

**An Online Study to Compare Treatment Advice Between  
Websites Created in America and Mesoamerican Countries:  
Has Ethnomedicine Reached the Web?**

By

Alicia Graves

A CAPSTONE

Presented to the Oregon Health & Science University's  
Department of Medical Informatics & Clinical Epidemiology

in partial fulfillment of  
requirement for the degree of  
Masters of Biomedical Informatics

May 2004

School of Medicine  
Oregon Health & Science University

Master of Biomedical Informatics

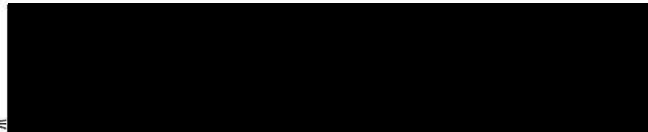
**Certificate of Approval**

This is to certify that the Capstone Project of

**Alicia K. Graves**

*“An Online Study to Compare Treatment Advice Between  
Websites Created in America and Mesoamerican  
Countries: Has Ethnomedicine Reached the Web?”*

Has been approved



Professor in charge of capstone project

*May 14, 2004*

Date

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## Acknowledgements

My greatest thanks on the completion of this Capstone research project must go to my advisor, Holly Jiminson. Not only was she instrumental in helping me design my research project, she provided feedback during the research phase and proved invaluable through her editing skills while I was writing this paper.

I also want to thank Pat Tidmarsh and Joan Ash who, along with Holly, provided guidance during the important proposal writing stage of this research.

Lastly, I want to thank my friends and family. I want to thank my husband, Rude Graves. Without his support, finishing this large research project would have been difficult, and I probably would not have been able to attend graduate school at all. My parents and siblings, though they are far away, have always been willing to lend telephone support. My friends in the department, and outside of it, have consistently encouraged me to continue with my education at OHSU and to do my best work.

Thank you.

## **Abstract**

Ethnomedicine is the socially and culturally influenced practice of medicine or healing. Its name describes exactly what it is; ethnicity based medical practices. Ethnomedicine is used the world over to treat many illnesses and conditions. This study researched asthma treatment information on the Internet for two purposes, 1) to determine if Mesoamerican websites gave different treatment advice than American websites, and 2) to determine if ethnomedical advice for the treatment of asthma has infiltrated the Web. This research involved searching for and selecting consumer health websites created in Mesoamerican countries and the United States, then comparing their asthma treatment advice using content analysis. The results did not demonstrate either a high level of ethnomedical advice on the web or large differences in treatment between Mesoamerica and America.

## **Introduction**

While vacationing in Costa Rica in 2003, my husband and I were introduced to a local man named Eduardo. Eduardo works with some friends of ours who have relocated there, and through them we were invited to spend time at his home with his family.

While playing with his children, I learned that his 10 year old son, Christian, has asthma and has been suffering from it since he was a young child. Eduardo believes that Christian's asthma was caused by the chemicals he used to use when they farmed their land. Unfortunately, due mostly to a language barrier, the family was unable to describe to me any treatment Christian was receiving. However, it appeared to me that he was on minimal medication, if any. This intrigued me, and I decided to investigate the idea that asthma treatment in Costa Rica may be different than that in the United States.

## ***Ethnomedicine***

Treatment methods for diseases vary widely by ethnicity, culture, and nation [1].

Typically, individuals from non-Western cultures value interpersonally oriented cultural values, and subscribe to spiritual-social or fatalistic causes of illness [2].

Specifically, in Central America and Mexico, health care is influenced by spiritual and religious elements [3]. Health care in those countries is often provided by spiritual folk healers, or can integrate folk remedies with Western medicine. These traditional

healing systems can include botanical, herbal, spiritual, and medical therapies as well as cultural concepts of health and illness [4]. These culturally influenced health care approaches are called *ethnomedicine*.

Murguia et al. researched the use of ethnomedicine by Central American immigrants in the United States in 2003 [3]. The researchers looked at the prevalence of folk and spiritual methods of health care, such as *hierbalista* (herbal remedies), *espiritismo* (spiritual belief that deceased spirits influence people to perform deeds and effect health outcomes), *santeria* (Afro-Cuban based religion in which the physical and emotional states are intertwined with the spiritual), and folk remedies by 76 Central American immigrants living in America in the District of Columbia. They found that the immigrants had a high degree of recognition of the ethnomedical methods with a lower level of belief in them, although every participant claimed to have used at least one of the methods in the past.

The study also looked at which illnesses and syndromes the participants treated with ethnomedical methods. Many of the immigrants had used ethnomedical approaches to treat culture-bound syndromes. Culture-bound symptoms are recurrent, locality-specific patterns of troubling behavior and experience that cannot be diagnosed by Western standards [5]. Culture-bound syndromes reported most often and treated with ethnomedical approaches in the Murguia study were *ataques de nervios* (attack of the nerves), and *empacho* (blocked intestine) [3]. Other illnesses that the participants reported treating with ethnomedicine included arthritis, asthma, fevers, infections,



migraines, and ulcers. Almost half of all the respondents reported combining physician and ethnomedical remedies together to solve their health problems. These results indicate that spiritual folk healers and folk medicine are both utilized and important to Central Americans. Whereas the Murguia paper showed that these alternative methods are being practiced, in this project my goal is to determine if their use is being suggested on consumer health care webpages.

For my research, I wanted to find sources of ethnomedical advice on the Internet. Narrowing the search to a single illness, I chose asthma because it is a worldwide illness and because there are documented cases of asthma being treated with ethnomedicine [3]. Thus, I searched for ethnomedical treatment of asthma on webpages from a certain region, the region of Mesoamerica.

Mesoamerica is the geographic and cultural area made up of Mexico and Central America, including the countries of Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, and Belize. Although my interest was piqued in Costa Rica, I did not want to limit myself to studying the websites of only one country, especially when the countries in question have fewer Internet resources than we enjoy here. For example, in 2002, the United States had an estimated 7,000 Internet Service Providers (ISPs), whereas all of the Mesoamerican countries together had only 82 (2000 estimate). In addition, in 2000, the country of Belize only boasted 18,000 Internet users, while the U.S. had approximately 160 million [6].

## ***Research Question***

Do consumer health webpages from Mesoamerica differ from those from the United States of America on the topic of asthma treatment? Do the Mesoamerican webpages offer ethnomedical treatment advice for asthma?

## ***Asthma***

Asthma is a chronic lung disease characterized by inflammation of the airways that leads to airflow obstruction [7]. This respiratory disease causes many days of restricted activity, missed work and school, lost sleep, and doctor or hospital visits in its many sufferers. In the United States, 20.3 million Americans report having asthma (2000-2001), and there are more than 5,000 asthma-related deaths in the country annually [8]. Asthma is also the most common chronic illness facing Latino children in the United States today [9]. Unfortunately, it is very difficult to find statistics on the prevalence of asthma in the separate Mesoamerican countries. Other researchers have commented on the lack of asthma research and epidemiological information in much of Latin America [10, 11].

This disease is, unfortunately, becoming more common worldwide. Asthma has been increasing in prevalence, morbidity, economic burden, and mortality (in some countries) around the world over recent decades [12]. There is evidence that it is increasing in Mexico [11], and the number of Americans with asthma has more than doubled over the last two decades. Not only is the number of people with the disease

increasing, so is the severity of the disease, causing a significant health problem here and abroad. Although the exact cause of the increasing epidemic is not known, it is believed that atopy, or the genetic susceptibility to become allergic, and environmental pollutants and factors may work together to generate asthma [13].

To give some background on asthma treatment, I will discuss The Expert Panel Report 2, “Guidelines for the Diagnosis and Management of Asthma” [14]. This report suggests treating asthma based on a four-component system:

- 1) Measures of Assessment and Monitoring
  - a. Initial Assessment and Diagnosis of Asthma
  - b. Periodic Assessment and Monitoring
- 2) Control of Factors Contributing to Asthma Severity
- 3) Pharmacologic Therapy
- 4) Education for a Partnership in Asthma Care

This report will be focusing on the second and third of those components, control of factors contributing to asthma severity (triggers), and Pharmacologic therapy (medical treatment). Since the goal of this research was to find ethnomedical asthma treatment advice on the Web, I am also looking at Complimentary/Alternative Medicines (CAMs), which is not included in the Expert Panel Report 2. CAMs treatments are said to be made up of two fields, the medical arts, such as acupuncture, and herbal/natural medicine [15]. CAMs therapies apply different philosophical approaches than

conventional medicine, and include chiropractic, massage therapy, Oriental medicine, naturopathy, and homeopathy. Some CAMs methods, like Oriental medicine, are also ethnomedicine, and more and more often, they are prescribed to patients along with more traditional methods.

### ***Ethnomedicine and Asthma***

In a study by Pachter et al. on the variation in asthma beliefs and practices among four different Latino groups in the U.S., Mexico, and Guatemala, surveys were given to 160 adults and the cultural consensus model was used to analyze agreements among respondents and compare beliefs [9]. The researchers found that the most widely shared beliefs were on the causes of asthma, while there were notable differences in the recipients' beliefs about symptoms and treatments. For all four populations the biomedical model was part of the explanatory model, with ethnomedical beliefs also present. The researchers found that the cultural beliefs that received positive responses included humoral beliefs (hot/cold cause of illness) and maintaining balance (in many aspects of life, such as emotional and physical balance). Other folk beliefs, such as witchcraft, the evil eye, and *susto* (fright), received negative responses.

This paper reported that, along with more typical treatments like medication and hospital visits, respondents utilized ethnomedical treatments for their asthma suffering. These culturally based treatments included avoiding getting upset, praying, and drinking herbal tea. However, it was their responses to what they believed caused asthma that really showed the humoral beliefs of the surveyed populations. Many

agreed that things such as a change in weather, exposure to winds or drafts, and getting wet or drinking icy drinks while sweating could cause asthma [9].

A study done on ethnomedical methods for childhood asthma practiced by Puerto Rican immigrants to the United States found that the ethnomedical techniques are well known and commonly used in the community. The researchers report that the methods used seem to relate to commonly recognized aspects of the Puerto Rican ethnomedical system, and appear to help when analyzed from within that framework. These methods include maintaining physical and emotional balance, religious practices, and ethnobotanical therapies [16].

While the last study I mentioned talks about the use of ethnomedicine by Puerto Ricans, I performed this research because I am interested in finding out more about ethnomedicine native to Mesoamerican countries. While I already know that Mesoamerican Latinos practice alternative medical techniques, I do not know to what extent the treatments have been made accessible to the public via the Internet. It is possible that these methods have received very little “airtime” on the Internet, at least as valid health care solutions on trusted consumer health webpages.

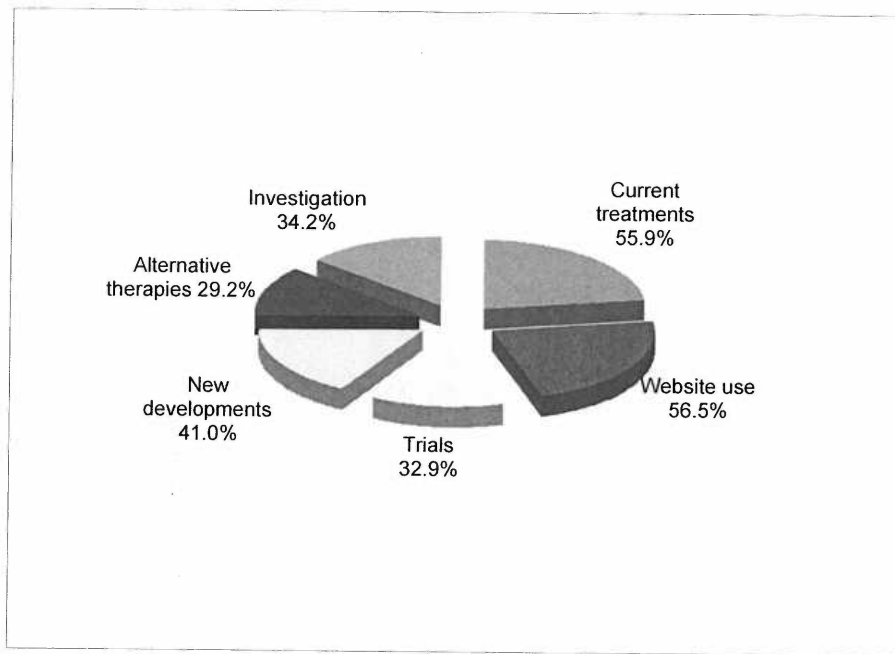
### ***The Internet and Consumer Health Information***

The Internet is quickly changing our lives and the way we access information, and with an estimated 20,000 to 100,000 health-related websites, it is quickly developing into a source for current consumer health information [17]. A previous study reported

that an estimated 70 million American have used it to get health or medical information [19], and another reported that by 2005 an estimated 88.5 million would use it for this purpose [18]. Health information seekers have explained that they like using the Internet to answer their medical questions for three reasons, 1) it is convenient, 2) they can get more information than from other sources, and 3) their searches are anonymous. The Internet is influencing these health information seekers, too; 41% say that the information they found on the Web influenced their medical decisions [20].

Consumer health information seekers use the Internet for different types of knowledge. Information seeking reasons include wanting knowledge on a specific illness, help making decisions about whether or not to see a doctor, getting health care news, or finding information to help select doctors, hospitals, or medicines [20]. Two studies (each with under 300 surveys) looked at the type of information consumers want when investigating a specific illness online. One (see Figure 1) found that nearly 56% of them want information on current treatments, while 29% are looking for alternative therapies [17]. The other found that 58% used the Internet to investigate drug side effects or complications of treatment, and 41% wanted information on CAMs [18].

**Figure 1**



**Figure 1.** Information requested on recommended websites [17].

One study reported that in the U.S. there is no difference between racial and ethnic groups in their use of the Internet to seek of health information, and that, unlike many other online activities, it is equally compelling to all [19]. In the United States the Hispanic population is the largest minority group in the country, and many of them speak Spanish primarily. Since they face much greater barriers to receiving health care than English speakers, it would be extremely useful for them to have access to Spanish-language health and medical information online. There are concerns that both English- and Spanish-language consumer health websites show a variability in performance, often lack accuracy and complete coverage of material, offer conflicting information, and require too high of a reading grade level for the average consumer [21].

## **Methods**

For this project the investigation consisted of three phases. The first phase was the selection of consumer health webpages to include in the research. In the second phase I coded the data from each webpages to determine content and similarity. Finally, the third phase consisted of analyzing and comparing asthma treatment information from webpages created in the United States of America to information from Mesoamerican webpages.

Since I am not fluent in Spanish, I used a variety of software tools to help me translate the Spanish-language webpages. These tools, while helpful, are not complete, and I translated portions of the text by hand when necessary. The translation software I used included Apple's Sherlock Translation Channel on my computer, and two online translation tools, Reverso ([www.reverso.com](http://www.reverso.com)) and Google Language Tools ([http://www.google.com/language\\_tools.html](http://www.google.com/language_tools.html)).

### ***Webpage Selection***

For this, the first portion of my research, I needed to complete multiple Internet searches of both English- and Spanish-language websites, and analyze the results from each search to determine which webpages would be included in my research.



## **Webpage Search**

To determine which webpages to include in my research, I performed Internet searches using multiple search engines. Search engines are designed to help people find information on the Internet, and since different search engines search the Internet in different ways, it is imperative to use more than one in order to have more inclusive coverage of the Web.

For finding relevant English-language websites from the United States, I utilized a number of English-language search engines. The search engines I used were

Google ([www.google.com](http://www.google.com))

Yahoo ([www.yahoo.com](http://www.yahoo.com))

Lycos ([www.lycos.com/](http://www.lycos.com/))

I entered each of the two English search terms (“asthma” and “asthma treatment”) into each of the four search engines. Then I selected the websites to use from the first 30 links of each search engine. Links were classified as relevant if the search term(s) were present in the link itself or the surrounding text. Other relevant pages may have been found by following links on already selected websites.

I did not complete a comprehensive web search of American asthma websites because they were not the main focus of the study. I was primarily using them for comparison. I needed the best of the asthma websites from the USA in order to create a “gold standard”

of asthma treatment in the U.S. to then compare to the treatment information given on the Mesoamerican websites.

For the Spanish-language portion of my web search, I utilized both English-language and Spanish-language search engines. The search engines used were:

Google

QuePasa ([www.quepasa.com](http://www.quepasa.com))

Yahoo en Espanol ([espanol.yahoo.com](http://espanol.yahoo.com))

Both of the two Spanish search terms (“asma” and “asma tratamiento”) were entered into all of the four search engines for each of the eight Mesoamerican countries. In order for me to be sure that the results were links to only Mesoamerican countries (and not other Spanish-speaking countries), I only accepted pages with Mesoamerican country domain extensions. A country domain extension is the part of the page’s Internet address that specifies that it originates from a server in a country other than the United States. The country domain extensions for the Mesoamerican countries are in Table 1.

After performing the web searches, I selected the Spanish-language websites to be included in my research from the first 100 links (or from the number of hits if there were less than 100) from each search engine. Links were classified as relevant if the search term(s) were present in the link itself or the surrounding text. Other relevant pages may have been found by following links on already selected websites.

**Table 1**

Country of Origin	Country Domain Extension
Belize	.bz
Costa Rica	.cr
El Salvador	.sv
Guatemala	.gt
Honduras	.hn
Mexico	.mx
Nicaragua	.ni
Panama	.pa

*Table 1.* List of Mesoamerican countries and their corresponding country domain extensions.

### **Webpage Analysis**

Next, I performed a quick analysis of each webpage to determine if it could be included in my research (see Table 2). Since this research is not designed to ascertain how *good* the information contained on a website is, but to find differences between websites from different countries, this site analysis was relatively short. However, I did want to maintain a certain level of dependability of the information, and did not want to include any websites that were selling commercial products or that were not primarily sources of health care information. A spreadsheet of the websites selected and some basic information about them can be found in Appendix 1.

**Table 2**

Feature Looking At	Indicator
Statement of Information Source	Yes/No
Balance and Bias	Sponsor declaration, product advertisement, information directed at consumers
Source	Supplier of information. Only want dedicated health care sites, including .org, .edu, .gov, and .com consumer health sites only
Country	Only USA sites for English-language search, only Mesoamerican sites for Spanish-language search
Type of File	Accepting only websites (html), no .pdfs or other file formats

Table 2. General webpage analysis for selecting pages to be included in research.

### **Coding**

The second portion of my research consisted of coding the asthma patient information webpages I had selected. Before I began data collection I had predetermined my general coding scheme. However, it became much more specific and detailed during the actual act of coding; codes were added to reflect the nuances of the data. The codes were used to both categorize and label each passage selected from the webpages. They are listed in Appendix 2. While the end goal of this research was to determine if there is ethnomedical asthma treatment advice on the Web from Mesoamerican countries, I coded *everything* regarding asthma treatment on these webpages. This was done in order to compare information on the American websites to that on the Mesoamerican sites.

The process of coding so many websites was made easier with the assistance of an open-source Macintosh qualitative research software program, the Text Analysis Markup System, or TAMS, Analyzer, Version 2.46b1 (available at <http://educ.kent.edu/~mweinste/tams/software.html>.) To utilize the program, I cut and pasted information from the websites into the TAMS Analyzer's Project Window, selected text from that window, and added codes to it from a hierarchical list of codes. See Appendix 3 for the TAMS Analyzer Document Model [22]. The TAMS system of coding is that of a markup language. A code is placed on either end of the text to which it points, and later can be recalled by performing a search of the entire code or any portion of it. The following is an example of a piece of coded text from my research (the codes are in bold, the website text in italics):

**{treatment>medication>bronchodilators}***Bronchodilators, generally used as "rescue medications," open up the bronchial tubes so that more air can flow through. Bronchodilators include beta-agonists and anticholinergics, and come in inhaled, tablet, liquid, or injectable forms.* **{/treatment>medication>bronchodilators}**

The codes shown above are in their markup language form. These codes are hierarchical, as shown below:

- I. Treatment
  - a. Medication
    - i. IgE Inhibitor
    - ii.

After coding each document in this way, the text can be searched by the codes. All documents included can be searched together, or any subset of the documents. To use the example above, I could search all Mesoamerican websites for either the specific code

**“treatment>medication> bronchodilators”** and get back all the text responses coded with it, or I could search for either of the hierarchically higher up codes, **“treatment”**, or **“medication”** and receive responses that are more general. Searches can also be created utilizing the Boolean AND and OR statements. The TAMS software was useful in managing the large amount of data (30 documents and 732 pieces of coded text) in this study.

During the actual coding process, codes were affixed to the data, with each pertinent piece of information receiving one or more codes. By attributing as many codes as necessary to each theme or section, I ensured a thorough examination of the data. I used different data elements as units of analysis, including themes (sentences or phrases) and concepts (words grouped in conceptual ideas) [21]. I also utilized metatags, or codes that included the entire document or large portions of it, so that I was able to quickly tell what material each entire document covered, as well as what country it was from. For example, I used the following metatags to show that the website was from Mexico, and that the information on the website was for childhood asthma:

**Country\_Of\_Origin>Mexico** and **Intended\_Population>Children**. To see an example of an entire coded document from this research, see Appendix 4.

### ***Content Analysis***

As with many qualitative projects, the analysis of this research actually began during the data collection and coding phases, because the data already gathered helps determine and shape the remainder of the data collection. In this way, researchers like myself are able to develop tentative conclusions or hypotheses based on their already collected data [23]. Through this initial analysis I was able to determine what specific questions I wanted to answer during my final analysis while still coding the texts.

Still, after the continuous analysis, there was much more analysis to complete. For this data-rich textual asthma treatment research, I needed a method of analysis that would extract pertinent data and allow me to apply standard quantitative statistical techniques to it. *Content analysis* is just such a research method; it uses a set of procedures to make valid inferences from text, and transforms qualitative into quantitative data. In fact, Weber states that one type of research that content analysis is particularly well suited for is to “disclose international differences in communication content” [24].

The simple content analysis technique I applied to my research included:

- 1) Reading each website and placing meaningful phrases into categories and sub-categories (completed during Coding phase).
- 2) Revising the categories and placement of phrases.
- 3) Using the TAMS software program and Excel worksheets to perform quantitative analysis on the data.

The type of examinations that content analytic research usually undertakes includes word counts, frequencies, sequences, and other patterns in the data.

## Results

A total of 30 websites were evaluated in this study. Thirteen of the websites were created in Mesoamerican countries, and 17 of them were from the United States of America (see Table 3 for more details).

**Table 3**

Country of Origin	Number of Websites
Belize	0
Costa Rica	2
El Salvador	0
Guatemala	1
Honduras	0
Mexico	9
Nicaragua	1
Panama	0
United States	17

*Table 3.* List of the countries in the research and number of websites from each.

Each of these websites were coded from a list of 83 total codes, hierarchically arranged in five categories, each with their own sub-categories where needed (see Appendix 2 for complete list). Table 4 shows the statistics of how many of each country's websites covered the basic asthma definition and treatment topics. The subjects most pertinent to this research had less than complete coverage, with ethnomedicine at 26.7%, and CAMs at 33.3% (see Tables 5 and 6). Prevention by avoiding biomedical triggers (86.7%) and treatment with medication (70%) were the two most thoroughly covered topics. See Tables 7 and 8 for more statistics on those two subjects.



None of the results tables include Belize, El Salvador, Honduras, or Panama. There were not any websites from those countries included in the research.

**Table 4**

General Topic	STATISTICS			NUMBER OF WEBSITES FROM EACH COUNTRY THAT MENTIONS TOPIC				
	Number of Websites	Percentage of Websites	Number of Codes	Costa Rica	Guatemala	Mexico	Nicaragua	United States
Total Number of Websites	30			2	1	9	1	17
Definition of Asthma	18	60%	28	1	0	5	0	12
Biomedical Triggers	26	86.7%	255	1	1	8	1	15
Treatment w/ Medication	21	70%	191	0	1	5	0	15
Immunotherapy Treatment	6	20%	191	0	0	1	0	5
CAMs Treatment	10	33.3%	23	1	0	3	1	5
Ethnomedicine	8	26.7%	25	2	0	5	1	0

Table 4. Website statistics and topic counts for websites from each country mentioned the topic for some general codes.

Each of the following tables shows the total number of mentions of four main asthma treatment/prevention topics from both the Mesoamerican and U.S. websites. The four topics are ethnomedicine (Table 5), CAMs (Table 6), biomedical triggers (Table 7), and medication (Table 8). In each table the results are broken down by number of websites per country and type of treatment or prevention. They also show the percentage of both Mesoamerican (N=13) and American (N=17) websites included in the study that mentioned each topic.

**Table 5**

Ethnomedicine	Total Number of Mentions on Websites	Costa Rica	Guatemala	Mexico	Nicaragua	United States	% of Mesoamerican Websites w/ Mentions	% of American Websites w/ Mentions
Diet	1	1	0	0	0	0	7.7%	0%
Exercise	8	0	0	3	1	0	30.8%	0%
Plants/ Herbs	3	2	0	0	0	0	15.4%	0%
Specific Plants/ Herbs	11	2	0	2	0	0	30.8%	0%
Supplements	1	0	0	1	0	0	7.7%	0%
Other	1	1	0	0	0	0	7.7%	0%
<b>Total</b>	<b>25</b>						<b>61.5%</b>	<b>0%</b>

*Table 5.* Mentions of using ethnomedical methods to treat asthma.

The topics in Table 5 include treating asthma with exercise, plants or herbs in general, specific plants or herbs (given by name and how to take), and supplements. While exercise is, not to my knowledge, a standard ethnomedical asthma treatment, I included it as such because it was not mentioned at all on U.S. asthma websites. Table 5 shows that the most ethnomedical advice given on the Mesoamerican websites was on the topics of exercise (30.8% of the websites mentioned it) and on specific plants or herb treatments (again, 30.8% of the websites mentioned it). All in all, only 61.5% of the Mesoamerican websites had mentions of ethnomedicine.

Table 6 shows that CAMs treatment for asthma is also not very prevalent on the Internet. On American websites the most common CAMs treatment advice was dietary supplements (29.4% of websites), whereas in Mesoamerican countries, exercise was, again, the most frequently mentioned (38.5%). I included exercise as a CAMs topic as well as a Mesoamerican ethnomedical one because I am not sure if it is, in fact, considered an ethnomedical approach, and since it was also mentioned a few times on U.S. websites. It is necessary to mention that supplements from American websites were different than those from American websites. More of the studied Mesoamerican websites included CAMs treatments than the American sites did.

Table 6

Complimentary and Alternative Medicines (CAMs)	Total Number of Mentions on Websites	Costa Rica	Guatemala	Mexico	Nicaragua	United States	% of Mesoamerican Websites	% of American Websites
Acupuncture	1	0	0	0	0	1	0%	5.9%
Diet Restrictions	1	0	0	0	0	1	0%	5.9%
Dietary Supplements	5	0	0	0	0	5	0%	29.4%
Horehound Tea	1	0	0	0	0	1	0%	5.9%
Nasal Wash	1	0	0	0	0	1	0%	5.9%
Exercise	10	1	0	3	1	2	38.5%	11.8%
Other	3	0	0	0	0	2	0%	11.8%
<b>Total</b>	<b>22</b>						<b>38.5%</b>	<b>29.4%</b>

Table 6. Mentions of using CAMs methods to treat asthma.

Table 7 shows that biomedical factors that trigger asthma attacks are fairly evenly covered on the Internet on both Mesoamerican and American websites. Occupational triggers and reflux disease, are the least covered, while allergens and irritants are included often. Reflux disease can trigger an asthma attack in some sufferers, particularly at night [14].

Table 7

Biomedical Triggers	Subset of Triggers	Total Number of Mentions	Costa Rica	Guatemala	Mexico	Nicaragua	United States	% of Mesoamerican Websites	% of American Websites
Total number of Websites			2	1	9	1	17		
Air Quality		12	1	1	3	0	5	38.5%	29.4%
Allergens									
	Cockroaches	8	0	1	0	0	6	7.7%	35.3%
	Dust Mites	18	1	1	4	0	9	46.2%	52.9%
	Mold	13	1	1	0	0	7	15.4%	41.2%
	Pets	20	1	1	5	0	9	53.9%	52.9%
	Pollen	12	0	1	3	0	4	30.8%	23.5%
	Non-specific	35	0	1	5	0	12	46.2%	70.6%
	<b>Total Allergens</b>	<b>106</b>						<b>61.5%</b>	<b>76.5%</b>
Emotional Anxiety		8	1	1	2	0	4	30.8%	23.5%
Exercise		14	1	1	2	1	7	38.5%	41.2%
Foods		11	0	1	2	0	6	23.1%	35.3%
Infections		16	1	1	3	0	8	38.5%	47.1%
Irritants									
	Tobacco Smoke	18	1	1	3	0	8	38.5%	47.1%
	Other	20	1	1	3	0	9	38.5%	52.9%
	<b>Total Irritants</b>	<b>38</b>						<b>38.5%</b>	<b>52.9%</b>
Medications		8	0	1	1	0	6	15.4%	35.3%
Reflux Disease		6	0	1	0	0	5	7.7%	29.4%
Climate		14	1	1	2	0	6	30.8%	35.3%

Occupational		4	0	0	0	0	1	0.0%	5.9%
<b>Total</b>		<b>382</b>							

Table 7. Mentions of preventing asthma attacks by avoiding biomedical triggers.

Table 8

Medication	Subset of Medication	Total Number of Mentions	Costa Rica	Guatemala	Mexico	Nicaragua	United States	% of Mesoamerican Websites	% of American Websites
Total Number of Websites			2	1	9	11	17		
IgE Inhibitor		4	0	0	0	0	3	0.0%	17.6%
Anti-Inflammatories									
	Corticosteroids	24	0	1	1	1	11	15.4%	64.7%
	Mast Cell Stabilizer	3	0	0	0	0	3	0.0%	17.6%
	Cromolyn/Nedocromil	2	0	0	0	0	2	0.0%	11.8%
	Non-specific	17	0	1	2	2	7	23.1%	41.2%
	<b>Total Anti-Inflammatory</b>	<b>46</b>							
Anti-Leukotrienes		15	0	1	1	1	9	15.4%	52.9%
Anticholinergics		2	0	0	0	0	2	0.0%	11.8%
Antihistamines		3	0	0	1	1	2	7.7%	11.8%
Bronchodilators								0.0%	0.0%
	Anticholinergic	4	0	0	1	1	3	7.7%	17.6%
	Beta Agonists	17	0	0	2	2	9	15.4%	52.9%
	Theophylline	11	0	0	1	1	8	7.7%	47.1%

	Non-specific	20	0	1	2	2	9	23.1%	52.9%
	<b>Total Bronchodilators</b>	<b>52</b>							
Combined Therapy		11	0	0	0	0	8	0.0%	47.1%
Epinephrine		4	0	0	0	0	2	0.0%	11.8%
Long-term		11	0	0	0	0	8	0.0%	47.1%
Quick Relief			0	0	0	0	8	0.0%	47.1%
<b>Total</b>		<b>257</b>							

*Table 8.* Mentions of treating asthma with medication.

Table 8 shows the breakdown of asthma medication advice given on the Internet. These numbers are highly variable, with more of the American websites offering proficient coverage of asthma medications than the Mesoamerican websites.

## Discussion

Generally speaking, the results from this online analysis were moderately negative.

While the study was designed to find examples of ethnomedical treatments of asthma on the Internet from certain Latino countries, it discovered very few actual instances of it.

While we know that asthma is often treated ethnomedically by natives of the Mesoamerican countries [3, 9], there were not many references to these remedies found on legitimate consumer health websites. Whereas over half of the websites from Mesoamerica mentioned ethnomedical treatments, they provided much less information on folk remedies than to conventional asthma advice. A majority of the websites, including the Mesoamerican webpages, discussed using medication (70% of the sites) or

limiting exposure to biomedical triggers (86.7%) to combat asthma attacks. That indicated that even from countries where folk remedies are widely practiced, the online treatment advice is unabashedly conventional in content.

There is a methodological factor that should be discussed regarding this study before discussing its results. Primarily, the portion of the world that I chose to study for web-based ethnomedical asthma advice is also a segment of it that has little access to the Internet. Websites were not available for four of the eight Mesoamerican countries studied (Belize, El Salvador, Honduras, and Panama). Thus, 50% of the study group was not included because there were no consumer health websites covering asthma found created in those countries. Whereas Mesoamerica was a good choice for studying the practice of ethnomedicine, it did not offer sufficient material for a definitive online study.

### ***Ethnomedicine on the Internet***

Whereas the results appear impressive because 61.5% of the Mesoamerican websites in the study included ethnomedical advice, this percentage may be a bit misleading.

Although many of the websites mentioned ethnomedical treatments, they did not give much space to them. There were only 25 mentions of ethnomedicine on all 13 Mesoamerican websites. This is not very many considering that for this research 732 codes were attached to the texts. Twenty-five ethnomedical codes make up only 3.4% of the total codes. Therefore, I conclude that ethnomedicine advice is not frequently being given on Mesoamerican websites, and that it has not yet penetrated the Web on consumer health websites in these countries.



There is more ethnomedical advice on the web than this study reports, however the majority of it is not on consumer health webpages. More information can be found about herbal/plant treatments on herbal medicine or biodiversity sites. Some sites sell potions derived from ethnomedical beliefs. In addition, there are sites devoted to subjects like *espiritismo* and *santeria*.

The most regularly mentioned ethnomedical asthma treatment on the Internet in this study was the use of specific plants or herbs. This subject had 11 mentions and was referred to on 30.8% of the websites. Diet, exercise, general information about plants or herbs, supplements and other (one statement encouraging parents to give their children daily baths) were also mentioned. However, advice expected from the literature, such as folk healing, prayer, rituals, keeping emotional equilibrium, *espiritismo*, and much more information on herbal remedies, were not found online [3, 9].

It is difficult to compare the results of my online study to those of other researcher's, since I could find no similar ethnomedicine-on-the-Web studies in the literature. I also want to point out that the majority of English-language papers available on ethnomedicine are written on immigrants practicing folk remedies in the United States, not in their native countries [3, 4, 9, 16].

### ***Exercise***

Four of the 13 websites had information on exercises that could help the asthma sufferer. Although this is not a typical ethnomedical approach to treat asthma, I included it mainly

because the mentions of exercise as treatment were distinguished by not appearing on the American webpages as well. I made this decision on the belief that if a treatment is typical of one society or ethnicity and not of another, than it can be considered ethnomedicine. Here is a typical segment from a Mesoamerican website that I would have coded **treatment>ethnomedicine>exercise**:

Next we teach you exercises that you can use when you have an attack.

The *chinito*

- \* Sit on the floor with crossed legs.
- \* Place your arms on your legs, with the palms of the hands turned and facing upwards.
- \* Incline your body forwards.
- \* Breath in through your nose.
- \* Push the mouth out (as if you were a fish) and release the air while counting mentally or with your fingers up to 10.

Segments like these I also coded under CAMs (**treatment>CAMs>exercise**). All together, there were 10 discussions of exercise as a type of CAMs coded in this study. These mentions came from five Mesoamerican websites, and one from an American website. However, exercise was the only topic on the Spanish-language pages that I considered a CAMs treatment as well as an ethnomedical one, because it was also mentioned on an American site. Therefore, I was unable to determine if the Mesoamerican websites were listing exercise as an ethnomedical approach, so I coded them as both. It is important to point out that exercise as treatment came up much more often on Mesoamerican websites. Also, the total number of CAMs mentions across all 30 studied websites is only 22, less than the ethnomedicine count. Apparently, ethnomedical

treatments are not the only alternative treatments that have not made it onto the Internet on respected consumer health webpages.

### ***Medication and Biomedical Triggers***

Both the Mesoamerican and American websites were fairly consistent in their coverage of treatment through medication and prevention through avoiding biomedical triggers.

The American websites generally gave more information on these subjects, but many of the Mesoamerican sites did equally well.

A few things were left off of the Mesoamerican websites altogether, including some newer treatments like IgE Inhibitors, Cromolyn or Nedocromil treatment, and anticholinergics. The Mesoamerican sites also did not mention epinephrine, which is an older treatment that is often not recommended these days. Nor did they talk about medications in terms of combined therapies, or long-term/quick-relief medications. The only biomedical triggers that were not mentioned on any of the Mesoamerican sites were occupational triggers, but they were only given space on one American website.

### ***Limitations of the Study***

As already mentioned, the largest problem with this study was the lack of websites from Mesoamerica. The research only included 13 Mesoamerican websites, and none at all from four of the target countries. One possible cause for the small number of Mesoamerican websites may be the way the website search was undertaken. In order to only receive Spanish-language websites created in one of the Mesoamerican countries, I only searched for those with the correct country domain extension. This may have

caused me to leave out appropriate websites that did not use the country domain extension.

Another issue was that only one researcher was involved in the study. With only one person performing the website selection and, more importantly, the coding, there are no checks and balances. Without multiple coders, there can be no inter-rater reliability and the possibility of mistakes (coding something wrong, or not coding a section) not being caught increases.

### ***Future Research***

While this research did not give a clear picture of ethnomedicine in Mesoamerica, it did help determine if ethnically based medical treatments from that area have appeared on the Internet. A comprehensive study of ethnomedical treatments for asthma (not just online advice) from each country included in this study would be both difficult and valuable.

Also, determining exactly what ethnomedical resources exist online (not just on consumer health webpages) for certain diseases could also be a source of future research.

This study has inspired a few other smaller research ideas. One is to design and complete a project to conclude if treating specific illnesses with certain types of exercise *is* given as ethnomedical advice. That study would need to include determining what ethnicities incorporate exercise as ethnomedicine, what types of exercises are included, and for which diseases/ailments. In addition, this one encourages another online research project, to determine if there is information on culture-bound symptoms (like *empacho*, or blocked intestine) and their treatments online.

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## Appendix 1

Country	Website	No. Pages	Source/Type of Website
Costa Rica	Biblioteca Virtual en Salud	5	Health library
Costa Rica	Area de Conservacion Guanacaste	1	Environmental group
Guatemala	Lice Moderno	3.5	Educational
Mexico	TuSalud	2.25	Consumer health
Mexico	Para Que Estes Bien	0.75	Consumer health
Mexico	Su Doctor	2	Consumer health
Mexico	Universidad Veracruzana	3	Educational
Mexico	Respirando Vida	1.5	Professional medical organization
Mexico	MiPediatra	1	Pediatric consumer health
Mexico	Independent National University of Mexico	5.5	Educational
Mexico	GraciasDoctor	.75	Consumer health
Mexico	ConSalud	5.5	Consumer health
Nicaragua	DirectorioMedico	1	Consumer health
USA	American Academy of Allergy Asthma & Immunology	17.5	Professional medical organization
USA	Allergy, Asthma and Immunology Online	7.5	Professional medical organization
USA	Asthma and Allergy Foundation of America	18	Patient organization
USA	American Lung Association	16.5	Voluntary health organization
USA	Allergy & Asthma Network: Mothers of America	18	Nonprofit organization

USA	University of Virginia Asthma Page	5	Educational
USA	U.S. Environmental Protection Agency	2.25	Government agency
USA	Dr. Greene	7	Physician's website
USA	National Jewish Medical and Research Center	12	Nonprofit organization
USA	Minnesota Department of Health	1	Educational
USA	National Heart, Lung, and Blood Institute	8	Government organization
USA	University of Pittsburgh	1	Educational
USA	No Attacks	1.5	Government organization
USA	Allhealth	6	Consumer health
USA	Intelihealth	11	Consumer health
USA	WebMDHealth	3.5	Consumer health
USA	MedicineNet	4	Consumer health

## Appendix 2

### *Asthma Treatment Codes*

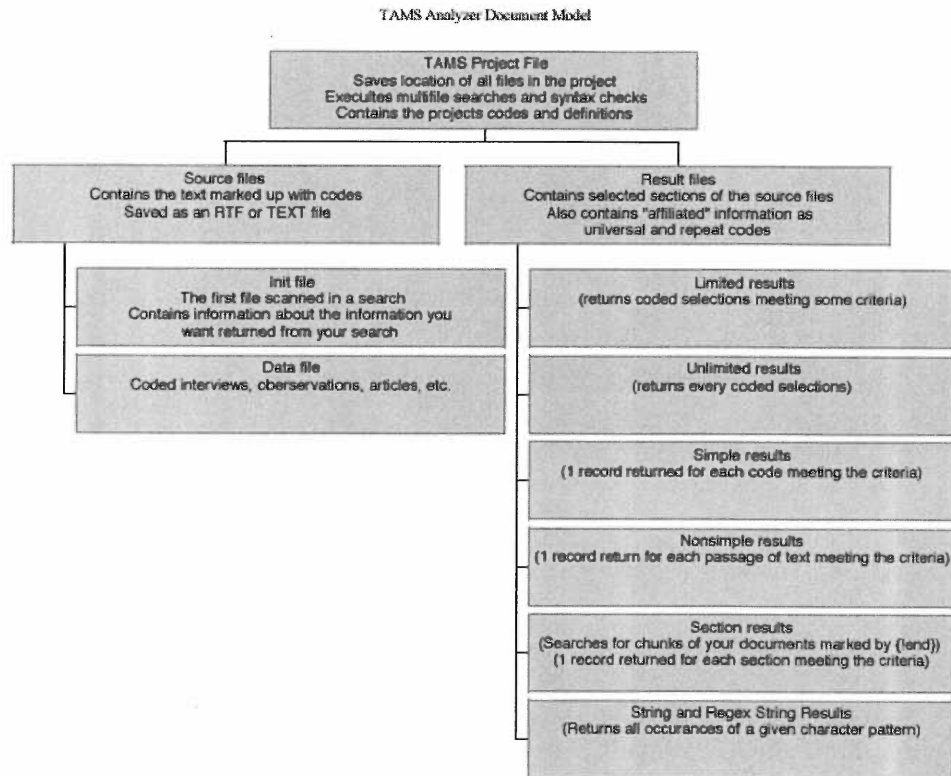
1. Definition
  - 1.1. Asthma
    - 1.1.1. Allergy-Caused
    - 1.1.2. Exercised-Induced
    - 1.1.3. Occupational
2. Treatment
  - 2.1. Medication
    - 2.1.1. IgE Inhibitor
    - 2.1.2. Anti-Inflammatory
      - 2.1.2.1. Corticosteroids
      - 2.1.2.2. Mast Cell Stabilizer



- 2.1.2.3. Cromolyn and Nedocromil
    - 2.1.3. Anti-Leukotrienes
    - 2.1.4. Anticholinergics
    - 2.1.5. Antihistamines
    - 2.1.6. Bronchodilators
      - 2.1.6.1. Anticholinergics
      - 2.1.6.2. Beta Agonists
      - 2.1.6.3. Theophylline
    - 2.1.7. Combined Therapy
    - 2.1.8. Epinephrine
    - 2.1.9. Long-Term Medications
    - 2.1.10. Quick Relief Medications
    - 2.1.11. How To Use Medications
    - 2.1.12. Side Effects
      - 2.1.12.1. Bronchodilators
      - 2.1.12.2. Corticosteroids
      - 2.1.12.3. Cromolyn
      - 2.1.12.4. Epinephrine
  - 2.2. Immunotherapy
  - 2.3. Management
  - 2.4. Complimentary and Alternative Medicine
    - 2.4.1. Acupuncture
    - 2.4.2. Diet Restrictions
    - 2.4.3. Dietary Supplements
    - 2.4.4. Exercise
    - 2.4.5. Horehound Tea
    - 2.4.6. Nasal Wash
  - 2.5. Ethnomedicine
    - 2.5.1. Diet
    - 2.5.2. Exercise
    - 2.5.3. Plants/Herbs
    - 2.5.4. Specific Plants/Herbs
    - 2.5.5. Supplements
3. Prevention
  - 3.1. Biomedical Triggers
    - 3.1.1. Air Quality
    - 3.1.2. Allergens
      - 3.1.2.1. Cockroaches
      - 3.1.2.2. Dust Mites
      - 3.1.2.3. Mold
      - 3.1.2.4. Pets
      - 3.1.2.5. Pollen
    - 3.1.3. Combustion Pollutants
    - 3.1.4. Emotional Anxiety
    - 3.1.5. Exercise
    - 3.1.6. Foods

- 3.1.7. Infections
  - 3.1.8. Irritants
    - 3.1.8.1. Tobacco Smoke
  - 3.1.9. Medications
  - 3.1.10. Reflux Disease
  - 3.1.11. Climate/Weather Change
- 3.2. Occupational Triggers
- 4. Ethnomedical Theories
  - 4.1. Humoral (hot/cold)
  - 4.2. Strong Emotions
- 5. Type of Asthma
  - 5.1. Exercise Induced
  - 5.2. Occupational
- 6. Metatags (codes for entire webpage or section of)
  - 6.1. Country of Origin of Website
    - 6.1.1. Belize
    - 6.1.2. Costa Rica
    - 6.1.3. El Salvador
    - 6.1.4. Guatemala
    - 6.1.5. Honduras
    - 6.1.6. Mexico
    - 6.1.7. Nicaragua
    - 6.1.8. Panama
    - 6.1.9. United States of America
  - 6.2. Intended Population for Information
    - 6.2.1. Children
    - 6.2.2. General Population

## Appendix 3



## Appendix 4

This is one of the shorter American textual documents from an asthma treatment website in my research. It is from the University of Virginia:

{USA>asthma\_info}{general\_pop>asthma\_info}University of Virginia

{website}http://www.people.virginia.edu/~smb4v/tutorials/asthma/treat.htm{/website}

{definition>asthma}Asthma is a disease of the respiratory system. Your respiratory system is made up of your nose and mouth, your windpipe (*also called your trachea, pronounced tray-key-uh*), your lungs, and a bunch of air tubes (*or airways*) that connect your nose and mouth with your lungs (*these tubes are called bronchi and bronchioles, pronounced bron-kye and bron-key-oles*). People who have asthma sometimes have trouble breathing. When people who have asthma have this trouble breathing, we call it an asthma attack.{/definition>asthma}

{treatment>medication}There are many different medicines that doctors may use to help people with asthma. Some medicines are swallowed (pills or liquids), some medicines are inhaled (breathed in through your mouth or nose), and some medicines are injected (given as a shot in one of your muscles or veins). For most people, inhaled medicines are used first because they start working very fast (*usually in less than five minutes!*) and they don't have too many side effects. This is because inhaled medicines go right into the lungs and not into other parts of the body.{/treatment>medication}

Medicines can work in different ways to help people who have asthma.

\* {treatment>medication>bronchodilators}some medicines make the muscles around the airways to relax. These medicines are called

**bronchodilators**{/treatment>medication>bronchodilators}

\* {treatment>medication>anti\_inflammatories}some medicines lessen the swelling and irritation in the airways. These medicines are called **anti-inflammatory agents (corticosteroids or steroids)**{/treatment>medication>anti\_inflammatories}

\* {treatment>medication>anti\_inflammatories>cromolyn}some medicines are used to prevent asthma attacks from starting (**cromolyn sodium**)  
{/treatment>medication>anti\_inflammatories>cromolyn}

### Bronchodilators

{treatment>medication>bronchodilators}There are many different bronchodilator medicines.

Doctors usually group bronchodilator medicines together by how they cause the muscles around the airways to relax. The three most common groups of bronchodilator medicines

are :

- \* beta-agonists
- \* anticholinergics
- \* methyl-xanthines

.Almost all of the different bronchodilator medicines people use for asthma fit into one of these three groups. Some bronchodilator medicines are swallowed (pills or liquids), some are inhaled (breathed in through your mouth or nose), and some are injected (given as a shot in one of your muscles or veins). For most people, inhaled medicines are used first because they start working very fast (*usually in less than five minutes!*) and they don't have too many side effects. This is because inhaled medicines go right into the lungs and not into other parts of the body. {/treatment>medication>bronchodilators}

{treatment>medication>bronchodilators>beta\_agonist}Beta-agonists come in many different forms. Some common beta-agonist medicines are:

There are also many ways to take beta-agonist medications. They can be:

- \* inhaled using a metered dose inhaler,
- \* inhaled using a nebulizer
- \* inhaled using a dry powder inhaler,
- \* swallowed as a liquid or tablet, or
- \* taken as shots.{/treatment>medication>bronchodilators>beta\_agonist}

{treatment>medication>quick\_relief}For most people with asthma, inhaled medicines are the first choice because they begin to work very fast (*usually in less than five minutes*), and they don't have too many side effects{/treatment>medication>quick\_relief} (The medicine goes right into the lungs and does not go to other parts of the body).

{treatment>medication>long\_term}Liquids or tablets don't work as fast as inhaled medicines (*they take 30 minutes or more to start working*), but they may keep working for as long as 4 to 6 hours.

{/treatment>medication>long\_term}{treatment>medication>quick\_relief}Shots are sometimes used in a doctor's office or an emergency room for very bad asthma attacks. They work very fast (*usually in less than five minutes*), but they only last about 20 minutes.{/treatment>medication>quick\_relief}

I{treatment>medication>bronchodilators>beta\_agonist}nhaled beta-agonists are good at stopping mild asthma attacks and are good a preventing asthma attacks that are caused by exercise. Some people use these medicines every day (three to four times a day) to keep their asthma under control.{/treatment>medication>bronchodilators>beta\_agonist}

-----

### {treatment>side\_effects>bronchodilators}Side Effects of Beta-Agonist Medicines

Sometimes asthma medicines make people feel weird or sick at the same time the medicine is making their asthma better. These weird or sick feeling are called side effects. Some of the side effects that people can get from beta-agonists are

- \* your heart beating very fast
- \* feeling very shaky or nervous
- \* feeling scared or worried
- \* feeling sick to your stomach (nauseous)

Most of the time, these side effects get better as your body gets used to the medicine.

Sometimes, side effects are so bad that people can't take the medicine any more. Some of these type of side effects are:

- \* bad pain in the chest
  - \* your heart beating very fast or irregularly
  - \* feeling very dizzy
  - \* feeling very sick to your stomach (nausea) or vomiting
- {/treatment>side\_effects>bronchodilators}

---

{treatment>medication>bronchodilators>beta\_agonist}Beta-agonist medicines may help people with asthma but they don't make swelling in the airways go away. They also don't prevent swelling in the airways. When people need to use beta-agonist medicines a lot, it may mean that the swelling in the airways is getting worse. If you need to use a beta-agonist medicine every day or if you use it more than three or four times in a single day, your asthma may be getting much worse. *You may need another kind of medicine, and you need to talk with your doctor right away.*{/treatment>medication>bronchodilators>beta\_agonist}

{treatment>medication>anti\_inflammatories}Anti-Inflammatories  
While there are many different types of anti-inflammatory medicines, the ones that are used most often in people with asthma are corticosteroids (*steroids*). Some common corticosteroids are:{/treatment>medication>anti\_inflammatories}

---

{treatment>medication>anti\_inflammatories>corticosteroids}There are three ways to take corticosteroid medications. They can be:

- \* Inhaled using a metered dose inhaler
- \* swallowed as a liquid or a tablet (called oral corticosteroids)
- \* taken as shots

**Inhaled corticosteroids** are taken with a metered dose inhaler. When they are used correctly, inhaled corticosteroids are very safe. They are helpful for people who have bad asthma because they prevent swelling in the airways and they lessen how sensitive the airways are to asthma *triggers*.

**Liquid and tablet (oral) corticosteroids** are used during bad asthma attacks to reduce swelling of the airways and prevent the attacks from getting even worse. Most of the time, people take oral corticosteroids for three to seven days and then stop taking them. Some people with very bad asthma may have to take oral corticosteroids every day or every other day.

**Shots of corticosteroids** are used only in a doctor's office or emergency room for very bad attacks

*No matter which way you take them, when corticosteroids are used to treat bad asthma attacks, they take about three hours to start working.*{/treatment>medication>anti\_inflammatories>corticosteroids}

---

{treatment>side\_effects>corticosteroids}Side Effects of Corticosteroids

Sometimes asthma medicines make people feel weird or sick at the same time the medicine is making their asthma better. These weird or sick feeling are called side

effects. Some of the side effects that people can get from corticosteroids are

- \* Inhaled corticosteroids may cause a yeast infection in the mouth or bother the upper airways and cause coughing. There are two things to do to keep these things from taking place. Use a spacer device (an attachment on the inhaler) and rinse out your mouth after you take the medicine.

Using oral corticosteroids for a short time may

- \* make you feel hungry all of the time
- \* make your body hold onto extra water so that you look puffy
- \* make your face look round or swollen
- \* make you gain weight
- \* make you very happy, very sad, or very mad
- \* make your blood pressure go up

All of these side effects will go away when you stop taking the medicine, but **do not** stop taking this medicine without talking to your doctor first.

- \* When oral corticosteroids are used for a very long time (*years*), they can have some bad side effects such as

- \* high blood pressure
- \* making bones weak and easier to break
- \* cataracts
- \* weakness of the muscles
- \* slowing how fast children grow

Because of these side effects, doctors try not to use oral corticosteroids for long periods of time.

*{/treatment>side\_effects>corticosteroids}*

*{treatment>medication>anti\_inflammatory>cromolyn}* Cromolyn is an anti-inflammatory medicine that prevents airways from swelling when they come in contact with an asthma trigger.

Cromolyn is an inhaled medicine and there are two different ways to inhale it:

- \* using a metered dose inhaler,
- \* using a nebulizer

Most people who use cromolyn to prevent asthma attacks take the medicine every day. People who take cromolyn to prevent asthma attacks that are caused by exercise or caused by contact with an asthma trigger (like a cat or dog), take the medicine between five and 60 minutes before they get exposed to the trigger. The effects of the medicine last three or four hours. *{/treatment>medication>anti\_inflammatory>cromolyn}*

*{treatment>side\_effects>cromolyn}* Side Effects of Cromolyn

Sometimes asthma medicines make people feel weird or sick at the same time the medicine is making their asthma better. These weird or sick feeling are called side effects. Cromolyn is a very safe medicine with very few side effects. The only side effect is a dry cough. You can avoid this side effect by rinsing your mouth and drinking some water after taking it. *{/treatment>side\_effects>cromolyn}*

*{treatment>medication>anti\_inflammatory>cromolyn}* ***Cromolyn cannot be used to stop an asthma episode once it has started, it can only be used to keep an episode from***

*starting.* This medicine doesn't work for everybody who has asthma and it might take up to 6 weeks before it starts working!{/treatment>medication>anti\_inflammatory>cromolyn}{/general\_pop>asthma\_info}{/USA>asthma\_info}