Asthma 2009;46:659-664.

Skinner EA, Diette GB, Algatt-Bergstrom PJ, Nguyen TT, Clark RD, Markson LE, Wu AW. The Asthma Therapy Assessment Questionnaire (ATAQ) for children and adolescents. Dis Manag 2004;7:305-13.

Vollmer, W. M. (2004) Assessment of asthma control and severity. Ann Allergy Asthma Immunol 93, pp. 409-414.

CARAT

van der Leewu S, van der Molen T, et al. The minimally clinically importance difference of the control of allergic rhinitis and asthma test (CARAT): cross –cultural validation and relation with pollen counts. Primary Care Respiratory Medicine 2015;25:14107.

Azevedo P, Correia de Sousa J, Bousquet J, Bugalho-Almeida A, Del Giacco SR, Demoly P, Haahtela T, Jacinto T, Garcia-Larsen V, van der Molen T, Morais-Almeida M, Nogueira-Silva L, Pereira AM, Rodríguez MR, Silva BG, Tsiligianni IG, Yaman H, Yawn B, Fonseca JA; WHO Collaborative Center for Asthma and Rhinitis, Montpellier. Control of Allergic Rhinitis and Asthma Test (CARAT): dissemination and applications in primary care. Prim Care Respir J. 2013 Mar;22(1):112-6. doi: 10.4104/pcrj.2013.00012

Fonseca JA, Nogueira-Silva L; Morais-Almeida M; Sa-Sousa A; Azevedo LF; Ferreira J; Branco-Ferreira M; Rodrigues-Alves R; Bugalho-Almeida A; Bousquet J. Control of Allergic Rhinitis and Asthma Test (CARAT) can be used to assess individual patients over time. *Clin Transl Allergy* 2012;2:16.

CARAT Kids

Borrego LM; Fonseca JA; Pereira AM; Pinto VR; Linhares D; Morais-Almeida M. Development process and cognitive testing of CARATkids - Control of Allergic Rhinitis and Asthma Test for children. BMC Pediatrics 2014;34.

Linhares DV1, da Fonseca JA, Borrego LM, Matos A, Pereira AM, Sá-Sousa A, Gaspar A, Mendes C, Moreira C, Gomes E, Rebelo FF, Cidrais Rodrigues JC,Onofre JM, Azevedo LF, Alfaro M, Calix MJ, Amaral R, Rodrigues-Alves R, Correia de Sousa J, Morais-Almeida M; CARATKids study

group. Validation of control of allergic rhinitis and asthma test for children (CARATKids)--a prospective multicenter study. Pediatr Allergy Immunol. 2014 Mar;25(2):173-9. doi: 10.1111/pai.12218.

RCP 3 Questions

Thomas M, Gruffydd-Jones K, Stonham C *et al.* Assessing asthma control in routine clinical practice: use of the Royal College of Physicians '3 Questions'. *Prim Care Respir J* 2009; 18: 83-8. Available from: http://www.thepcrj.org/journ/view_article.php?article_id=580

Pinnock H, Burton C, Campbell S *et al.* Clinical implications of the Royal College of Physicians three questions in routine asthma care: a real-life validation study. *Prim Care Respir J* 2012; 21: 288-94. Available from: http://www.thepcrj.org/journ/view_article.php?article_id=933