

# Mapping the Asthma Care Process: Implications for Research and Practice



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**What is already known about this topic?** Asthma management is a complex process influenced by multiple interacting factors. There is limited integration of research on these influences, making it difficult to use research evidence in clinical practice.

**What does this article add to our knowledge?** We propose a fully-integrated logic model of asthma care that emphasizes the role of patient behaviors (medication adherence, self-monitoring, trigger management, and management of severe asthma exacerbations) and health care professional behaviors (medical care and self-management support activities) in improving health outcomes.

**How does this study impact current management guidelines?** The model can be used as an integrative framework for research and clinical practice in asthma, and optimized or adapted for different clinical contexts and respiratory conditions.

**BACKGROUND:** Whether people with asthma gain and maintain control over their condition depends not only on the availability of effective drugs, but also on multiple patient and health care professional (HCP) behaviors. Research in asthma rarely considers how these behaviors interact with each other and drug effectiveness to determine health outcomes, which may limit real-life applicability of findings.

**OBJECTIVE:** The objective of this study was to develop a logic process model (Asthma Care Model; ACM) that explains how patient and HCP behaviors impact on the asthma care process.

**METHODS:** Within a European research project on asthma (ASTRO-LAB), we reviewed asthma care guidelines and empirical literature, and conducted qualitative interviews with patients and HCPs. Findings were discussed with the project team and respiratory care experts and integrated in a causal model.

**RESULTS:** The model outlines a causal sequence of treatment events, from diagnosis and assessment to treatment prescription, drug exposure, and health outcomes. The relationships between these components are moderated by patient behaviors (medication adherence, symptom monitoring, managing triggers, and exacerbations) and HCP behaviors (medical care and self-management support). Modifiable and nonmodifiable behavioral determinants influence the behaviors of patients and HCPs. The model is dynamic as it includes feedback loops of behavioral and clinical outcomes, which influence future patient and HCP decision making. Key evidence for each relationship is summarized to derive research priorities and clinical recommendations.

**CONCLUSIONS:** The ACM model is of interest to both researchers and practitioners, and intended as a first version (ACM-v1) of a common framework for generating and translating research evidence in asthma care. © 2016 The Authors. Published by Elsevier Inc. on behalf of the American Academy of Allergy, Asthma & Immunology. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). (J Allergy Clin Immunol Pract 2016;4:868-76)

**Key words:** Asthma; Medication adherence; Management; Therapeutic education; Behavioral care; Evidence-based care

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The research leading to these results has received funding from the European Community's 7th Framework (FP7/2007-2013) under grant agreement no. 282593.

Conflicts of interest: A. L. Dima has received research support from the European Commission (7th Framework [FP7/2007-2013] under grant agreement no. 282593) and Respiratory Effectiveness Group; and has received travel support from the Respiratory Effectiveness Group. E. van Ganse has received research support from the European Commission (7th Framework [FP7/2007-2013] under grant agreement no. 282593), Merck, GlaxoSmithKline, ALK-Abelló, Bristol-Myers Squibb, and Bayer; is on the Pfizer Board; has received consultancy fees from Steve Data/PELyon; has received lecture fees from Bristol-Myers Squibb; has stock/stock options in PELyon; and has received travel support from Novartis, AstraZeneca, and Boehringer Ingelheim.

Received for publication February 17, 2016; revised April 27, 2016; accepted for publication April 29, 2016.

Available online June 7, 2016.

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2213-2198

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<http://dx.doi.org/10.1016/j.jaip.2016.04.020>

*Abbreviations used*

ACM- Asthma care model

HCP- Health care professional

HRQoL- Health-related quality of life

IM- Intervention mapping

SAE- Severe asthma exacerbation

Managing asthma is a challenging task as it requires sustained performance of numerous behaviors from patients, their caregivers, and the health care professionals (HCPs) involved in their care. To support patients effectively in achieving and maintaining asthma control, HCPs need to monitor and intervene in a complex causal process, and to base their decisions on the latest research evidence regarding an ever-increasing number of treatment options, self-management strategies, technological advances, and health care policies. Advising patients on appropriate medication adherence strategies is part of this process. To be valuable for clinical practice, research needs to be conducted and disseminated in a standardized and easily interpretable manner and to provide accurate information on the whole domain of interest. However, recent reviews of adherence research highlighted study heterogeneity and substantial knowledge gaps.<sup>1,2</sup>

The lack of a unified and comprehensive overview of the asthma care process is not by itself a limitation of individual studies, but can be a barrier to effective care. Individual studies are, necessarily, constrained by the need to focus on specific concepts and relatively simple models that can be tested within the boundaries of 1 study. Expectedly, most observational asthma research uses cross-sectional designs and targets a limited number of concepts selected based on data availability rather than on theoretical considerations.<sup>1</sup> Experimental designs, although highly valued for their capacity to isolate the effect of a single causal element (eg, medical compound, behavioral intervention, care protocol), have been criticized for their low external validity when compared with routine care, which often involves a more complex causal network.<sup>3</sup> Aligning research hypotheses with questions relevant for real-life practice is a priority for asthma care, and medical care in general. Although individual studies can optimize their clinical impact to some extent,<sup>4</sup> building a unified picture of asthma care requires a separate process of reviewing evidence and clinical guidelines, studying current practice, and dialogue within the research and clinical community to reach and update consensus on essential causal relationships that require testing. This process would help generate not only a comprehensive model of asthma care, but also standardized methods for testing common research hypotheses.

This article proposes such a model, developed within the ASTRO-LAB project, a European Union-funded project investigating adherence to inhaled medication in asthma.<sup>5</sup> We describe model components and hypothesized causal relations, and derive an agenda for asthma care research that would maximize its value for clinical practice. The model is presented as a first version that would benefit from further input from clinicians, researchers, policy makers, and patients. We hope to stimulate collaboration and focus that would facilitate more rapid accumulation of evidence.

## METHODS

We conducted reviews of asthma treatment guidelines,<sup>6-10</sup> literature reviews, qualitative interviews, and behavior analysis of the asthma care process with input from the study team and respiratory care experts. Results from the guidelines review were complemented with focused scoping reviews on specific topics, such as HCP asthma care support, patient self-management (eg, medication adherence, trigger management, exacerbation management), and asthma outcomes (eg, control, exacerbations); and a systematic review on determinants of medication adherence in asthma.<sup>1</sup> Keyword searches were conducted in EMBASE, Medline, PsychInfo, and PsychArticles until July 2012 (the ASTRO-LAB set-up phase) using terms such as asthma, adherence, and determinant. Articles were selected if they reported empirical studies or narrative or systematic reviews on these topics. References of selected articles were examined for additional relevant works.

Qualitative interviews were conducted by telephone with patients, parents of children with asthma, and general practitioners and nurses involved in asthma care (13 interviews in France, 26 in the United Kingdom), as part of patient and public involvement in research. Participants were recruited via patient and professional organizations, and convenience sampling; no additional selection criteria were specified. The discussions were based on semistructured interview guides that included questions for HCPs on how they deliver medical and behavioral asthma care and their perceptions on patient behaviors and determinants, and barriers and facilitators to providing asthma care; patients and/or parents were invited to share their perceptions of the asthma care needed and received, and their asthma management behaviors and beliefs. Results were audio-recorded, summarized qualitatively, and used to interpret research evidence in light of patient, caregiver, and HCP experiences, and to analyze the asthma care process from a behavioral perspective based on health behavior theory and principles in line with the Intervention Mapping (IM) approach.<sup>11</sup> Links between components were formulated as causal relationships consistent with existing theory, evidence, and clinical observation. The model was developed iteratively via discussions with the ASTRO-LAB team and respiratory care experts, in which model versions were presented and feedback requested on its components, relationships, and general format. The research literature published during and after model development was integrated within the relevant model components and relationships.

## RESULTS

### The model

The asthma care logic model (ACM-v1; [Figure 1](#)) distinguishes between 3 categories of components: the asthma management process, the patient and/or caregiver's roles, and the HCP's contributions to this process. Each category is briefly described below, followed by a review of the available research evidence for the key model components, and the associated implications for research and clinical practice.

**The asthma management process.** The causal sequence of asthma management is well known to respiratory care practitioners and can be formulated in simple terms as the following sequence of events. The process of managing a person's asthma is prompted initially by an acute and spontaneous change in symptoms such as wheezing, breathlessness, chest tightness, and cough, indicating the onset of asthma at a given level of *asthma severity (a)*. These symptoms lead the patient to consult an HCP

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