

## **Development of the Web-Based Child Asthma Risk Assessment Tool**

Herman Mitchell, Ph.D.  
Rho, Inc Chapel Hill, NC  
[hmittell@rhoworld.com](mailto:hmittell@rhoworld.com)  
(919) 408-8000 x223

### **Overview:**

One of the clearest results of the Phase I National Cooperative Inner-City Asthma Study (NCICAS) was that asthma is a multi-determined, multi-factorial problem for children, especially among those in the inner city. NCICAS showed that there are a number of factors that are related to asthma among children, and that no one factor is a primary cause for all children - there is no magic bullet for treating this chronic disease. For some children, they did not have the correct medication plan, for others; they had problems with adherence or environmental allergen exposures, or behavioral problems. All these factors were shown to be differentially important for various groups of children.

Based upon the NCICAS Phase I epidemiologic study, the finding of a variety of different factors which seemed to influence children's' asthma morbidity led us to attempt to tailor the NCICAS intervention to the specific problems of each child. To that end, an Asthma Risk Assessment Tool (ARAT) was developed drawing upon the results of the 2 1/2 to 3-hour baseline assessment that was part of the NCICAS research protocol. While this tool proved of great value in individualizing the NCICAS Phase II intervention, it is not likely that hospitals and clinics could mount such an ambitious baseline assessment in order to employ this approach, no matter how valuable it has been shown to be.

For the recent implementation of the NCICAS intervention by the Centers for Disease Control (CDC), a version of the CARAT has been developed that has streamlined the assessment to less than 10 minutes while maintaining the basic integrity of the instrument. This risk profile allows a family, or healthcare worker to individually tailor and prioritize a self-management plan for their child's asthma. This asthma management plan does not address clinical issues such as medications or physician related management, but rather behavioral and environmental issues that these NIAID projects have shown to be related to asthma morbidity.

The CARAT draws upon the results of these prior studies of children with asthma as well as input from an expert panel of asthma clinicians and researchers. It is hoped that this web site will provide asthma health workers, children with asthma and their families with a source for accurate, up-to-date information on asthma risks and support for dealing with their individual asthma triggers and risk factors.

## What is the CARAT?

The Child Asthma Risk Assessment Tool (**CARAT**) and is designed to assist clinicians and asthma counselors in evaluating potential risks for children with asthma. Based upon the National Cooperative Inner City Asthma Study, published asthma research, with input from nationally renowned asthma specialists, the CARAT is designed to provide a rapid risk profile of children with asthma. Asthma is a multifactor, multi-causal chronic disease and recent research has shown that the factors responsible for asthma symptoms and exacerbations can vary widely from child to child. This profile covers a variety of potential risks for children with asthma and provides a tailored profile for each child. Results are displayed in summary and graphical representations.

## How to use CARAT information

The CARAT is designed for a brief initial assessment of asthma risk. It takes 6 or 7 minutes to administer and can be self-administered as well. The CARAT scores asthma risks on 9 different dimensions of asthma risk and is greatly strengthened if skin test allergy data are available. The scores on these dimensions range from 0 to 10. Risk dimensions (or factors) that are scored 7 or higher should receive priority in the management of the child's asthma, scores between 4 and 6 should definitely be addressed; while scores below 4 are less problematic but still require some discussion with the family or child.

The CARAT risk profile is meant to provide only a quick assessment as a starting point for tailored asthma education and management of the child's symptoms. It will point to areas that should be explored further in discussion with the family and should be supplemented by additional clinical data, detailed discussions, and follow-up.

## Login Procedure

Accessing the CARAT web-site

At present the CARAT is located on a private, password controlled website. Within the next few months it will be made publicly available for all users. The website is best viewed using Microsoft Internet Explorer version 5.0 or higher, or Netscape Navigator version 4.7 or higher.

## Using CARAT

Starting CARAT

To enter data for the CARAT, click on the 'Begin Assessment' menu item. The questionnaire will be displayed (**see Appendix A for a copy of the CARAT Form**).

Complete the identifying information in the “A” question array, and then continue on to the “B” question array.

### Entering Data

Questions in the “A” section do not ask for names, but allow you to provide information regarding the interviewer and child so that you can correctly file the CARAT report for future reference. These questions are self-explanatory. With the exception of question B1 (“What is the name of your child’s school?”) all of the questions in the “B” section are answered by selecting the best answer from the pull-down list associated with that question. Answer each question as directed. This is done by placing your mouse pointer on the down arrow and clicking once, then moving your pointer to the desired response and clicking again. The list of options will close, leaving your selection in the response area. If an error has been made, you may repeat the process. No data is saved until the “Submit” button has been selected at the end of the questionnaire. For those questions for which you do not know the answer, select the “Missing” response

### Submitting the Data

Once you have completed all of the questions and have reached the bottom of the form, click on the ‘Submit’ button.

### CARAT Reports

Upon completion of the survey, two reports will be available to the user:

#### Risk Summary and Analysis (see **sample report in Appendix B**)

This report summarizes the collected data in a categorical format, providing scores for each of the analytic sub-categories:

- Medical Risk Assessment
- Environmental
- Smoking
- Adherence
- Adult & Child Asthma Responsibility (Responsibility)
- Psychological Well-Being of Child (Child Behavior)
- Psychological Well-Being of Caretaker (Adult Well-Being)
- Asthma Attitudes
- Child Skin Test (Allergies, if available)

Within each sub-category, or risk factor, every questionnaire item that contributes to the factor score is printed along with the scoring weight assigned to that item. Please

note that it is possible for the sum of the individual items within a factor to add up to more than 10 points. However, in this case, the overall factor score will be truncated at 10 and considered to be at the maximum.

#### Graphical Output (see example in Appendix C)

The risk factors listed above are displayed graphically in an Adobe PDF file. Adobe Acrobat Reader is required to view this graphic and may be downloaded free of charge at: <http://www.adobe.com/products/acrobat/readstep2.html>

Horizontal bars are color-coded according to risk score:

**Green** – low risk (1 to 3 points)

**Yellow** – moderate risk (4 to 6 points)

**Red** – high risk (7 to 10 points)

Total risk scores are also included at the beginning of each bar.

# Appendix C

## **CHILD ASTHMA RISK ASSESSMENT REPORT**

(sample)

Completed: January 21, 2002 by H.E.M.

ID Code: 1A3C6730

Child is 8 years old and speaks English. Child is in grade 3 at Anderson Elementary school; has 3 relatives with asthma and does not have a regular doctor.

### **MEDICAL RISK ASSESSMENT SECTION SCORE: 6**

Child only takes medicines PRN. (3)

A doctor or health provider has never given the child written instructions for what to do about taking medicines. (3)

### **ENVIRONMENTAL SECTION SCORE: 8**

Child does not have a pillow or mattress with a zipped plastic cover for allergies.

A humidifier or vaporizer is used in the child's bedroom. (3)

The TV/Family room has carpeting. (2)

A gas stove is sometimes used to help heat the home. (1)

There is moisture or mildew on the windows (1).

There are problems with cockroaches (1).

### **SMOKING SCORE: 3**

3 People in the child's home smoke. (3)

### **ADHERENCE SCORE: 4**

The caretaker has indicated they sometimes have problems when trying to be sure the child gets his/her medicines. (4)

# Appendix C

## **ADULT & CHILD ASTHMA RESPONSIBILITY SCORE: 10**

Caretaker says child takes asthma medication on his/her own most or all of the time. (10)

## **PSYCHOLOGICAL WELL BEING OF CHILD SCORE: 10**

Caretaker indicated that they are concerned about their child's behavior or emotions "pretty much" or "all of the time". (10)

## **PSYCHOLOGICAL WELL BEING OF CARETAKER SCORE: 0**

## **ASTHMA ATTITUDES SCORE: 6**

Caretaker believes that it is not possible to control their child's asthma so that they can play like other children. (2)

Caretaker believes that it is not possible to manage their child's asthma so that they can be free of symptoms. (4)

## **CHILD SKIN TEST RESULTS SCORE: 10**

Skin test indicates that the child is dust mite sensitive. (10)

Skin test indicates that the child is Cockroach sensitive and there is evidence of cockroaches in the home. (10)

Skin test indicates that the child is Rat sensitive and there is evidence of Rats in the home. (10)

# Appendix D

## Child Asthma Risk Scores

ID Code: 1A3C6730

