

# VALIDATION OF A SET OF ASTHMA ILLUSTRATIONS IN CHILDREN WITH CHRONIC ASTHMA IN THE EMERGENCY DEPARTMENT



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## INTRODUCTION

- Asthma is a chronic inflammatory disorder of the airways. It is the most common chronic condition affecting children worldwide. Despite its enormous prevalence and economic burden, the management of asthma remains poor.
- Written asthma action plans are recommended by national and international asthma guidelines. However those presented in text format are difficult for pediatric patients and those with low literacy skills to comprehend.
- Pictograms enhance comprehension of information in action plans.
- To be effective, pictorial aids must be understood by the patient population that will be using them.

## OBJECTIVE

To test, modify and validate a set of asthma illustrations depicting different levels of asthma control and common asthma triggers in children (and their parents) with asthma presenting to an Emergency Department (ED) for their eventual inclusion into an action plan.

## METHODS

- Semi-structured interviews using guessability and translucency questionnaires tested the comprehensibility of 15 illustrations (8 representing different levels of asthma control and 7 representing asthma triggers) in asthma patients 10-17 years of age (or parents of children 1-9 years of age) seen in the pediatric hospital ED over the 10-month study period.
  - Guessability** to determine the patients understanding of what each image was meant to portray
  - Translucency** to determine how well they felt the illustration represented what it was meant to portray
- Literacy level assessed using the Rapid Estimate of Adult Literacy in Medicine (REALM) or REALM-teen scales.
- Asthma education and counseling provided by pharmacist to study participants if requested by patient/parent or if deemed to clinically necessary by pharmacist
- If guessability and/or translucency scores were low, the illustration was redesigned and re-tested (Round 2 + 3) in the study population



## RESULTS

80 patients enrolled in the study. After the first 30 patients were interviewed, modifications were made to 7 of the original 15 pictograms to improve comprehension. Data analysis was performed overall on the 80 patients (n = 42 in parents of children aged 1-9, and n = 38 in children aged 10-17 years). Literacy assessments found both groups to have the ability to read most patient education material.

Table 1. Demographic data of study participants

	Children 1 – 9 yrs n = 42 (%)	Children 10 – 17 yrs n = 38 (%)
<b>Gender</b>		
Male	27 (64.7)	23 (60.5)
Female	15 (35.7)	15 (39.5)
<b>Education Level (Parents)</b>		
None	0 (0)	0 (0)
Grade 1 – 3	0 (0)	0 (0)
Grades 4 – 6	0 (0)	12 (31.6)
Grades 7 – 8	0 (0)	13 (34.2)
Grade ≥ 9	3 (7.1)	10 (26.4)
College / University	36 (85.7)	0 (0)
Post-graduate studies	2 (4.8)	0 (0)
<b>Health Literacy Grade Equivalent, (raw score)</b>	<b>REALM</b>	<b>REALM-Teen</b>
≤ Grade 3, (0 – 18)	0 (0)	0 (0)
Grade 4 – 6, (19 – 44)	0 (0)	3 (7.9)
Grade 7 – 8, (45 – 60)	3 (7.1)	11 (28.9)
≥ Grade 9, (61 – 66)	39 (92.9)	23 (60.5)

Figure 1. Sample illustrations requiring modifications based on guessability and translucency score of study participants

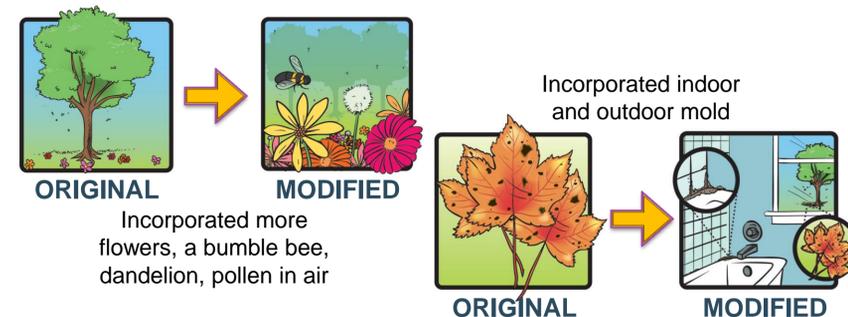


Table 2. Final illustrations depicting 4 different levels of asthma control

Pictogram								
Pictogram #. description	1. Good	2. Good	3. Moderate	4. Moderate	5. Bad	6. Bad	7. Emergency	8. Emergency
Parents (Children 1 – 9 years)								
Group (n)	42	39	42	39	28	28	42	42
<b>Guessability</b>								
Correct, n (%)	42 (100)	33 (84.6)	40 (95.2)	32 (82.1)	27 (96.4)	28 (100)	41 (97.6)	41 (97.6)
<b>Translucency</b>								
Median (min-max)	7 (7-7)	6 (3-7)	7 (4-7)	6 (2-7)	6 (4-7)	6 (4-7)	7 (5-7)	7 (7-7)
Scores ≥ 6, n (%)	42 (100)	37 (94.9)	41 (97.6)	36 (92.3)	27 (96.4)	27 (96.4)	42 (100)	42 (100)
Children 10 – 17 years								
Group (n)	38	33	37	33	29	29	38	38
<b>Guessability</b>								
Correct, n (%)	38 (100)	27 (81.8)	38 (100)	28 (84.8)	28 (96.6)	26 (89.7)	38 (100)	38 (100)
<b>Translucency</b>								
Group (n)*	37	32	36	32	28	28	37	37
Median (min-max)	7 (5-7)	6.5 (5-7)	6 (3-7)	6 (4-7)	6 (5-7)	6 (2-7)	7 (6-7)	7 (7-7)
Scores ≥ 6, n (%)	36 (94.7)	32 (97)	34 (89.5)	31 (94)	28 (96.6)	28 (93.1)	37 (97.4)	37 (97.4)

\* One child did not understand the 1 to 7 translucency scale so it was not completed.

Table 3. Final illustrations depicting common asthma triggers

Pictogram #. description							
Parents (children 1 – 9 years)							
Group (n)	28	42	42	39	42	28	42
<b>Guessability</b>							
Correct, n (%)	26 (92.9)	42 (100)	41 (97.6)	37 (94.9)	42 (100)	28 (100)	37 (88.1)
<b>Translucency</b>							
Median (min-max)	7 (5-7)	7 (6-7)	7 (5-7)	7 (1-7)	7 (3-7)	7 (4-7)	7 (3-7)
Scores ≥ 6, n (%)	28 (100)	42 (100)	42 (100)	35 (89.7)	41 (97.6)	27 (96.5)	40 (95.2)
Children 10 – 17 years							
Group (n)	29	38	38	33	38	29	38
<b>Guessability</b>							
Correct (%)	28 (96.6)	38 (100)	38 (100)	31 (93.9)	38 (100)	29 (100)	27 (71.1)
<b>Translucency</b>							
Group (n)*	28	37	37	32	37	28	37
Median (min-max)	7 (5-7)	7 (5-7)	7 (6-7)	6 (2-7)	7 (4-7)	6.5 (5-7)	6 (2-7)
Scores ≥ 6, n (%)	28 (96.6)	37 (97.4)	37 (97.4)	30 (84.8)	36 (94.8)	28 (96.6)	28 (73.7)

\* One child did not understand the 1 to 7 translucency scale so it was not completed.

Table 4. Asthma Education and Counseling

Asthma Education / Counseling Provided	Parents (of children 1 – 9 years)	Children 10 – 17 years
Yes	32 (76.2)	26 (68.4)
No	10 (23.8)	12 (31.6)
Requested by Patient / Parent	13 (31)	12 (31.6)
Pharmacist Intervened	18 (42.9)	12 (31.6)
<b>Areas of Education / Counseling Provided</b>		
Asthma Triggers	20 (47.6)	25 (65.8)
Medications	29 (69)	22 (57.9)
Inhaler Technique	19 (45.2)	17 (44.7)
Self Monitoring / Asthma Action Plan	9 (21.4)	13 (34.2)
<b>Time Spent Educating / Counseling</b>		
Mean (range), minutes	12.3, (5-40)	13.7, (5-60)

Figure 2. Final set of illustrations designed based on validation testing



## CONCLUSION

- A total of 15 illustrations have been successfully developed, modified and validated to be useful and comprehensible tools for inclusion into an action plan for use in our pediatric emergency department
  - 8 illustrations represent 4 different levels of asthma control (good, moderate, bad and emergency)
  - 7 illustrations represent common asthma triggers

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