A REPORT ON THE DEVELOPMENT AND EVALUATION OF A BOOKLET ENTITLED "GROWING UP WITH ASTHMA: A Guide For Parents"

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A Report On The Development and Evaluation

Of A Booklet Entitled

Growing Up With Asthma

A Guide For Parents

by

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Abstract

Asthma is a problem that affects approximately two to five per cent of all children and accounts for one-third of all chronic conditions in children under the age of 17 and represents one-fourth of all days lost from school. The child's intellectual and emotional growth is disrupted and causes immeasurable personal grief and it also exerts a considerable strain on the life of the family.

There is clearly a need for education concerning asthma and a booklet was selected as the best strategy for communicating to the largest possible number in the most effective manner.

The booklet was designed with its broad objective being to help parents learn to understand asthma and be able to prevent or control acute attacks.

Through implementation and dissemination, parents would have a constant reference that could be read and studied carefully when they are not under stress. This should reduce the number of times they must rush to the emergency department or have their child absent from school.

The booklet was produced following thorough analysis of needs, intended audiences, and a delineation of tasks and objectives. Formative evaluation was conducted following completion of the text and the feedback resulted in a number of alterations. Following production, the completed booklet was summatively evaluated through the implementation of two evaluation methodologies.

Acknowledgements

A sincere appreciation is extended to Dr. Garfield Fizzard, project supervisor, for the advice, assistance and encouragement shown during this project. I should also like to express thanks to Dr. Elizabeth Hillman for reading and criticizing the text and to Dr. R.T. Braffet for his help during the development and evaluation of the project.

Many deserve my gratitude but none more so than Bill Griffin for the very many hours of assistance in designing the booklet. Appreciation is also extended to Wallace Boone.

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CHAPTER I

INTRODUCTION

One of the most striking aspects of life these days is the sheer number and complexities of illnesses which affect mankind. Some of these illnesses have been around a long time and we are only now learning about them, while the development and nature of others may be associated with the present industrial and social nature of Western society.

One of the interesting things in recent years has been the growing number of organizations which are explicitly developed to help people with specific illnesses, for example, we have the Multiple Sclerosis Society of Canada with Division Offices in most provinces to help people with Multiple Sclerosis, and the Diabetic Association to help those with Diabetes. Despite these developments, some of the very common illnesses have received very little attention. One such illness is asthma, which affects five per cent of the Canadian population (McDonald, 1976). It is the most common chronic disease among children, yet we have given very little attention to the social and psychological dimensions of this illness. The purpose of the project reported here is to develop an information package that will fill this information gap in Newfoundland and Labrador. Specifically, the aim is to isolate and present the social

and psychological problems often associated with asthma in children so that those affected might become more aware of these complexities and thereby develop the appropriate plans of action for dealing with this illness.

Asthma Defined

A person with asthma will tell you that experiencing loss of breath is terrifying. This breathlessness associated with acute asthma is extremely distressing, both for those who experience it and for those who witness it. Few diseases account for more disability in developing infants and children than asthma. According to the latest government figures, 500,000 Canadians suffer from asthma or some other allergic condition, as well as accounting for one-third of all chronic conditions in children under the age of seventeen and represent one-fourth of all days lost from school due to chronic illness. It is estimated that over 600,000 school days were lost by Canadian children with asthma in one year. (Guenter, 1979).

While the pediatric death rate from asthma is low, roughly one per 100,000, morbidity in the form of severe respiratory disability remains high. (Rivard, 1979). The child's intellectual and emotional growth is disrupted; asthma causes immeasurable personal grief, but it also exerts a considerable strain on the life of the family. It is therefore important to help the child and his family to understand asthma and the limitations it places on all of them.

Bronchial asthma is best defined as an over-responsiveness of the airways to various stimuli and it is manifested by intermittent episodes of wheezing and severe dyspnea. Asthma is different from other obstructive pulmonary diseases in that it is reversible and the person with asthma may have asymptomatic periods.

Asthma is the most common chronic disease of childhood, and is increasing in both incidence and severity. The disease is not new. It was known to the ancient Greeks, who called it "asthma", meaning "panting or breathing hard", and this is its most noticeable symptom as anyone knows who has witnessed or experienced the desperate fight for each breath during an acute attack.

Simply stated, asthma is a serious but usually reversible inability to breathe well, and is characterized by wheezing, shortness of breath, tightness in the chest, coughing and sudden choking. The inability to breathe results from a narrowing of the bronchi caused by muscle spasm, the swelling of tissue, excessive secretions and dried mucus plugs.

The effects of asthma may differ from one individual to another. Some children have mild uncomplicated asthma that produces symptoms only occasionally, such as pollen

related asthma, whereas others may have severe life threatening attacks. In severe asthma, normal amounts of oxygen and carbon dioxide are not maintained in the blood and tissues. This acute attack is most distressing to the child with asthma and can progress to status asthmaticus, where the child may not respond in spite of adequate treatment.

There is no one factor that causes asthmatic attacks. Instead, attacks are usually triggered by some initiating event, factor or combination of factors such as infection, allergies, psychological stress, irritants or cold air.

Rackemann (1947) has described two basic forms of asthma. These are "extrinsic" and "intrinsic".

Extrinsic asthma is usually allergy induced. Allergic substances such as dust, pollen, or animal danders that are foreign to the body combine with specific antibodies within the body to create an allergic reaction. Allergens can be inhaled, ingested or simply enter the body through the skin or mucous membranes. This allergic reaction most often takes the form of allergic rhinitis, hives, eczema or asthma.

Intrinsic asthma identifies asthma whose origin is internal and is usually found in persons who are not

allergic to specific substances. Intrinsic asthma is often secondary to chronic respiratory infections. The frequency and severity of attacks are greatly influenced by precipitating factors such as anxiety, stress, temperature and barometric changes, fatigue and endocrine changes.

Prevalence in Society

Few diseases account for more disability in developing infants than asthma. It has been estimated that one in 15 children will have at least one attack of asthma and that one in 40 will have repeated episodes, or even chronic disability.[1] Asthma affects about 500,000 Canadians and makes up 25 per cent of the chronic diseases of childhood under the age of 17. It occurs in about five to 15 per cent of children and is twice as common among boys as among girls. Statistics over the last decade have demonstrated an increased morbidity from asthma. In Canada, among the known school children with asthma there were 600,000 days of school missed; this represents 25 per cent of all school days lost for all the chronic diseases that cause school absences.

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1 The data referred to in this section is taken from the Bela Schick Memorial Lecture by Dr. Cecil Collins-Williams, Reprinted from Annals of Allergy, Vol. 44, No. 6. June, 1980.

The morbidity of severe respiratory disability resulting from asthma is quite high. In addition to disrupting the child's intellectual and emotional growth and causing immeasureable personal grief, the disease exerts a considerable strain on the finances, in particular, and on the general quality of life of the families it affects. The stress of numerous emergency room visits and hospitalizations can be emotionally draining for the child and the family.

Problems Associated With Asthma

The problems associated with asthma can be categorized along the lines of their physical and biological, psychological and social characteristics.

Physical and Biological Problems

There are two dimensions to the physical and biological problems of asthma. They are (1) poor posture, and (2) reduced activity.

Posture. Poor breathing habits, common in children with asthma, may contribute to poor posture, which in turn may develop into a permanent problem which decreases the efficiency of respiration. This arises from habitual use of shoulder and neck muscles for breathing which causes the shoulders to be carried up and forward, thus causing a round-shouldered posture.

Reduced Activity. Asthmatic breathing requires more effort than does normal breathing. Children with a significant disease of chronic asthma may be working hard most of the time, and may be chronically fatigued and run down because of this effort. The triggering of asthma by exercise may cause many children to restrict their activity so that their general condition is poor. Many exercise-sensitive school children are barred from games, gymnastics, swimming or dancing, and most have the resigned awareness that future

plans - parties, holidays and other excitement - may be heralded or accompanied by asthmatic attacks. Although excessive exercise, like especially long arduous running may be undesirable in some children, carefully planned programs of physical conditioning may be beneficial to the asthmatic child and his family.

Psychological Problems

Not all children with asthma develop significant emotional problems. Children with mild or well-controlled asthma may have few or no problems, but in children with persistent, poorly controlled symptoms, psychological problems are often present and may be greater than the physical impact of the disease. These problems are associated with fear, over-protection and lack of self esteem.

Fear. Some children with asthma live in constant fear of the onset of another breath-robbing asthmatic spasm. To these children, asthma means frustration and helplessness. They wake up in the middle of the night struggling to get some air. They feel so very frightened even though it has been occurring for several years. It always brings that awful fear of not being able to breathe.

The fear of death or permanent disability is also a common feeling among the more severely affected children,

even though they may not speak about it. With fear there is often aggression, mixed with anger or resentment directed inwardly at themselves as well as at the seeming helplessness of people nearby when they are having an attack.

Overprotection. Parents are sometimes hesitant to punish asthmatic children for fear that punishment will cause an attack. As a result the child may be difficult to manage and other children in the family may resent what they see as special treatment of the asthmatic child who has not been disciplined. Some children play upon the anxiety of their parents and use the asthma or threats of it for manipulative purposes. Avoidance of unpleasant chores, school, and other unwanted activities is expedited through the asthma. Secondary gains of attention and care while ill become positive reinforcement for the perpetuation of attacks. In extreme instances intense anxieties of both the child and parents lead to unnecessary invalidism.

Self Esteem. The certainty of being able to count on one's own body is absolutely necessary for the development of self-confidence. For the child with asthma, any future event, whether pleasant or unpleasant, creates tension and excitement and possibly an attack that will prevent the occurrence of the event. It is consequently very difficult for a child with asthma who is seriously ill to develop a "healthy" outlook in the future.

Lack of basic security also avenges itself in relationships with other children. A child with asthma is often insufficiently able to hold his own among others of his age. They may withdraw, strain to keep up, or sometimes "buy" friendship. The more they try to conceal their uncertainty, the more they feel themselves wronged so they react aggressively.

Inability to compete in strenuous activities and repeated absences from school increase the feelings of inferiority. These children are usually teased about being different or sickly and as a result, fail to participate in activities that are not too strenuous for them. They are afraid of failing to play the game well and increasing the risk of ridicule and non-acceptance from other children so these children withdraw from the activities.

Social Problems

Children with asthma and their families are prone to particular social problems associated with family relationships and absenteeism from school.

Family Upset. The asthmatic process is a complex one usually involving all members of the family. Many asthmatic attacks happen during the night. Parents come to expect these middle-of-the-night incidents but not without apprehension and some frustration. These broken nights may

cause increasing tiredness and marital tension.

Absenteeism. Children with asthma lost 600,000 school days in Canada in one year. (Guenter, 1979). It is the number-one cause of school absenteeism due to chronic illness. It is more difficult for an asthmatic child to get over a cold than for the average person. In addition, a cold often triggers an asthmatic attack.

CHAPTER II

NEEDS ASSESSMENT

Need for Education

There are two major aspects to the communication needs concerning asthma. One is the need for public education of teachers, parents, and community oriented people concerning the physical and biological, psychological and social dimensions of asthma. The other challenge is to communicate with the clients with asthma, thereby making them more aware of the ways and means of living more effectively with their illness.

Need to Educate Children with Asthma

Children with asthma need not learn to live with symptoms and disabilities. Recent progress in the medical treatment of asthma has been remarkable. This progress has resulted from the development of a number of new medicines and also new concepts of what constitutes optimal treatment. It is now reasonable to expect complete control of asthma virtually all the time. However, everyone with asthma does not receive optimal treatment. They do not have all the information. They need to know:

- the importance of knowing all the symptoms of asthma
- their particular triggers
- all about their drugs, and when and how to take them
- how important it is to remain physically active, and in which exercises and sports they can participate
- how to relax
- how to recognize the symptoms of respiratory infection
- how to avoid irritating substances such as smoke
- how to talk with others, their teachers and physicians in particular, about their condition
- what to do in an emergency situation

Need to Educate the Public

People need to be informed about asthma. Attitudes, opinions and habitual responses in chronic illness are deeply ingrained. Since some of these are often inappropriate, re-education is necessary.

Those who deal with the child must learn what to expect in the way of physical and emotional problems set off by the disease itself and sometimes even by the drugs used to treat it.

Teachers need to be better equipped to assist the asthmatic child with problems that he might face in school.

arising from his asthma. They particularly need to be informed about the hidden handicaps that asthmatic children face, such as difficulties with exercise or inability to concentrate.

The physical education teachers need to know that most children with asthma can participate in exercise and sport. With good communication between doctor, parent and teacher, the child can be encouraged to participate. The child can learn to pace himself and come to know when to stop if an activity is exhausting.

Meeting the Need: Alternative Solutions

There is, then, a need for education of both the public and clients concerning asthma. The question becomes one of deciding what strategy or strategies one can use to maximize the communication effects in this domain. There are several communication tools which could be employed in meeting the challenge. These include television, film strips, motion pictures, slide-tape presentations, seminars and printed booklets.

There are certain advantages and disadvantages for selecting each one of these options to teach about asthma. In this section, the pros and cons of each strategy will be presented and the rationale for selecting the booklet

strategy as the best package for communicating to the largest possible number in the most effective manner will be outlined.

Media Selection

Gerlach and Ely (1971) define a medium as "any person, material, or event that established conditions which enable the learner to acquire knowledge, skills, and attitudes." (p. 282) They further define media as "the graphic, photographic, electronic, or mechanical means for arresting, processing, and reconstituting visual or verbal information." (p. 282) When selecting an instructional medium, it is important to select on the basis of its potential to meet the stated objectives of the project. The factors to consider are (1) appropriateness (2) level of sophistication (3) cost (4) availability, and (5) technical quality. These key factors must be considered before selecting the best medium to accomplish the defined objectives.

Television. Television is an electronic system of transmitting still and moving images with accompanying sound over a wire or through space. Because learning is based on sensory perception, this medium would help to reinforce the learning experience if the illustrations are well chosen.

It could be an appropriate medium to meet the learning objectives. However, it would probably be aimed at a wide range of grade levels so there would be a potentially large viewing audience for the product. In this event, the level of sophistication might be suitable for the public and most parents but may be beyond the vocabulary of the child. The cost would be reasonable because it would not have the advantages of playback capability so that important sequences or concepts could be repeated.

Even though a television production could be appropriate for a portion of the interested population, the program would not always be available when needed. Scheduling is one of the primary problems of broadcast television. Also, the technical quality may be hampered by poor reception because of the topography in some areas of the Province. Although television coverage is quite good, three per cent of the population in Newfoundland and Labrador are not receiving television transmissions. (O'Mara, 1982).

Film Strips. A filmstrip is a length of 35 mm film containing a series of still pictures in colour or black and white intended for projection in sequence one at a time. It is a widely used instructional medium because of its many advantages. The filmstrip is an

appropriate medium to accomplish the learning tasks but the level of sophistication would not be flexible enough for the various age ranges of the secondary target population. They lack the attention-compelling qualities of the motion picture and television which are more familiar to students. Filmstrip equipment is relatively inexpensive, lightweight, small, and easy to operate, but still too costly when considering the large number required to meet the needs of five per cent of the population. The technical quality would be good because the materials would be made by commercial producers. However, film and equipment breakage when used by inexperienced handlers would create many problems.

Motion Pictures. A motion picture is a series of still pictures taken in rapid succession on 8 mm or 16 mm film, which, when projected through a motion picture projector, gives the viewers an illusion of motion. The motion picture is a very effective medium of communication and would be considered because of its capacity for presenting visual information in an accurate manner. It would not, however, be on the correct level of understanding for all clients. Movies also require very costly equipment, skilled personnel, much time for preparation and much money for materials and services. This material and equipment may not always be available when required because the cost would only allow

for limited copies that would have to be requested in advance. The limitations of a technical nature such as cumbersome and confusing projectors is a major deterrent to extensive use of the motion picture.

Slide-Tape Presentation. A slide-tape presentation is a combination of visual slides and a tape recording. The slides are film transparencies contained in either a 2" x 2" or 2 1/4" x 2 1/4" mount. The tape recording provides the audio narration for the accompanying slides.

One slide-tape presentation could not accomplish the defined task, but rather several would be required to teach all the information required to prevent and control asthma. This particular format could present each concept quite adequately, especially if each set of slides had two or three tapes presented at different levels of sophistication but this would require a great deal of time and expense to produce and supply the product. The cost of having numerous supplies of both software and hardware available in addition to maintaining the technical quality would make this package unrealistic.

Seminars. Guinee (1966) defines seminars as "a form of class organization that utilizes a scientific approach to the analysis of a problem chosen for discussion." The

seminar should have guided discussions with the learners taking the intellectual initiative. This form of teaching is quite appropriate as the learners exchange information relevant to the problem, thus providing an opportunity to review knowledge concerning the subject. If all learners are at the same level, this medium would be quite acceptable but it is unreasonable to expect five per cent of the general population to have this experiential readiness. Also, the cost of presenting seminars in all communities in Newfoundland and Labrador would make this task impossible. It is also doubtful that experts in the field of asthma would be able to make themselves available for this long term project.

Booklet. A booklet is printed teaching material which contains printed language, pictures, diagrams and charts. Experience has shown that all people do not learn equally well in the same way or at the same rate; some people learn best by seeing, some by hearing, some by doing, some may learn with one exposure where only one sense is stimulated while others need repetition and stimulation of several senses to learn. Another generally accepted fact is that in our society about 83 per cent of learning is visual, 11 per cent is through hearing, and the remaining six per cent is acquired by the other senses of touch, smell,

and taste. In addition, we know something about the law of forgetting and that reinforcement, properly spaced, aids in retention of learning. Readibility is also an important factor and must match the learning to the material. Considering all these factors, the learner should be able to meet the objectives of the project because the reader can control the speed at which he reads and comprehends, and it would be constantly available for reference and reinforcement. This would be the easiest and most economical medium and it would enable every client to have his own copy for easy reference.

Survey of Available Materials

Educational materials concerning the control of asthma are available but they present many limitations for the client and his family. A new film entitled "The Modern Management of Asthma" is excellent. Unfortunately, for our purposes, it was prepared for a physician audience.

"Lung Diseases of Children" by Hugh E. Evans, M.D., (1979), devotes nine pages to asthma. This volume is intended for health professionals such as administrators, nurses, respiratory therapists, physical and occupational therapists, and others working with children. It emphasizes what others can do but not what the parent can do about asthma.

Another excellent brochure, "Children With Asthma" (1977), has been written to answer some of the questions frequently asked by parents of children with asthma. Unfortunately, it is very small and unattractive and fails to stimulate the reader. The information is good but not complete. A third brochure entitled "Captain Wonderlung" (1979) presents breathing exercises for asthmatic children in a comic book format. It has a very colourful cover but the

contents are black and white. The medium is very effective but presents only one aid in the entire management program needed to understand and control asthma. There are numerous other pamphlets and booklets prepared by drug companies that emphasize the effects of a particular drug rather than the various learning needs of the parent.

Rationale for Development of Booklet

On the basis of lack of appropriate materials to meet the needs of the family with asthma, a decision was made to prepare a comprehensive educational booklet to help children and parents learn to understand and prevent or control acute episodes. This booklet could be read and studied carefully when they are not under stress. The parents will probably need to call the physician fewer times with questions, and will be more likely to call sooner when they do need help.

Outline of Development Process

It was decided to develop an instructional booklet along the lines illustrated in the Instructional Development Model. (See Fig. 1)

The Instructional Development model provides for a number of steps in the development of instructional materials. The major steps are: analysis, production, evaluation, and dissemination.

Analysis. This step includes the identification and analysis of the need to develop the material; the identification and analysis of learners - the individuals for whom the materials are intended; the analysis of the learning task - the information to be learned; and an analysis of the media to be used in the preparation of the materials.

Production. In this step the instructional materials are produced in a form that is ready for initial evaluation.

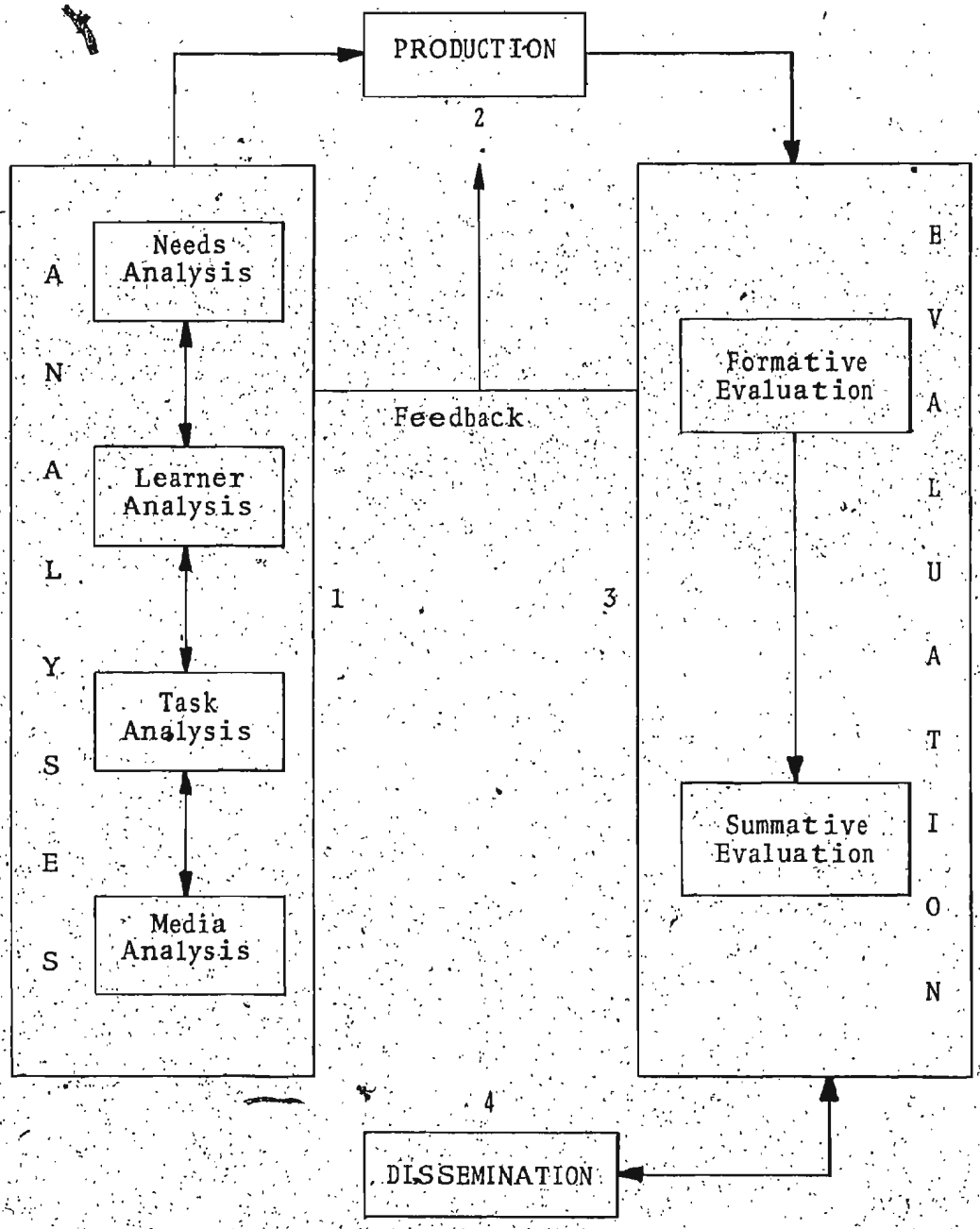

FIGURE 1. Instructional Development Model

Evaluation. This step includes two types of evaluation - formative and summative. Formative evaluation is carried out to determine if the materials are successful in reaching the intended outcome; if not, one or more revisions are made. The summative evaluation is carried out to assess the final outcome of using the materials.

At each of the above stages, provision is made for feedback from one stage to another. For example, at the production stage problems may be encountered that require reconsideration of media selection, or at the formative evaluation stage it may be necessary to revise the learning tasks.

Dissemination. At this stage, the final product is distributed for use in the field.

All criticisms and suggestions will be considered and incorporated into the final production.

CHAPTER III

LEARNER ANALYSIS

Primary Audience

The primary audience could be comprised of any parent with no clear demarcations of age, sex, social status, or educational background. There are, however, certain characteristics which do prevail among those who are found to require information concerning asthma.

As one would expect, the need for information concerning asthma is usually evident in the parent of very young and school aged children. The average parent ranges in age from nineteen to thirty-five.

One can assume that the potential learners may be either rich or poor, may range in educational experience from less than seven years of school to graduation in professional training, and may reside in either urban or rural environments.

Secondary Audience

Although the instructional package was designed primarily for the parents of children with asthma, there are other groups who may utilize the material. As has been

indicated previously, the asthmatic child's family is an extremely important group in the management of his asthma, since it may effect the integrity of the family unit. The instructional package would give them the information required to help combat the physical, psychological and social problems associated with the condition.

Another secondary group to be considered are health professionals themselves. Although most of these have knowledge about asthma and its manifestations, it may be that some may not have thorough knowledge of all related factors. More experienced specialists may be totally familiar with asthma and its control and treatment but one may wish to consider those who are being prepared for careers in nursing, medicine and other health care areas.

CHAPTER IV

TASK ANALYSIS

After the needs were assessed and the learners identified, it was necessary to delineate precisely what information would be included and to arrange this content in a sequential manner.

The following learning objectives were identified. The parents need to know:

- the importance of knowing all the symptoms of asthma
- their child's particular triggers
- all about the drugs, and when and how to give them
- how important it is to remain physically active, and which exercises and sports they can participate in
- how to relax
- how to recognize the symptoms of respiratory infection
- how to avoid irritating substances such as smoke
- how to teach their children to talk with others, their teachers and physitians in particular, about their condition

A task analysis was performed in an attempt to identify precisely what information would be included for meeting the learning needs of the target audience. The following content outline was identified:

Subject Content:

A. Learning About Asthma
   - The Cause of Asthma
   - The Normal Lung
   - The Asthmatic Lung
   - The Triggers of Asthma

B. Controlling Asthma
   - Changes in the Environment
   - Medications
   - Immunotherapy
   - Dietary Control
   - Breathing Exercises
   - Exercise
   - Psychotherapy
   - Moving
   - Teaching
   - Proper use of Inhaler and/or Spinhaler

C. The Language of Asthma

The task analysis is displayed in Figures 1 to 4.

ASTHMA

TASK ANALYSIS (1)

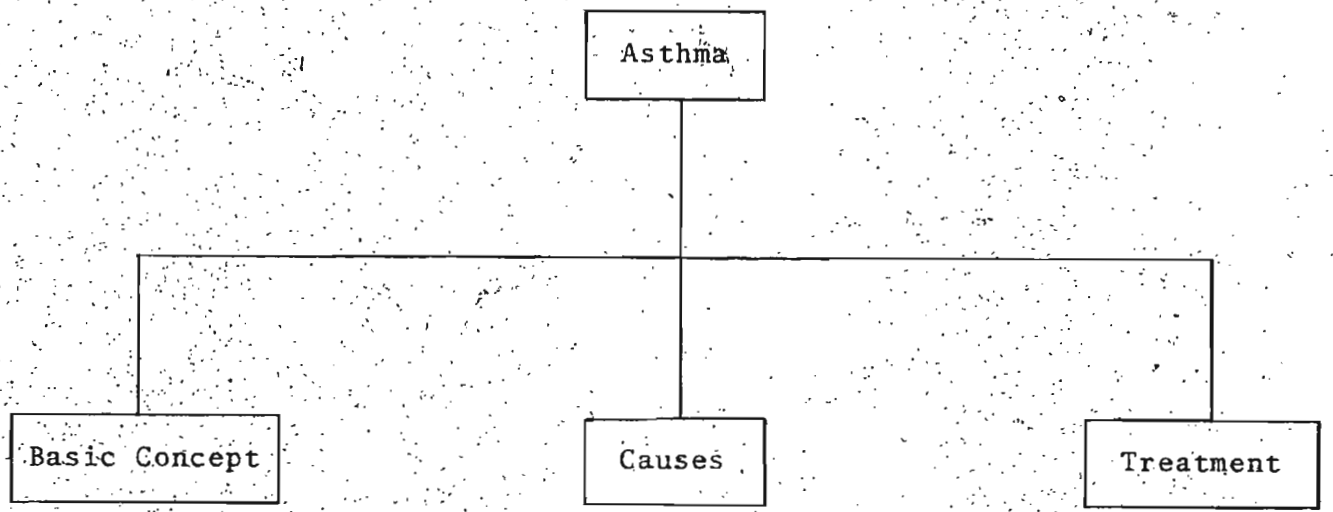

FIGURE 2. Task Analysis (1)

ASTHMA

TASK ANALYSIS (2)

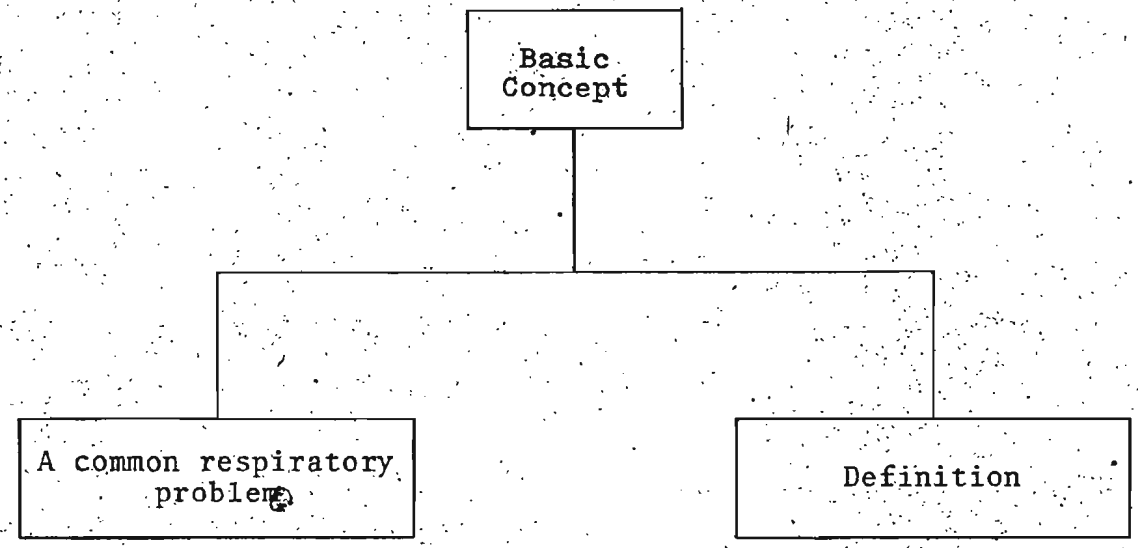

FIGURE 3. Task Analysis (2)

ASTHMA

TASK ANALYSIS (3)

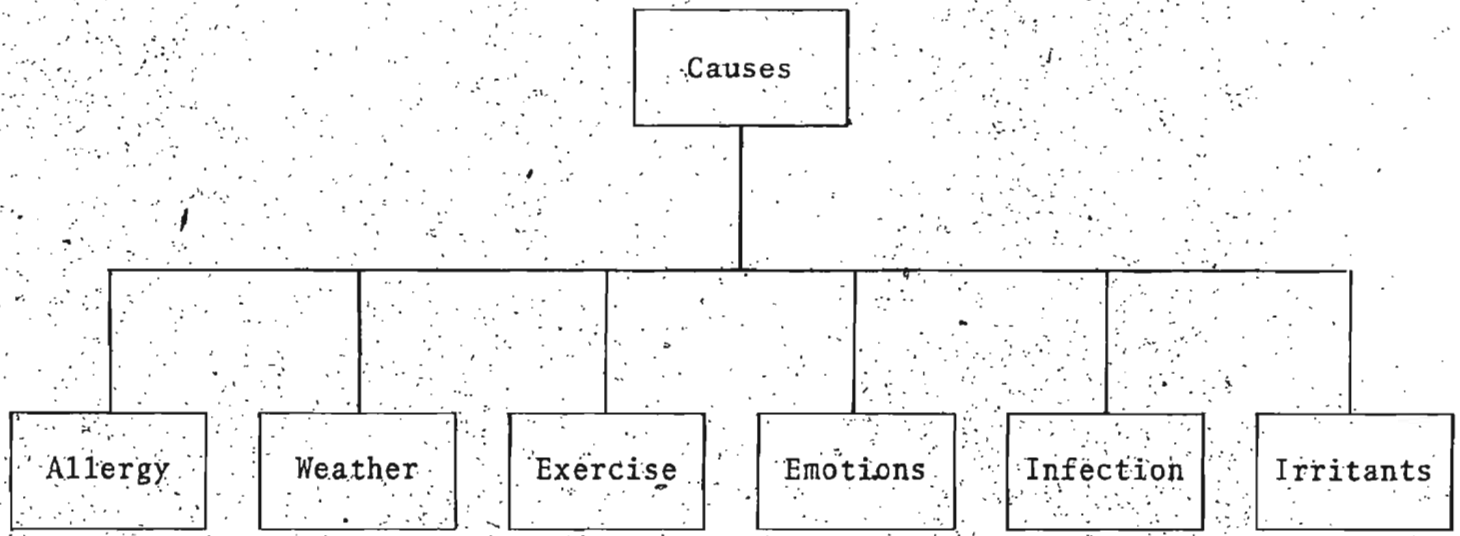

FIGURE 4. Task Analysis (3)

FIGURE 5. Task Analysis (4)

Behavioural Objectives

The behavioural objectives of the booklet are derived directly from the task analysis. The objectives are designed to detail specific learning outcomes and should, therefore, serve as the basis for the design of the testing instrument to be used in the summative evaluation. Mager (1962) points out that the behavioural objectives should be precise enough to allow a person unfamiliar with the instructional development project to design a valid evaluation instrument.

It can be expected that the intended audience has some knowledge concerning the drugs prescribed for their child but few would have information concerning the side effects of the prescribed drugs. Most parents would have some familiarity of some sports in which they may safely participate. Few would be familiar with the symptoms and triggers of asthma. Most children would not have an adequate understanding of the problem of asthma and would frequently be treated differently from their siblings.

There was a number of immediate and specific objectives which could be readily identified. The objectives of the package are outlined as follows:

Objectives

Having read the booklet, members of the audience will be able to:

1. State three symptoms of asthma
2. Name six triggers of asthma
3. Explain preventive measures that may be taken when symptoms first begin
4. Name the drugs prescribed for his child
5. Describe the side effects of the drugs used by his child
6. Describe the importance of sports and physical education for his child
7. Select specific sports that will reinforce proper breathing
8. Demonstrate relaxation techniques

From a long range perspective, it was hoped that increased knowledge of asthma would reduce hospital admissions and absenteeism from school as well as the attitude of some parents regarding the 'invalid' status of their child. Such goals, however, were general aims of the booklet and could only be discerned subtly and over an extended period of time.

CHAPTER V

RATIONALE FOR CHOICE OF MEDIA

A review of the literature in instructional media reveals the existence of a number of classification systems or taxonomies which attempt to accurately describe the appropriateness of different media formats to specific situations. Dale's Cone of Experience, (Dale, 1954) was one of the first models to be developed. This model classified media in terms of proximity and reality.

Gagne (1965) specified a number of component functions of instruction which represented the different influences on the learning environment on the student. Optimal external learning conditions could thereby be established when the most appropriate media were selected.

One of the best known taxonomies is probably that proposed by Briggs (1970) who developed a matrix which attempted to make appropriate matchings of learner characteristics with task and media characteristics.

Yet another approach to classification was presented by Heidt (1978) in which he suggests a model which groups media with regard to the quantity of stimuli transmitted by each medium.

Although such taxonomies attempt to relate the applicability of various media to certain theories of learning, it seems obvious that the criteria for classification varies considerably from model to model, and as Meredith (1965) noted:

> ... man himself contributes significantly to the structure of his taxonomic system. He imposes an order on things which can be arranged in many alternative orders. He should have a rational basis for the particular type of order he selects. And since in educational media we are dealing with systems which are largely man-made, the idea that there is any one objective "natural" classification is somewhat absurd. (p. 379)

These considerations led Heidt (1978) to conclude that:

> ... a single, comprehensive media taxonomy which is suited to all occasions cannot exist, that one has rather to aim at the development of a number of equally valid classification systems for different purposes and for different theoretical approaches. (p. 36)

However valid the assessments of Meredith and Heidt may be, they are nonetheless, assessments of a purely theoretical approach to media selection. Frequently, instructional development and choice of media, has much of

its basis in a number of practical considerations. The most outstanding factor for the developer was that the booklet would be constantly available for reference and reinforcement.

Aside from this factor, there remains a number of additional aspects which support the choice of a booklet as the ideal medium. In choosing media, one must be constantly aware of the intended audience. For parents of children with asthma, the primary target group, the booklet possesses many advantages. Information can be explicitly presented in a format which is familiar to most individuals, regardless of age, sex, and to some degree, educational background. In an encyclopedia article on communication, Dr. Wilbur Schramm of Stanford University mediates his ideas by print to readers seeking information. His opening statement is: "Words are the easiest of all symbols to use, whether written or spoken. Words are the names given to everything we see and know." (p. 711). This would seem to suggest a good method of conveying a great deal of information in a short period of time.

In terms of physical delivery to parents, the advantages of a booklet are undeniable. The booklet may be made available from the Provincial Lung Association, from family physicians, and from special asthma programs such as

the Family Asthma Program presently sponsored by the Charles A. Janeway Child Health Centre.

Of all media, the booklet can possibly receive much wider dissemination than any other form. This is an important factor when one considers that the secondary audience includes the families, friends and teachers of the asthmatic child.

In terms of cost-effectiveness, the booklet was a most viable production alternative. The printing was done by the Printing Services of the Memorial University of Newfoundland. Graphics and photographs were made available through the facilities of Memorial University's Learning Resource Centre. Other expenses incurred were for travel related to the needs assessment and evaluation of the booklet.

Although the booklet has obvious practical advantages, at least in the context of this project, the medium has always received strong support. Traditionally, the book has been the chief instrument of instruction.

Some of the major advantages of the booklet are:

1) No elaborate and expensive equipment is needed

2) In reading, one can stop at any time and return to go on from there. One can also get the review, reinforcement, and enjoyment that a second reading

provides.

3) Every learner may vary his reading speed, depending on whether he is a fast or slow reader

4) Printed material furnishes a permanent record

5) In reading, you can react to your own booklet by writing in it. You can underline words and passages, and thus more firmly fix in your mind key ideas found there

6) The learning of lengthy, difficult material is best achieved by reading

Some limitations of the medium should be noted. These include the fact that it is hard to keep up-to-date. New information may be available after the printing of the booklet. Also, it is difficult to provide answers to all the questions a parent may ask. Such criticisms are valid but do little to negate the importance of a booklet as a viable and effective medium for imparting information to a large audience.

CHAPTER VI

DEVELOPMENT PROCEDURES AND FORMATIVE EVALUATION

The booklet was designed within the framework of an established instructional development plan. Once the initial planning procedures of needs assessment, audience analysis and task analysis had been completed, the production phase began, including text, diagrams, photographs and evaluation.

Throughout the phases of pre-production, the developer was in consultation with various professionals in the health care field to ensure that the necessary content was included and to determine how well the stated objectives reflected the demonstrated needs. The content advisor felt the material was well-written, clear, appropriate for the parent of an asthmatic child and that the language was straight forward without much medical jargon. Some changes were suggested. The developer was requested to:

1) emphasize the danger of over-use of inhaled broncho-dilators
2) add a statement to re-emphasize diet restriction for children who are often over-protected and given too much 'junk food'.

These recommendations were accepted and incorporated in the text.

The developer also consulted another medical specialist with specific expertise in asthma. The consultant added many suggestions for improvement but also recommended the omission of the paragraph relating to the side effects of steroids. In addition, a copy of the consultant's Bela Schick Lecture on Asthma was forwarded with special reference to the discussion of immunotherapy with the principles that should be followed in giving it. The consultant wanted particular emphasis to be placed on this topic because:

> ... immunotherapy is a very useful tool in helping asthmatic children and it is much maligned, partly because so many people who do not know how to order it are ordering it and also because there are many people who would prefer to treat these children with continuous drug therapy over many, many years without making a serious attempt to get at the basic problem of their disease.

These recommendations were accepted.

The first draft of the booklet was also evaluated by a learning and media specialist who indicated that the text reflected the behavioural objectives, there was a smooth flow from one topic to the next with the

narration aiding in the continuity and support of the diagrams and photographs. The specialist indicated that the material was technically quite acceptable. There was, however, a number of changes suggested. It was recommended that the developer reword the first paragraph in the text because the discussion concerning 'triggers' was unclear. It was also noted that the terms psychosomatic and mucosal edema were too difficult for the target audience. The remaining changes related to typing errors and the omission of a label below one of the diagrams.

The booklet was also tested by three parents who were representative of the potential audience group. It is important to acknowledge that the needs of parents will vary because of the previous experiences each has had. Many have been in contact with many nurses and doctors who may have imparted varying degrees of information. Most contacts with nurses and doctors would have been in times of great stress, so the degree of learning would likely have been limited. Other contacts may have occurred in a more relaxed environment. For example, in the doctor's office during a regular assessment of the condition, more learning may have occurred if the particular physician was interested in patient teaching. The developer took these factors into consideration when choosing the representative audience.

Prior to viewing the booklet, a questionnaire was administered to the parents to determine certain environmental factors as well as their level of understanding regarding certain information related to asthma. (Appendix B).

The questionnaire began with an explanation of its purpose in a general way so that bias was not introduced. Bias has been defined by Kahn and Cannell (1957) as the intrusion of any unplanned or unwanted influence. It may occur through inappropriate wording of questions or by statements made in the introduction or actual dialogue with the respondent.

The introduction also included the position of the developer as a student and his objective in carrying out the evaluation of the booklet.

The questionnaire was administered by the developer to ensure the questions could be fully understood and that the parent was encouraged to reciprocate in the communication process.

Following the administration of the questionnaire, the booklet was left with the parent to study in a manner that would represent the normal procedure under which it would be used. That is, the husband and wife reading it together in the privacy of their home at their leisure and convenience. After one week, the developer arranged a

second interview to administer the post-test. This questionnaire was also administered by the developer. The representative audience viewed the booklet with favor stating that the text answered many of their concerns regarding asthma, that it was concise, and that it was able to hold their attention for the time required to read it with understanding.

The production of an effective instructional booklet requires that a structured developmental process be followed. Most development plans are similar and usually are comprised of four basic steps, as shown in Figure 1. This model suggests that needs analysis, learner analysis, task analysis and media analysis must be investigated prior to the actual production of the materials. It further indicates the value of both formative and summative evaluation in providing feedback which affects the production of the booklet.

As a result of the formative evaluations, some changes were introduced prior to the production of the booklet:

1) it was decided to emphasize the danger of over-use of inhaled bronchodilators
2) a section on dietary control was added
3) the paragraph relating to the side effects of steroids was omitted

4) emphasis was given to the topic of immunotherapy

5) an attempt was made to avoid difficult medical terminology

The booklet was then produced in a six inch by eight and one-half inch format with fifteen photographs and three diagrams. Both the terminology and presentation was non academic with the print fairly large and easy to read.

CHAPTER VII

SUMMATIVE EVALUATION

Evaluation of the booklet consisted of two separate methodologies. One method was the administration of both a pre-test and a post-test to 20 parents to assess the effectiveness of the cognitive elements presented in the material. The second method was to receive feedback from specialists in media, learning and content by the completion of an evaluation form written after reading the booklet and the objectives of the program.

Because of the difficulties encountered in obtaining permission to interview patients and their parents, it was necessary to select subjects who were reasonably available for interview. This accidental or convenience sampling is commonly used but there is no way of knowing what biases might be introduced. The available subjects may be typical or atypical of the population with respect to the variables of interest.

Results

In the evaluation form administered to the content, media and learning specialists, feedback was received on a four-point scale indicating how well the booklet met various aspects of the evaluation (see Appendix E). The results of the questionnaire clearly indicate that the booklet was well received and that they considered it successful in meeting its objectives. (see TABLE 1). All criteria were rated in either the excellent or good categories. This was a clear indication of a highly favourable judgement of the material by the various specialists.

The questionnaires administered to the 20 parents included eight questions relating to the cognitive elements of the booklet. A comparison of the pre-test and post-test assessments of the parents' knowledge about asthma are shown in Table 2. It can be readily seen that the parents' knowledge about asthma improved in all items except number six. Most parents better understood the value of exercise but it was not possible to change habits in such a short period of time. However, most parents did indicate that they would encourage better participation in sports by their children at the beginning of the following school term.

TABLE 1

Evaluation by Content, Media and Learning Specialists

	Evaluator																			
	A				B				C				D				E			
	E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P
Does the material satisfactorily serve the objectives?	X				X					X			X				X			
Is there a smooth flow from one topic to the next one?	X					X			X					X				X		
Does the narration aid in continuity and support the visuals?	X									X				X			X			
Is the material too long overall, requiring deletions?		X			X				X					X				X		
Have important points been left out?	X					X				X			X				X			
Should some of the pictures be replaced or need additional ones be made?	X					X				X								X		
Is the content appropriate for parents of children with asthma?	X				X				X				X				X			
Is the vocabulary appropriate for the parents?	X				X				X				X					X		
Is the material technically acceptable?	X				X				X				X				X			

Excellent - E
Good - G
Fair - F
Poor - P

TABLE 2

A Comparison of the Pre-test and Post-test Assessment of the Parents' Knowledge About Asthma

Questionnaire Item	Item Numbers Pre	Item Numbers Post	Pre-test Results Knowledge Adequate	Pre-test Results Knowledge Limited	Pre-test Results Knowledge None	Post-test Results Knowledge Adequate	Post-test Results Knowledge Limited	Post-test Results Knowledge None
Symptoms of Asthma	8	3	10	10	0	17	3	0
Triggers of Asthma	9	4	0	20	0	20	0	0
Why Know Symptoms	10	5	6	10	4	18	2	0
Name Prescribed Drugs	11	6	16	4	0	20	0	0
Side Effects of Drugs	12	7	4	0	16	16	3	1
Acceptable Sports	14	9	10	10	0	20	0	0
Positions for Relaxation	15	10	0	0	20	20	0	0

N = 20

Analysis of Results and Conclusion

An analysis of the data from the first methodology of administering both a pre-test and a post-test to 20 parents indicated that those parents who read the booklet had much more knowledge about asthma and its control than they did prior to reading the booklet.

The results of the questionnaire given to the content, media, and learning specialists clearly indicate that the booklet was successful in meeting the stated objectives. The analysis also indicated a favourable impression of the content and its presentation.

Summary

It is difficult to assess all aspects relating to asthma and its control by administering a questionnaire to a sample of only 20 parents. However, it does yield results in the proper direction, indicating that the booklet was successful in achieving its objectives. This assessment seems to have been substantiated by the evaluations of the content, media and learning specialists.

CHAPTER VIII

CONCLUSION, RECOMMENDATIONS, IMPLEMENTATION

The booklet, entitled Growing Up With Asthma - A Guide For Parents, seems to be successful in presenting an overview of the general facts about asthma as well as ways in which the condition may be controlled.

This understanding of asthma on the part of the parents should assist their children in leading a more normal life style. They should have fewer attacks of asthma, less frequent admissions to the emergency department of hospitals and reduced absenteeism from school.

It should be understood that the booklet serves only as a guide because some of the information may not pertain exactly to every child with asthma.

The major area from which the booklet can be disseminated to the largest number of parents, teachers, doctors, nurses, and other health professionals is the provincial Lung Association.

This volunteer agency will cover the cost of printing the booklet and distribute it to all interested persons wishing to obtain a copy. This will ensure that

all persons with asthma will have the material available at all times, as well as those in the teaching and health care fields. Copies will also be made available to physicians for distribution to their patients.

Although the booklet was designed to meet a specific need in Newfoundland and Labrador there is no reason why the concepts presented cannot apply nationally. It is hoped that other provinces might use the booklet, thus giving it the widest dissemination possible in Canada.

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APPENDICES

APPENDIX A

PHOTOGRAPHY PERMISSION FORM

NAME _____ DATE _____

I hereby give consent that my child _____ can be photographed and the same photographs may be published in a booklet "Growing Up With Asthma in A Guide for Parents." Any other uses of the photographs will require your consent.

Witness _____

_____

Parents Signature

APPENDIX B

TRIAL PRE-TEST QUESTIONNAIRE

PRE TEST

1. What are the symptoms of asthma?

2. Describe the triggers of asthma?

3. Why is it important to know the symptoms of asthma?

4. Name the drugs presciibed for your child?

5. What are the side effects of the drugs used by your child?

6. Do you encourage your child to be active in sports and physical education classes at school?

7. What specific sports would be helpful for your child?

8. Name three positions your child could assume for abdominal breathing.

_____

_____

_____

9. Is it necessary for your child to know all about asthma?

Yes _____ No _____

APPENDIX C

PRE-TEST QUESTIONNAIRE

Growing Up With Asthma

A Guide For Parents

QUESTIONNAIRE

Family information

1. Surname: .....

2. Given Names: Father ..... Age .....

Mother ....

Child ....

3. Address: Apt. Box No./Street No. and Name

.....

City/Town .....

Postal Code .....

4. Occupation: Please describe the usual occupation of the principle wage earner in your household.

Title .....

Kind of Work .....

Kind of Company or Business .....

5. Income: What is your approximate family income from all sources, before taxes?

	Family Income
Under $10,000	.....
$10,000 - 19,999	.....
20,000 - 29,999	.....
30,000 - 39,999	.....
40,000 - 49,999	.....
50,000 - 59,999	.....
$60,000 and over	.....

6. Education of Parents: Please indicate the highest level of education obtained.

	Father	Mother
Less than 7 years of school	.....	.....
Junior high school	.....	.....
Partial high school	.....	.....
High school graduation	.....	.....
Partial college training	.....	.....
College or university graduation	.....	.....
Graduate in professional training	.....	.....

7. Smoking Habits: Please indicate if members of your family smoke tobacco.

	Father	Mother	Other immediate family member
Non-smoker	.....	.....	.....
Smoker	.....	.....	.....

Asthma Information

8. What are the symptoms of asthma?

.....

.....

.....

9. Name the triggers of asthma.

.....

.....

.....

10. Why is it important to know the symptoms of asthma?

.....

.....

.....

11. Name the drugs prescribed for your child.

Oral: .....

Inhalers: .....

Other: .....

12. What are the side effects of the drugs used by your child?

.....

.....

.....

13. Is your child active in sports and physical education classes at school?

Yes ..... No .....

14. What specific sports would be helpful for your child?

.....

.....

.....

15. Name three positions your child could assume for abdominal breathing.

.....

.....

.....

16. Do you think your child with asthma understands his problem?

Yes ..... No ..... Uncertain .....

17. Is your child with asthma treated differently from the other children in the family (e.g. fewer chores, etc.)?

Yes ..... No .....

If yes, explain

.....

.....

.....

18. How do the other children react to the asthmatic child's different status?

.....

.....

.....

Thank you very much for your co-operation!

Date: .....

APPENDIX D

POST-TEST QUESTIONNAIRE

Growing Up With Asthma

A Guide For Parents

Post-Test

1. Surname .....

2. Given Name .....

3. State three symptoms of asthma:

   1) .....

   2) .....

   3) .....

4. Name six triggers of asthma:

   1) ..... 4) .....

   2) ..... 5) .....

   3) ..... 6) .....

5. Explain the preventive measures that may be taken when symptoms first begin:

   .....

   .....

   .....

6. Name the drugs prescribed for your child:

   ....

   ....

   ....

7. Describe the side effects of the drugs used by your child:

.....

.....

.....

8. Why are sports and physical education important for your child?

.....

.....

.....

9. Name four sports from which your child may benefit:

.....

.....

.....

.....

10. Demonstrate the relaxation technique.

APPENDIX E

SPECIALIST EVALUATION FORM

GROWING UP WITH ASTHMA

A GUIDE FOR PARENTS

EVALUATION

Please read the questions and check the most appropriate rating.

	Excellent	Good	Fair	Poor
Does the material satisfactorily serve the objectives?	....	....	....	....
Is there a smooth flow from one topic to the next one?	....	....	....	....
Does the narration aid in continuity and support the visuals?	....	....	....	....
Is the material too long overall, requiring deletions?	....	....	....	....
Have important points been left out?	....	....	....	....
Should some of the pictures be replaced or need additional ones be made?	....	....	....	....
Is the content appropriate for parents of children with asthma?	....	....	....	....
Is the vocabulary appropriate for the parents?	....	....	....	....

Is the material technically acceptable? ....

Additional comments and suggestions:

Signature .....

Title .....

Date: .....

APPENDIX F

INSTRUCTIONAL BOOKLET

GROWING UP WITH ASTHMA

A GUIDE FOR PARENTS

GROWING UP WITH ASTHMA

A GUIDE FOR PARENTS

GROWING UP WITH ASTHMA

A GUIDE FOR PARENTS

Marilyn Marsh

St. John's
Newfoundland, Canada
1983

This booklet was prepared in partial fulfillment for the degree of Master of Education in Learning Resources, Memorial University of Newfoundland

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This booklet has been prepared as a source of information for families of children with asthma. In order to keep the booklet brief and readable, I have not gone into great detail about all aspects of asthma. And, since no two children with asthma are alike, some of the information may not pertain exactly to your child's situation. Your own physician will best be able to answer specific questions about your child.

M.M.

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LEARNING ABOUT ASTHMA

Asthma is a physical illness which causes repeated episodes of difficulty in breathing, wheezing, and sometimes, coughing. It affects the air passages to the lungs. The tiny air tubes, called bronchioles, are the parts most affected. They are affected because they are sensitive to certain things which are harmless to other people. Because the air passages are too sensitive, they can respond by making it hard to breathe. The things to which a person is sensitive trigger the response. Some people can be triggered by one thing but others may take three or four things to trigger an attack. Each child responds in his own way. So asthma is not always the same for each child. Each is sensitive to different things and responds in different ways on different occasions.

Asthma attacks, although uncomfortable and frightening, may last only a few minutes or they may go on for hours or even days. They may be mild and easily handled by using the medications ordered by your physician, or, occasionally, the attack may be severe and require hospital care. The attacks may occur frequently, or there may be long periods of time between attacks.

THE CAUSE OF ASTHMA

The basic cause of bronchial irritability is unknown. Asthma has been considered to be basically an allergic disorder but we now know that allergy is but one of many triggers of symptoms in the asthmatic lung. The six basic things that trigger asthma are allergens, exercise, emotions, weather, infection and irritants. Sometimes these triggers work separately but most of the time several of them combine to trigger an episode. For example, paint fumes alone might not trigger an asthma attack but when the child is exposed to paint fumes plus other things to which he is sensitive, like dogs or pollen, these together could push him into an asthma attack. Different things will trigger an asthma attack in each person with asthma, and sometimes these triggers will change with time.

THE NORMAL LUNG

It is important to know about the normal structure and function of the respiratory system before you can understand what happens in the lung of a child with asthma.

The lung has several important functions but the most basic function is respiration. Respiration is the exchange of oxygen from the environment with carbon dioxide from the body. The diaphragm, a muscle just below the lungs, does most of the work of breathing. The diaphragm and the muscles between the ribs cause the chest cavity to increase and decrease in size as you breathe in and out.

The lung has five lobes or sections. There are three lobes in the right lung and two lobes in the left lung. The airways or bronchial tubes spread through the lungs like an upside-down tree.

The bronchial tube wall contains muscle which expands and relaxes as you breathe in and out. Millions of thin, elastic air sacs called alveoli are at the end of each airway. As you breathe in, these air sacs open up like balloons and then collapse quickly as you breathe out. These air sacs are surrounded by blood vessels. It is here that oxygen gets from the lung into the blood stream and is carried to all parts of the body. In addition, carbon dioxide gas is brought to the lung through the blood stream and breathed out. A thin layer of mucus covers the inside of each airway. Normally, just enough mucus is secreted to keep the airway moist and lubricated.

Figure 1 shows the pathway of this gas exchange. Air first enters the nose where it is filtered, warmed and humidified. After passing through the trachea, it continues into the lung through a branching system of tubes — the bronchi (singular: bronchus) which grow smaller as they go deeper into the lung. The smallest bronchi are called bronchioles, which open into balloon-like sacs called alveoli.

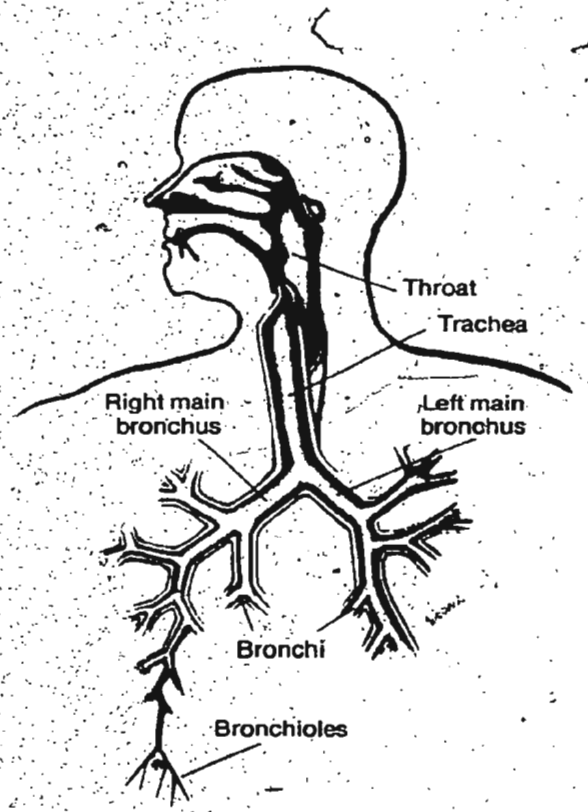


Figure 1 — Passage of Air Into the Lung

Figure 2 shows where the exchange of gases takes place. The alveoli are separated by a very thin membrane from the blood vessels of the lung, and it is across this membrane that the exchange of gases takes place. Oxygen from the air enters the lung and is absorbed into the blood, and carbon dioxide passes from the blood into the alveoli and is breathed out of the lung with the next exhalation.

The components of the lung—the bronchi, bronchioles, alveoli and blood vessels—all have very complex regulatory systems so that the flow of air and the exchange of gases are properly matched to the body's needs at any time.

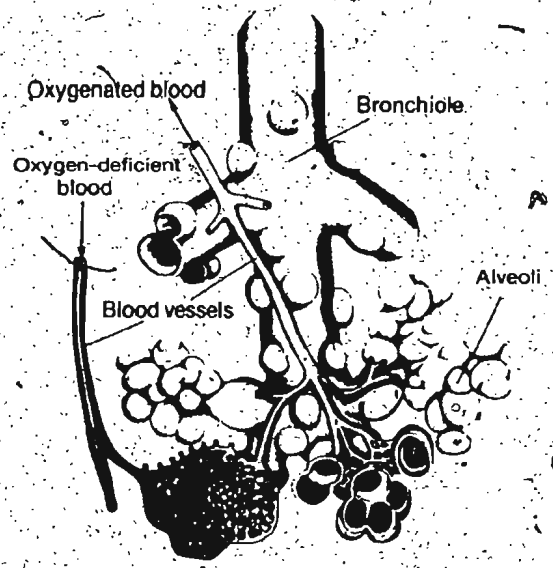
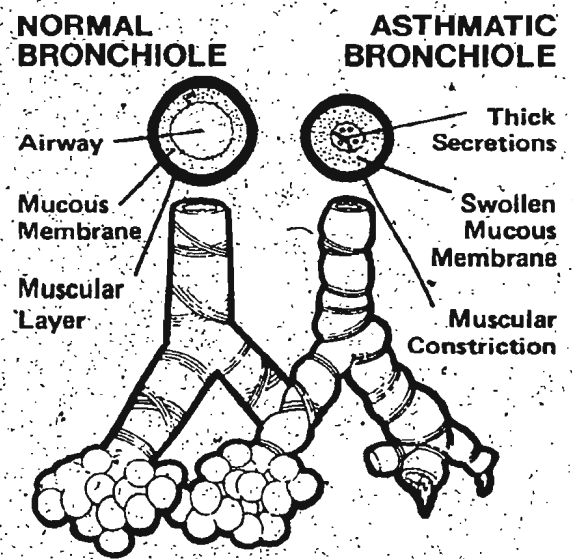


Figure 2.— Bronchiole with Alveoli

Figure 3 shows that around the bronchi are wrapped bundles of muscle. The state of tension of this muscle is an important factor. Contraction of the bronchial muscle narrows the bronchus while relaxation widens it. The inner wall of the bronchus is lined by the same delicate membrane called the mucosa that lines the nose, the mouth, and the throat. This is also the location of the mucous glands which produce and secrete mucus into the middle of the bronchial cavity.



Three responses occur in asthmatic lungs

- *The secretions thicken*
- *The mucus membranes swell*
- *The muscles constrict*

Figure 3.— Comparison of Normal and Asthmatic Bronchioles

THE ASTHMATIC LUNG

In asthma, three responses occur in the lungs because the bronchi and bronchioles are very sensitive and become irritated very easily. When the irritation occurs, the muscles in the bronchioles tighten up and narrow the diameter of the bronchus. This makes it very difficult to get air out of the air sacs in the lungs. Also, the mucosa becomes swollen and inflamed, which narrows them even more. Thirdly, the bronchial glands produce excessive amounts of very sticky mucus which is difficult to cough out and which may form plugs in the bronchus, further obstructing the flow of air out of the lungs. These result in the signs and symptoms seen in the child with asthma.

When the bronchi become obstructed, greater effort is needed to push air through them in an attempt to meet the body's requirements for oxygen. This requires a greatly increased muscular effort on the part of the child. Many of the child's symptoms are related to this effort — sweating, fatigue, coughing and irritability. Normally, so little effort is required for breathing that the diaphragm alone is enough. During an asthma attack, other muscles must be utilized. It is usually obvious during an attack that the muscles attached to the ribs, shoulders and neck are being used. Wheezing is usually heard which is the forcing of air at high pressure through a narrowed, uneven bronchial tube which causes vibrations of the mucus trapped in the bronchus and of the bronchus itself.

When these vibrations are of high frequency, they produce high pitched squeaking or whistling sounds usually referred to as wheezing. When they are of lower frequency, they cause lower pitched rumbling or rattling sounds. They can often be felt by placing your hands on the child's chest.

Coughing is also a major symptom which is caused by excessive amounts of sticky mucus caught in the bronchi. This is a very irritating situation which usually triggers persistent coughing.

In most children with asthma, this narrowing of the bronchial tubes lasts only a few hours or a few days, but in some situations, a minor degree of narrowing can last much longer. Between attacks, breathing is normal but after a severe episode, there may be chest muscle soreness from the laboured breathing.

THE TRIGGERS OF ASTHMA

In the child with sensitive airways, many different things can trigger symptoms. Things that commonly affect children with asthma include:

- ALLERGY

When foreign substances enter the body, one of the natural defences is the formation of antibodies which combine with the foreign substances so as to render them harmless. This process is called immunity. This is the same process that occurs when the child is given a vaccine for such diseases as polio and measles. A weakened form of the virus is given in order to stimulate the formation of antibodies which will protect the child if he is later exposed to the disease. It is immunity which prevents a child from getting a disease like red measles more than once because the antibodies formed after the first illness protect against reinfections.

Allergic children form protective antibodies just as other children. Unfortunately, the allergic child also forms other antibodies which rather than being protective, cause allergic disease. The foreign substances called allergens (substances capable of causing allergic reaction) which stimulate the production of these antibodies to those allergens are of many types, and include animal danders, pollens, molds, foods and house dust. When these substances combine with the type of antibody present in allergic children, a reaction takes place which results in the release of several irritating chemicals. These chemicals may then produce asthma. Not all children with allergic asthma are sensitive to the same substances, and often a child will react to an allergen only if it is encountered in combination with another allergen. With allergic asthma, there is usually a family history of allergy and asthma.

Allergy can cause asthma only in children with irritable airways. Many children with allergies have no asthma but do have hay fever, hives, or other types of symptoms. Many allergic children do not have asthma and in many children with asthma, allergy is not as important as some other triggers.

- WEATHER

Asthma may be intensified by changes in the weather. However, there is no one type of climate that is better than another type for all children with asthma. Some children wheeze more on windy days while others wheeze on rainy

days. Some have difficulty in hot, dry weather while others have difficulty on cold days. The type of climate that is best will depend upon the allergens of the child and their relationship with the weather.

EXERCISE

Exercise is a very common trigger of asthma. It is usually referred to as Exercise-Induced Asthma (EIA). This may take the form of obvious wheezing after exercise, or coughing after exertion. Although hard exercise for at least five minutes brings on an attack, it should still be encouraged. A program designed to improve physical fitness is most beneficial and the child should be encouraged to try various sports to discover for himself what he is able to do. Inform the physical education teacher of the importance of encouraging the child with asthma to participate in all gymnastic and athletic activities.

Exercise-induced asthma can usually be prevented by taking a medication such as Cromolyn (Intal). Other medications may also be effective. It is useful only when taken regularly to prevent attacks, and has no effect when taken after wheezing starts.

Because we know that hard exercise can make some children wheeze, it is important to prevent this wheezing.

Every child deserves the right to enjoy a normal, fit, athletic life.

Ways to prevent wheezing:

1. Keep in shape by exercising every day.
2. Always do warm-up exercises before hard exercise.
3. Choose a sport that doesn't make you wheeze.
4. Take you medication to prevent the wheezing when you exercise.

EMOTIONS

Asthma is not a psychosomatic disease but emotions of anxiety, anger or other emotional stress are frequently involved in triggering asthma. The start of a new school term, a birthday, and separation from parents or friends may be emotional triggers. However, no amount of emotional upset will cause asthma unless a child already has the characteristic irritable airways of this condition. Children with asthma run the risk of ridicule or nonacceptance from other children so it is important for them to keep up with their school work, take prescribed medications correctly and thus enable them to participate like other children in most activities at school and play. In other words, the most effective way to deal with the consequences of asthma is to achieve excellent control of the asthma. The resulting confidence and sense of security make it much easier to cope with the situation.

INFECTION

Most children with asthma have increased difficulty during upper respiratory infection. The viruses that cause respiratory infections in non-asthmatic children cause the same infections in children with asthma but it is usually more severe because of the problems in the airways that accompany the infection. The cells in the bronchioles produce more mucus, which in turn plug the bronchioles, so it is important to cough really well in an attempt to get rid of this mucus. Otherwise, an even more severe infection, such as pneumonia, could develop. Because of asthma, a minor cold may sometimes lead to a significant illness.

IRRITANTS

Irritants are things in the air that can trigger asthma. They are different from allergens. Either a tiny amount or a large amount of an allergen can trigger the same response. A tiny amount of an irritant might not trigger an episode, but a large amount could. Obviously, if a specific irritant can be identified, it should be avoided. Common irritants are tobacco smoke, paint and gasoline fumes, air pollutants, some aerosols, dust and cold air. The only way to control these triggers is to avoid them. If the episode starts as the result of an irritant in the air, getting away from the irritant and taking proper medication will usually stop the asthma.

Cigarette smoke is by far the most important, and is the irritant a person can do most to avoid if he wants to. Even in small amounts, smoke causes very intense irritation of the bronchi.

Fumes of any kind can be a great hazard. It is important to turn on the vent over the stove while cooking. There is also a need to be more conscious of keeping the burner low enough to prevent whatever is cooking from smoking. Exposure to volatile substances from new carpets or house paint can be reduced by doing home renovations in the summer when ventilation is good.

Aerosol sprays are definitely not to be used. The propellents in spray containers are some-

times toxic in themselvs. Also, the chemical being sprayed into the air, a hair spray, perfume, a household cleaner or a deodorant is bound to be a substance that should not be inhaled.

Cold air causes some irritation in most people but it is more intense in those with irritable airways. Wearing a scarf over the face may decrease the irritation. Sometimes extremes in temperature of the things that one eats or drinks is a factor in bronchospasm. Avoidance of iced drinks and very hot foods is recommended.

TREATMENT OF ASTHMA

Asthma is defined as intermittent airway narrowing caused by three processes: constriction of bronchial smooth muscle, excess mucus production and mucosal edema. However, as the basic defect in the lung is not yet known, asthma cannot be cured. Therefore, the objective of treatment is control of the attack so the child can enjoy the normal activities of daily living, work and physical exercise.

With such control, asthma can often be changed from a major family problem to a relatively minor annoyance. The goal in the treatment of asthma is the achievement of a normal lifestyle, including participation in any activities that interest the child. Because asthma cannot be cured, a treatment plan for each child can help relieve symptoms.

The treatment plan consists of the following:

Changes in the environment
Medications
Immunotherapy
Dietary Control
Breathing Exercises
Exercise
Psychotherapy
Proper use of inhaler and/or spinhaler
Moving
Teaching

CHANGES IN THE ENVIRONMENT

When asthma is triggered by allergens such as animal dander or feathers, the best solution is to get rid of all feather or hair stuffed pillows, mattresses, and quilts. Occasionally, the family pet may be the cause and it may be necessary to find it a new home. However, the pet should not be removed unless there is very good evidence that it is a major factor in the child's asthma.

A child can become very attached to a pet and its removal from the house may cause so much upset to the child that it cancels out any possible benefit. If there is doubt about the importance of the cat or dog in causing the asthma, it may be an idea for someone to look after the animals for a few weeks. If the asthma seems to improve while the pet is away and then occurs again when it returns, this would suggest that it may be a factor. Further investigation can then be carried out.

Neither medication nor allergen injection is any substitute for the removal of allergens. Some allergens, such as house dust or molds, are difficult to remove entirely, but the intensity of exposure can be reduced. There are many steps to make your home as dust-free as possible. Because a child spends about one-half his time in his bedroom it is best to centre your attention there.

This can be done by using smooth, not fuzzy, washable blankets and bedspreads and by removing all carpets, stuffed animals and other dust collecting objects. Do not use upholstered furniture.

There should be nothing living in the room such as house plants or pets and the door should be closed at all times. Plastic covers for pillow cases and mattresses also help to decrease the child's exposure to potential allergens.

Clean the room daily by damp dusting and damp mopping. Vacuuming blows a great deal in the air, so do not vacuum the room in the presence of the child with asthma.

Foods may sometimes act as an allergen in chidlren with asthma. If particular foods are suspected of causing problems, they should be removed from the diet.

Many substances in the environment, while not allergens, can irritate the lung. Cigarette smoke is one of the most common of all irritants, but aerosol sprays, perfumes, paint fumes and air pollution are also significant irritants. The air should not be too dry; humidifiers may be helpful.

All children need a caring and happy home environment. For the child with asthma, this is particularly important as emotional stress can worsen symptoms. The child with asthma who feels unloved or ignored may be tempted to use his symptoms to compel attention. It is important to maintain his self-confidence so that he will not feel guilty about something he cannot control but instead he will become quite self-reliant and able to help in the control of his asthma. A child with a healthy self-image can see that he has strengths and weaknesses. Most children with asthma can participate in sports. However, if a child cannot do all of them, he needs to know that he can probably swim or play ball with his friends. He needs to know that he can excel at something.

MEDICATIONS

Medication has been the most successful approach in the treatment of asthma. The most common cause of failure of treatment is lack of compliance. This may occur for a variety of reasons. Children who are not willing to accept that they have asthma may attempt to deny it by forgetting to take their medication. Sometimes medication schedules are arranged without considering the child's life-style, so that medications which are due at inconvenient times are skipped. The older child must be included in his own care if compliance is to be expected.

Medications are not a cure for asthma; they simply control the symptoms. Their effect on asthma lasts only as long as they are being taken.

There is no drug which is effective for every kind of asthma and for every child. Medications must be ordered for each child on an individual basis.

The severity of asthma changes with time, and a child's responses to medication change as he grows and develops. Therefore, medications must be checked at regular intervals to be certain they are still appropriate.

Many drugs for the treatment of asthma are available and are extremely effective if used properly. There are four basic groups of drugs given for asthma:

- Theophylline
- Beta-Adrenergics
- Cromolyn
- Steroids

Antibiotics are also useful when asthma is complicated by bacterial infection.

THEOPHYLLINE

This oral drug is effective and safe and is one of the most widely used. Its action is on the bronchial muscle where it acts as a muscle relaxant. Since relaxing bronchial muscle increases the diameter of the bronchus, theophylline is known as a bronchodilator. It is prescribed under a variety of brand names, which include:

Aminophyllin
Choledyl
Elixophyllin
Quibron
Somophyllin
Theo-Dur

Theophylline is usually given by mouth, although in a severe attack it may be given intravenously as aminophylline. Since the effectiveness of theophylline is related to its level in the blood, your physician may want to take occasional blood samples for measurement of blood levels of the drug. In most children, the effect of theophylline lasts four to eight hours, so the drug may have to be taken several times a day for control of chronic asthma. Fortunately, theophylline does not appear to lose effectiveness with long-term use and does not have serious long-term side effects. However, there are some side effects which can be produced when dosage is too high. These effects are nausea, vomiting, loss of appetite and stomach aches as well as headaches, dizziness and hyperactivity. When any of these symptoms occur, theophylline side effects should be suspected. In most children, theophylline can be adjusted so that relief of asthma is obtained without unacceptable side effects.

BETA-ADRENERGICS

The beta-adrenergics are also bronchdilators which relax the bronchial muscle. They may be prescribed with theophylline or instead of it. They can be administered orally, by inhalation or by injection. This group of drugs is also prescribed under a variety of brand names, which include:

Oral

Alupent
Bricamyl

Inhalation

Berotec
Fenoterol
Ventolin

Injection

Epinephrine

Inhaled bronchodilators can be used routinely from four to six times daily. A useful preventive measure is the use of an inhalation 10 to 15 minutes before activities such as exercise or before inhalation of cromolyn if these events are known to cause symptoms. Side effects — such as shaking of hands, sleeplessness, headache or heart beating hard — may occur. See your physician if any of these effects are present. If the response to the bronchodilator is reduced, this is an early sign that the medications need to be reviewed. The need to inhale beta-adrenergics more than four times daily on a regular basis or more than six times daily at any time is an important signal that the medication should be changed or other medications given in addiction to those already prescribed. Over-use of inhaled bronchodilators occurs when asthma is not controlled.

CROMOLYN

Cromolyn has a unique action; when inhaled about ten minutes before exposure to allergens, it helps to prevent the release of substances that cause the asthma attack. Although it has no effect after an attack of asthma has started, as a preventive measure it may eliminate most attacks. So it is important to use this drug on a regular basis because one doesn't always know when exposure to allergens will occur. It does not act as a bronchodilator to relieve asthma rapidly and, therefore, it may need to be used in addition to bronchodilators.

The usual dose is the contents of a capsule up to four times daily. If used less frequently, it should be increased to four times daily when symptoms appear.

Cromolyn is very safe and can be used in conjunction with other asthma drugs. The preventive effect begins within minutes and lasts for several hours. The side effects are minimal. It may irritate the airways and cause a cough or a mild wheeze. This can be prevented by using an inhaled bronchodilator ten minutes before using the cromolyn.

Consult your physician early if you are using cromolyn four times a day plus other prescribed drugs and there is no improvement or the asthma is becoming worse. Also, see him if your sleep or ability to do various forms of exercise is still impaired by the asthma.

Cromolyn is prescribed under the following brand name:

Intal

STEROIDS

Steroids interfere with the ability of allergens to irritate the airways. They are usually given orally in large doses to control very serious symptoms and then reduced to the lowest dose required to control those symptoms. Most children with mild asthma can discontinue steroids in the oral tablet form and then take an inhaled form of the medication.

The steroids are all related to cortisone, the hormone produced by the adrenal gland. A large variety of synthetic steroid hormones is in use, including:

Inhaled Steroid

Beclovent
Vanceril

Ingested Steroid

Prednisone

Steroids are a group of very powerful drugs and are most useful in relieving very severe, acute asthmatic attacks, but are not usually used unless other drugs fail. Use of a steroid as a first line of treatment is not recommended; it does not produce bronchodilation or prevent exercise-induced asthma.

The dangers in the use of oral steroids over long periods of time are due to the significant side effects of various types. The risks involved are sometimes small compared to the benefit a child may receive from careful use of these drugs. However, now that we have inhaled steroids, it is rarely necessary to have a child on long term oral steroid therapy.

These effects are usually avoided if the inhaled steroid is used. The side effects of inhaled steroids may be an irritated throat, but this effect can be reduced by holding the inhaler two inches in front of the open mouth. Inhalation before meals and rinsing the mouth and throat with water after inhalation are also beneficial. However, inhaled steroids are not effective for acute severe attacks of asthma.

At times, the child may have difficulty concentrating. The teacher should know that some drugs, used in controlling asthma, can effect concentration.

IMMUNOTHERAPY

This form of treatment is also referred to as "allergen injections" or "allergy shots". It consists of a series of injections of solutions of the allergens which are believed to be triggering the symptoms. The objectives of treatment are:

1. to identify the substances that trigger an allergic response.
2. to assist the child in devising ways to avoid or at least limit exposure to these allergens.
3. to relieve or decrease the severity of the symptoms produced by the allergen.
4. to increase resistance to specific allergens likely to trigger an allergic reaction.

Allergen identification is sometimes fairly easy, as in drug allergies and other situations that are not routine occurrences in the life of the child. Less easily identifiable allergens might include animal danders, pollen, dust, mold and a variety of other substances that are common in the patient's environment. In these cases, some detective work and close attention to details of the child's daily life are needed.

In those children in whom the allergist feels immunotherapy is indicated, treatment usually begins with injections of a weak solution given once or twice a week, with the strength gradually increased until the child no longer experiences a reaction to the allergen. When the top dosage is reached, the injections are then usually given about once a month. For results to be lasting, these monthly injections may have to be continued for several years.

It is important to remember allergen injections take time to show an effect. You must allow from six months to a year to be able to decide if there has been any benefit.

This type of treatment is only useful for children who have asthma triggered by allergens which cannot be avoided. It is no use for asthma in which exercise, climate, injections, irritants or other factors are the main triggers. It should not be used for dog danders or feathers, which can be avoided. A positive skin test alone is not sufficient evidence that a certain allergen is causing asthma. It must also be evident from your own observation of the child.

DIETARY CONTROL

Children with asthma have the same nutritional requirements as other children. Aside from avoidance of specific foods which have been clearly shown to cause symptoms, no special kind of diet has been shown to be beneficial in asthma. A regular balanced diet contributes to the general health measures which are vital to the control of asthma.

Certain foods or combinations of foods may provoke an asthmatic attack in the allergic child. Some of the more common foods causing an allergic response are fish, nuts, chocolate, milk, cereal, and eggs. If the child has allergic symptoms to a food, the entire food class should be eliminated in the beginning. For example, if the child has a peanut allergy, he must avoid all other legumes like chick peas, lentils and soy beans. It is also important to know the contents of prepared foods such as weiners which contain a soy bean filler. Such additives must, by law, be declared on the label, so check labels carefully if your child has a definite food allergy.

Parents group together during a Family Asthma Program to discuss experiences with their children's asthma.

BREATHING EXERCISES

Correct breathing exercises are one of the important aspects of asthma treatment. These exercises help the child to develop and use all his breathing muscles. They help to control breathlessness and wheezing and either stop an episode early or minimize the severity of the attack. The child with asthma tends to develop poor breathing habits and loses the movement of his lower chest. This makes breathing more difficult and causes poor posture and a limited exercise tolerance. If the child cannot keep up with his friends, he may begin to spend more time alone and become overprotected and even antisocial.

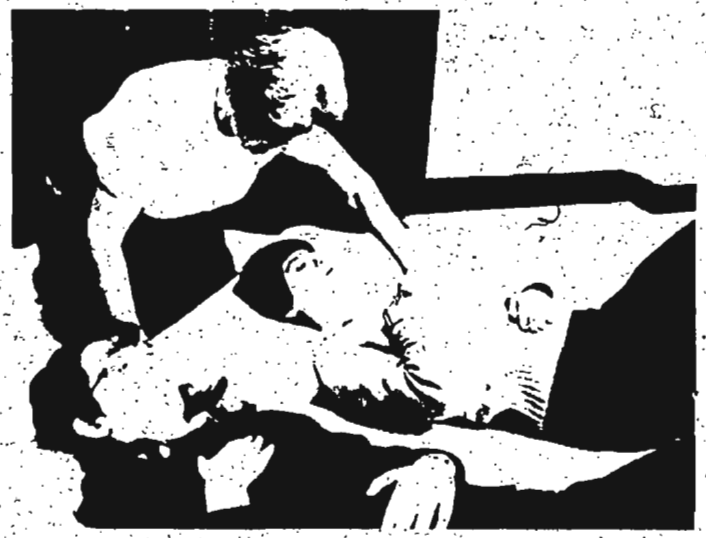
If breathing exercises are practiced regularly, the child learns to control his episodes. He also learns to become less frightened during an episode because he is actively involved in relieving his own signals. This helps the child to develop self-confidence, particularly when he is in situations when he is away from his parents or if medications are not readily available.

These breathing exercises will improve his posture and help him to take part in exercises and sports without causing problems. If shortness of breath does occur, the child is encouraged to drop out of the activity, regain his breath control and then return to the activity. If diaphragmatic breathing is carried out in the very beginning of an episode, the episode will usually be prevented. This allows the child with asthma to take an active part and keep up with his friends.

In the beginning, the physician or the therapist will teach the child these breathing exercises. It is also very helpful if he attends a family asthma program until he can do the exercises well.

RELAXATION AND DIAPHRAGMATIC BREATHING EXERCISES

Tension and panic can make you lose control of your breathing. Learning to relax, particularly the shoulders and upper chest muscles, together with breathing exercises, will help to control shortness of breath and wheezing. Learning relaxation takes a great deal of practice, so it should be practiced every day. It should be done when the child feels good, so that he can use it when he feels an asthma episode coming on. The diaphragm is the main muscle in breathing. Many people with asthma use only their upper chest muscles to breathe. This takes more energy, which uses up more oxygen and uses less lung tissue. By using the diaphragm well in breathing, you use less energy to breathe because it is a strong muscle and does not tire quickly. You also get more air into and out of your lungs, making you less short of breath.



Relaxation and diaphragmatic breathing exercises will help to control breathing, especially during periods of stress or increased activity by:

1. breathing at a slower rate
2. breathing out through pursed lips
3. relaxing the upper chest and attempting to fill the lower part of the lungs

STEPS FOR RELAXATION

1. Lie down with a pillow under your head and shoulders and a pillow under the knees.
2. Tighten like a tin soldier. Start tightening (tensing) the muscles in face, neck, shoulders, arms, hands, upper back, lower back, stomach, legs and feet and hold very tight for five seconds.
3. Then go floppy like a rag doll. Relax all the muscles, starting with the face and working down to the toes until really floppy.
4. Repeat this exercise several times, noticing the differences between being tense and being relaxed.
5. Add to this exercise by taking a deep breath in through your nose as you tighten up, then slowly breathe out through the mouth as you relax. Every time you breathe out, relax the whole body, thinking first the face and neck and then the hands, forearms, shoulders, across the chest, upper back, lower back and finally the legs, feet and toes.
6. Before getting up after general relaxation, always stretch well to slowly get the body active again. Then return to normal activities.

DURING AN ASTHMA EPISODE

Diaphragmatic breathing draws air more easily into the lower part of the chest and helps to relax the very tense and rigid upper chest, thus making it easier to get air in and out of the lungs. To help encourage this, the child should get into one of the positions to relax and begin diaphragmatic breathing.

A calm relaxed manner in the people around will help the child to relax. The diaphragmatic breathing should be practiced every day so that at the onset of an episode, the child will automatically assume the relaxed position and do the diaphragmatic breathing.

STEPS FOR RELAXED DIAPHRAGMATIC BREATHING

1. Lie flat on your back, on the floor or on a level bed.
2. Bend your knees and keep your feet on the floor.
3. Rest one hand across the middle of your chest.
4. Place the other hand on the tummy (abdomen), with the thumb just below the navel.
5. Breathe in (inhale) deeply through the nose, and let the tummy go out like a balloon. Your chest should not move. By keeping your hand on the chest, you can feel it if it does.
6. As you breathe out (exhale) slowly through pursed lips, making a soft blowing sound, the hand on your tummy goes down. The hand on your chest is still.

ALTERNATE RELAXATION POSITIONS

When breathing is difficult, use one of the following positions to promote relaxation. This will help to control breathing with very little effort. The choice of position will depend on where the child is at the time. In all positions, gradually relax the neck muscles, shoulders and upper chest, and try to breathe quietly with the lower part of the chest.

Sitting in a Chair

Sit and lean forward with a straight back. Rest your forearms on your thighs with wrists relaxed. (see Position A)

Position A

Standing Against a Wall

Lean the lower half of your back against a wall, with your feet placed twelve inches away from the wall. Your shoulders should be relaxed, your arms hanging loosely by the side. (see Position B)

Position B

Standing, Leaning Forward

Stand and lean forward from the hips onto something of the correct height. Your back should be straight, your arms should be spread well apart, and your head should rest on your hands. (see Position C)

Sitting in a Chair up to a Table

Sit leaning forward from the hips with a straight back, resting your head, shoulders and arms on the pillows. When you are well relaxed, your arms should be lying loosely on the table, while your shoulders and upper part of the chest rest against the pillows. (see Position D)

Lying Down

If you are lying down, make a slope with three or four pillows, placing an extra pillow to fill the gap between the waist and armpit. Lie high up on these pillows with the whole of the side supported and the shoulder underneath the top pillow. (see Position E)

Position C

Position D

Position E

POSTURE

Good posture is essential for good breathing, and should be corrected frequently. Practice good posture in front of a long mirror. The rules for good posture are:

1. stand tall
2. head up, chin in
3. shoulders back and relaxed and level
4. tummy pulled in
5. seat muscles tightened and tucked in
6. back flat
7. legs straight

EXERCISE

Most children with asthma can take part in regular sports and physical education programs. The right kind of exercise, including competitive sports, can do much to make the child with asthma as active as his friends. Children with asthma are often excused from physical education class and are not included in many group activities. Such exclusions should only be made on rare occasions and with true medical reasons. Being left out sets the child apart from his friends and tends to make him more of an invalid. Self-esteem may be affected as a result. If the child cannot participate, it will be easy to find some less strenuous form of exercise that will still involve the child with his friends: serving as score keeper, being in charge of checking equipment, or some other activity that is an important contribution to the team or the school.

For some children, exercise can produce wheezing and coughing and even trigger a full-blown attack so it is important to choose the right kind of exercise. Be careful not to push children into physical skills that are too difficult for them. There are other activities where such children can excel. Brief exercise for three or four minutes often decreases airway obstruction so the child with asthma should be encouraged to participate in such sports as baseball and sprint running that involve brief, vigorous activity but not in others such as basketball and long-distance running that require prolonged exertion. Only when exercise is prolonged for four to six minutes or longer do wheezing and shortness of breath develop. Recreational swimming is the best exercise as it uses all muscles and it is not competitive. Also; they should be able to participate in a broad range of sports and exercises. Baseball, skateboard, hockey, golf, softball, karate and archery are excellent activities because they emphasize total concentration and they also reinforce proper breathing. Jogging is popular, but if it causes the child to wheeze, try alternating a few minutes of running with a few minutes of walking. To reduce exercise-induced asthma further, keep a watchful eye on the weather. Exercising in warm, moist air is much less likely to cause an attack than exercising in cold, dry air.

Playing a wind instrument such as a clarinet, recorder, trumpet or tuba is another exercise that is fun and at the same time relaxes muscles that may otherwise be in spasm.

Encourage your child to take part in activities according to his own interests and capabilities.

Excessive exercise may be undesirable for some children with asthma, but carefully planned programs of medication and physical conditioning may be beneficial, in permitting the child to participate in athletic activities.

Some children need drugs in order to increase their tolerance for exercise. They may experience no difficulty when walking or swimming but they may get abnormally short of breath when they run or participate in sports requiring prolonged exertion.

General physical conditioning exercises should be part of the child's daily routine. From these exercises, the child learns that he can be in control of his body.

Karate is an excellent sport for personal development. The emphasis is on proper breathing and total concentration.

PSYCHOTHERAPY

Emotions play a part in asthma but they do not cause this illness. It is not a psychosomatic disease. Children with asthma suffer from unexpected and frightening attacks from a wide range of causes. These attacks make the child apprehensive. The emotional tension created by these anxieties can trigger or aggravate an attack. The best way to deal with these consequences is to achieve excellent control of the asthma. The resulting confidence and sense of security make it much easier for you and your child with asthma to change attitudes and patterns of behaviour. Time lost from school and limitations on activities tend to make your child feel different from other children. He may become overdependent and preoccupied with his illness, or hostile and aggressive and use his asthma to avoid school or manipulate the rest of the family. To avoid these problems, it is important to have a positive attitude about asthma.

It is important to understand the seriousness of the condition and the importance of following your physician's advice. Your child should learn in simple terms, what his condition is, what causes his illness, how it is best controlled and what he can do as a responsible person to prevent acute attacks. He should understand why he should be aware of his surroundings and the importance of avoiding precipitating factors that can make him ill. He should also know that all attacks may not be prevented, and if symptoms occur, he should be aware of the steps he can take to quickly get them under control. He should also learn to trust his doctor and confide in him so that his treatment program will be maintained throughout his growing years. A referral to a psychologist or psychiatrist may be helpful when a major problem of acceptance and adjustment arises. Severity of asthma alone is not a valid criterion for referral. When school failure is associated with asthma, or when parents are so overwhelmed by the problem they are unable to provide the comprehensive care needed by the child, a referral for psychotherapy may be indicated. This service can often help the family to resolve conflicts that the illness causes.

PROPER USE OF INHALER AND/OR SPINHALER

It is extremely important that inhalers and/or Spinhalers be used properly to be certain the prescribed medication will be taken correctly. Your physician should give you a demonstration of the correct method just before your child begins using an inhaler and at each visit afterwards. It would be helpful if your child arranges to take his medication by inhaler at the same time as his visit so the doctor can see how well he is able to use the inhaler. If the child is not using it properly, the doctor can instruct you and your child again at that time. Your child will not get the benefits from the drugs if the inhaler is not being used correctly.

Directions for use of the inhaler must be followed completely.

The child must be shown how to remove the cap from the mouthpiece, making sure the cannister is firmly and fully pushed into the outer shell. Then shake the inhaler, while at the same time breathing out fully before putting the mouthpiece into the mouth and holding his breath. He should hold the inhaler in both hands with the lips closed firmly around the mouthpiece and with the inhaler directed towards the back of the mouth. His head should be tilted slightly back. As he starts to breath in, deeply and slowly, he should press the metal cannister down so that the spray is released and taken into the lungs. He should breathe in deeply and slowly for over three seconds. Before the second puff, he should wait at least thirty (30) seconds for the valve pressure to build up again. Then shake and repeat the same procedure again.

If your child is older, it is better if he holds the inhaler in both hands about two or three inches *in front of his widely opened mouth* with the mouthpiece directed toward the back of his mouth. This method allows more of the drug into the lungs and less in the mouth.

The inhaler can be used routinely with two puffs up to four times a day. It should not be used more often unless your physician recommends it. Even then, he would never recommend increasing it beyond five or even less frequently to six times a day. If relief is not being given by regular use, the reason quite often is simply because the inhaler is not being used properly or because the total medication treatment needs to be looked at again. Overuse of the inhaler will not help.

Similar directions are followed when the Spinhaler is being used. Look at the diagram of the Spinhaler for the name of each separate part. Wash your hands and load the Spinhaler in an upright position with the mouthpiece pointing downwards. Place the Spincap into the cup of the propeller and then screw the body tightly back onto the mouthpiece. With the Spinhaler still in the same position, slide the cover of the body down as far as possible and then back up again. This pierces the Spincap and makes the Spinhaler ready for use.

Then the child breathes out fully, with the Spinhaler away from the mouth. Then place the mouthpiece in the mouth with the lips closed around it. With the head tilted well back, breathe in as deeply as possible. The breath is held for a few seconds with the Spinhaler away from the mouth. Then the child breathes out completely and repeats the same procedure three or four times until the capsule has been emptied. It doesn't matter if a little powder is left. To prevent irritation of the throat, have your child drink a small amount of water when he has finished his treatment. For smaller children, a whistle can be attached to the Spinhaler which makes the treatment a little more fun and much easier for the parent. Three good blasts from the whistle will indicate that the powder is pretty well used up. You don't have to take the Spinhaler apart each time to check.

HOW TO USE THE INHALER

Directions to the patient for the correct use of Ventolin® and Beclovent® Inhalers

1.
Make sure the canister is firmly and fully inserted into the outer shell or actuator. Press canister firmly into the actuator and rotate back and forth several times. Remove the cap from the mouthpiece. Hold the inhaler as illustrated and shake VIGOROUSLY.

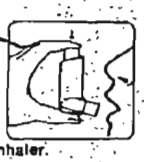
2.
Breathe out slowly until no more air can be expelled from the lungs, then IMMEDIATELY . . .

FOR THE NEXT STEP THERE ARE TWO ALTERNATIVES (3a or 3b) DEPENDING ON THE TECHNIQUE PREFERRED BY THE PHYSICIAN.

3a.
Place the mouthpiece over the tongue and well into the mouth. Close the lips tightly around the mouthpiece. Press the top of the canister firmly between forefinger and thumb whilst inhaling deeply and slowly.

OR

3b.
Place the inhaler directly in front of the mouth as shown. Begin a normal inward breath through the wide open mouth, at the same time pressing the canister down firmly into the inhaler.



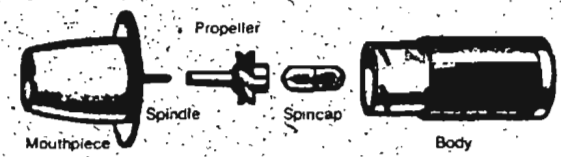
4.
Continue inhaling to carry the spray deep into the lungs. Hold the breath for as long as is comfortable.

5.
Release the pressure on the canister. Remove the inhaler away from mouth and breath out gently.

6.
Before the second puff, wait for at least 30 seconds for valve pressure to rebuild between puffs. Then shake again before re-using the inhaler. Replace the cap.

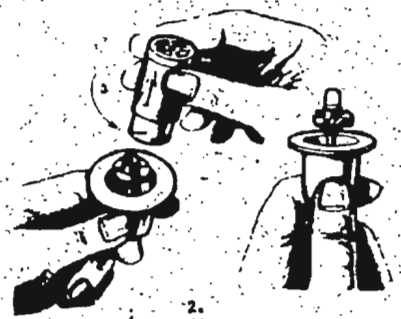
Illustration courtesy of Allen & Hanburys

HOW TO USE THE SPINHALER



How to load the Spinhaler

First make sure your hands are clean and dry. Tear open the sachet and press out a Spincap through the foil. Load the Spinhaler as follows



1.
Hold it upright with the mouthpiece pointing downwards, then unscrew the body

2.
Check that the propeller is on its spindle, then firmly push a Spincap (coloured end downwards) into the cup of the propeller. Make sure that the propeller spins easily and then screw the body tightly back onto the mouthpiece.

3.
Still holding the Spinhaler upright, slide the grey outer sleeve down as far as it will go and then back up again. This pierces the Spincap and makes the Spinhaler ready for use. This step may be repeated a second time for optimal piercing.

Continued on next page.

HOW TO USE THE SPINHALER Continued

How to inhale Intal

1. Make sure the mouthpiece and the body of the Spinhaler are still tightly screwed together.
2. Breathe out, put the mouthpiece in your mouth and close your lips around it so that they are right up against the lip of the Spinhaler.
3. Tilt your head well back and breathe in as deeply as you can.
4. Hold your breath for as long as comfortable, then take the Spinhaler right out of your mouth and breathe out.
5. Keep repeating this process until the Spincap is empty. Two or three attempts should be enough and it does not matter if a little powder is left.
6. If you have a little irritation in your throat afterwards, have a drink of water.

Remember — time and patience spent taking Intal correctly can save you from countless attacks of asthma and the upheaval they cause.

Parents — your doctor or pharmacist can get you a whistle to put on the end of the Spinhaler. This could make taking Intal more fun for your child and may help him or her to learn to take it properly.

How to look after your Spinhaler and Spincaps

Always keep your Spinhaler in its container. This will make sure no dirt can get into it.

For best results, the parts of the Spinhaler must be kept free from any powder remaining. At least once a week, it is important that you brush off any powder left sticking to the propeller and wash all parts of the Spinhaler in warm water. Make certain everything is quite dry before re-assembling.

illustration courtesy of Fisons Corporation Limited

MOVING

Asthma is just as common in places with warm dry climates as in those with wet cold climates, so moving does not necessarily help. Sometimes a move to a different part of the country seems to produce an improvement in asthma. Whether this is due to different climate, avoidance of certain allergens, or other factors is unknown, so it is very difficult to predict whether a move will be beneficial. It is a decision which should not be considered until every other approach to the problem has failed.

TEACHING

Children with asthma are frequently admitted to hospital and these admissions lead to many episodes of frustrating and helpless feelings. With more knowledge and understanding about asthma, it is possible for both parents and children to learn to live with asthma more successfully. They need not have to learn to live with symptoms and disabilities. Recent progress in the medical treatment of asthma has been remarkable. This progress has resulted from the development of a number of new drugs and also new concepts of what constitutes optimal treatment. It is now reasonable to expect complete control of asthma most of the time.

To maintain control, your child needs to know:

- the importance of knowing all the symptoms of asthma
- their particular triggers
- all about their drugs, and when and how to take them
- how important it is to remain physically active, and in which exercises and sports they can participate
- how to relax
- how to recognize the symptoms of respiratory infection
- how to avoid irritating substances such as smoke
- how to talk with others, their teachers and physicians in particular about their condition
- what to do in an emergency situation

THE LANGUAGE OF ASTHMA

Children with asthma must learn to understand and use the language of asthma. They come in contact with many types of medical people during the course of asthma threatment. Too often, the doctors and nurses talk to the parents rather than to the child. They do this because explanations to a child are more difficult and more time consuming. But, if we expect the child to follow his treatments faithfully, we must also expect him to understand asthma. He should be talked with and no longer talked about.

The child must be able to talk intelligently about his condition to his parents, teachers, friends, and especially with his physician. If he understands the nature of the problem, he will better understand the reason for his prescribed medications and treatments and therefore will be more likely to follow them properly. When he understands the action and the dosage of his medications and is familiar with the side effects, it will help him to take the medications as ordered by his physician. His cooperation can be expected if he understands the language used to discuss asthma. The child should be able to talk about the condition using the proper words such as bronchus, mucus, inhale, exhale, congestion, allergen, allergy and infection. This knowledge increases his confidence and helps him to become an active member of his own health care team. The greatest favour you can do for a child with asthma is to help him as much as possible to stand on his own feet and to send him on his own independent, self-sufficient way.

The child with asthma talks to her physician about her condition.

LIVING WITH ASTHMA

With successful treatment programmes, children can grow into adulthood in control of their asthma. By being good managers of their asthma, the following adult and children are leading happy and active lives.

February 19, 1982

My name is Ty Evans and I was born in St. John's on April 29, 1955. I have been an Asthmatic for the past eight years. At first I suffered severe attacks of asthma from cats fur and dust. Also, I had attacks of asthma from cold and damp weather which left me completely exhausted.

Not having developed asthma until the age of eighteen, and being completely ignorant in thinking that asthma was a disease you got only as a child, I was completely drawn back, considering that up until this time I was quite active and successful in sports such as hockey and rowing, both of which demand good wind and stamina.

My attacks of asthma first led me to believe that my sport days were over. I thought my attacks would jeopardize my team, it's spirit and most of all, my spirit. Not being a quitter, I looked for an individual sport in which to participate. It was then that I started my Karate training. Through my training I learned to control my breathing and maintain my stamina. At my own time and pace and after six years of training I am a holder of a black belt in Japanese Karate.

I would recommend to the young that just because you have asthma doesn't mean that your right to physical fitness should be any different than if you did not have asthma at all.

Ty Evans

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