# Is it Asthma?

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Asthma is the most common of the chronic diseases of childhood. Like many other illnesses and conditions, this too is a very genetic disorder. The medical history of the parents is clearly more important than the siblings or the extended family. If a parent had eczema (atopic dermatitis) or asthma and to a lesser extent seasonal allergy (allergic rhinitis) or food allergy as a child themselves, risk for the children of those parents is heightened. If the parents continue with those conditions into adult life, the risk is clearly greater for their children than if those four conditions were present only in the parents' childhood.

Simply put, asthma is an inflammatory condition of the lungs. The inflammation causes the lungs to react to a variety of stimuli with spasm / tightening of the smallest airways and increased mucus production deep within the lungs. The inciting stimuli are many things. They include cold and other respiratory viruses (RSV and related viruses), influenza, seasonal allergens / pollens, indoor allergens (dust mites etc), animal dander, environmental pollution, perfumes, food allergens, thermal change, mold and clearly second hand tobacco smoke. That list is not exhaustive, but it gives you the idea that the number of stimulating "triggers" for asthmatic lungs to develop symptoms is lengthy.

Symptoms from the asthmatic patient are far less lengthy than the list of "triggers". Coughing is clearly the number one symptom. It has been said with good accuracy that "not all coughing is asthma, but every asthmatic coughs". Coughing can be accompanied by wheezing, chest tightness, chest pain, cough induced vomiting and trouble breathing. If you want to get a feel for the symptom of the trouble breathing that a well-developed asthma episode represents, get a soda straw and breathe in and out of that straw for a minute or two and you'll have a brief example of the misery of asthma. You'd think with all the suffering that breathing as-if through a soda straw entails, that this would be an easy and obvious diagnosis that any patient or parent would recognize. Bad news, but this is far from the truth. The analogy I like to use is an iceberg. Ninety percent of the iceberg is below the waterline and cannot be seen. Similarly, in asthma ninety percent of the patients cough only or wheeze so subtly that the disease can go unrecognized. So what can a parent who harbors suspicion do to look for confirmation of those suspicions? If there are multiple children in the family and only one has

asthma, that child will clearly cough more than the siblings. If there is a relationship between coughing and exertion--exercise, laughing, crying or any activity where the lungs are filled to capacity, be suspicious. If most "colds" end up in the chest and coughing goes on for weeks and weeks repeatedly, be suspicious. If a child avoids exercise and exertion even if the explanation offered by the child is "I just don't like running" and on the surface trouble with breathing is not mentioned, be suspicious. Many asthmatics will "self-restrict", meaning they will avoid activities that require exertion because they exist in a state of respiratory disadvantage. The exertion is unpleasant, exacerbates lung symptoms, and they often will not compete effectively which further makes exercise an unpleasant experience. Be suspicious if your child is recurrently absent from school for health related reasons and the common thread almost always includes coughing. Be suspicious if your child's school nurse or teacher requests you remove him / her from school because the frequency of cough is disruptive in the classroom. Be suspicious if you've been to the doctor or urgent care and the bulk of the visits are generated by persistent cough that lasts and lasts.

Therapy for asthma has improved markedly in the past twenty years. Improvement has been sufficient enough that for the vast majority of asthmatics, a nearly unrestricted and exercise laden lifestyle is well within reach. Initial therapy levels are based on the frequency and severity of symptoms at the time of diagnosis. In patients who can perform lung function tests (spirometry), the level of compromise and the magnitude of improvement with rapidly acting asthma medications will help to determine the type and initial amount of medication recommended. For asthmatics having symptoms more than twice per month at night (during sleep) or twice per week in the daytime, reduction in key spirometry indices to below 80% of predicted or improvement in key spirometry indices with rapidly-acting asthma medication that exceeds 12 to 25%, daily medication to control inflammation, and thereby asthma symptoms are warranted in the eyes of experts in the field.

In my career as a pediatrician, in the early years before the controller concept and inhaled medication / inhaled corticosteroids, children hospitalized for days to a week or more and needing oxygen was commonplace. Caring for those children without controllers meant a recurrence of symptoms that was predictable. A diminished quality of health was frustrating for patient families and physicians alike. In recent years, barring noncompliance with medication and the most unusual of circumstances, going an entire year without a child/patient hospitalized is a genuine and expected possibility. The power of the modern inhaled medications in the therapy of asthma and the

improvement in the short and long-term health of asthmatic patients has had a powerful influence on me as a physician.

Daily medication is typically referred to as a "controller" and as a controller of inflammation they typically are corticosteroids (steroids). At the inception, it is important to understand that these are not the anabolic (muscle building) steroids that are fraught with a list of complications and illegality. It is equally important to understand that long-term significant doses of oral or intravenous corticosteroids (inflammation controllers) are fraught with their own list of complications including hypertension, weight gain, adrenal suppression, risk of infection, diabetes mellitus, stomach ulcers and the list goes on. So what physician, patient or parent would thoughtfully consent to this sort of complication riddled medication? For many patients, this is where the evaluation ends and understandably the willingness to start or persist with controllers also ends. Remember what Paracelsus said "The dose makes the poison." This is true of oxygen, water, vitamins, a multitude of seemingly innocuous other daily supplements some choose to use. It is also true of corticosteroids. This is where the progress of the past twenty years has been so substantial. The dose of the corticosteroid controllers needed to be reduced to the extent that it would still be effective and not be associated with the lengthy list of toxicities I listed above. So let's talk about where this progress has been made. Almost exclusively, the progress has been in the varied products that provide inhaled aerosols and powders that contain controllers almost all of which are minute doses of corticosteroids (inflammation controllers). These medications allow a physician and patient to apply tiny amounts of corticosteroids to the lung surface directly. Since many of the asthma patients have eczema, they may be familiar with direct application of tiny amounts of corticosteroids to their skin in the "steroid cream" they have used to control the root cause of their eczema: inflammation. The analogy is obvious. Both illnesses have inflammation as a root cause and the use of directly applied controlling corticosteroids in minute quantities is common to both. Remembering Paracelsus, the smallest effective dose should always be sought and so a recurring dialogue between physician and patient should be expected to arrive at this smallest dose. These tiny doses have one principle potential side effect of growth suppression. This is variable, affects a very small percentage of patients, is likely to be less than an inch over the growth years of a child, is believed to be an effect that may wane over the years but remains an understandable source of concern for patients and families. A second side effect of a yeast infection of the lining of the cheeks/mouth (thrush) is largely

preventable if mouth rinsing is done as recommended and pretty easy to treat if it occurs despite rinsing.

Still!!!! Why should you accept ANY risk associated with even the tiny doses that have evolved in inhaled medications over the last twenty years? To me, there are two obvious reasons and maybe more. For me, it's about now and later. Now, the use of controllers allows for the immediate best promise of good respiratory health and all the activity that comes with that. Feeling well, attending school, fulfilling exercise potential, avoiding the more side effect fraught practice of using larger doses of oral steroids, staying out of urgent care facilities and emergency rooms, never staying days in the hospital and avoiding potential death start the conversation but clearly are not an exhaustive list of the "shorter" term benefits of the use of inhaled corticosteroids. In the long term, the principal complication is respiratory insufficiency, chronic obstructive pulmonary disease if that term is more resonating for you.

Despite the proven benefits of the inhaled corticosteroids, "steroid phobia" and the problem many patients have taking daily medications, most patients stop inhaled steroids once they feel better and start up again with the next episode. This unfortunate pattern of use eliminates the real preventive power of inhaled steroids. It takes many days to weeks for the tiny doses of inhaled steroids to begin to have an effect. So the periodic use of inhaled corticosteroids costs money (copays etc), dramatically limits effectiveness, promises little in the therapy (short or long term) of asthma and perhaps worst of all is the "apparent" (to the patient) ineffectiveness of inhaled steroids when used this way. This just further convinces some patients they were right all along to not use the steroids. These patients will see asthma as an uncontrollable problem and the medications as toxin-filled options with limited effectiveness. They suffer repeated school absences, respiratory disability, the probability of exercise avoidance (and all that goes with that decision). That said, if patients choose to participate, inattention to the proper techniques of administration will diminish the effectiveness of the medication and again potentially lead to the patient beginning to again believe the controllers are ineffective. The natural outcome of this will often be waning compliance and eventual cessation of regular use. Once again, asthma can "win" at the expense of even a well-intentioned patient. In maximizing technique, **always** use a chamber for controllers and rescue inhalers. In a younger child, use a mask that fits over the nose and mouth but is not so large as to prevent getting the essential tight seal on the face. In the younger child a series of five or six regular breaths will assure the

chamber's contents have been fully inhaled. Put only one puff of the prescribed dose in the chamber at a time. Once the child is old enough to very reliably seal the mouthpiece of the chamber, take a slow deep breath and briefly hold his breath, the mask can and should be removed, as this will improve delivery of medication to the depths of the lungs where it is truly needed. With these older children, teens and adults, a single slow deep breath (with a good lip seal and tongue out of the way of the breath) with a few seconds of breath holding after the dose can replace the younger child's technique. For those not using a chamber and not using it with complete attention to the details of administration, as little as fifteen (yes! fifteen) percent of the dose is available as compared to the available dose from a properly prescribed and used chamber. **Always**, that is key with controllers. Everyday use with care to proper delivery technique is part of that **always** concept. It's like oral contraceptives. People who use oral contraceptives only on the "special" nights in a month are likely, after the fourth or fifth child, to begin to question the effectiveness of oral contraceptives much as they would question the effectiveness of asthma controllers. I often say with controller asthma medication use them until a physician personally tells you to alter your dose or stop all together. If you're tempted to stop for whatever reason, come to the physician and have an examination and conversation. That is part of the synergy of decision making essential to the successful management of any long-term illness.

The long-term inflammation of asthma (remember inflammation is the bedrock of asthma) produces its changes in lung function so slowly that they often go unnoticed as we age. Along with that aging often comes a more sedentary life experience or perhaps one where self-limiting of exertion takes place as exertion and its increased pulmonary demand become less pleasant. So the patient with life-long asthma may reach a point in adult life where even the exertion of daily living exceeds the reduced lung capacity brought on by longstanding, progressive "ignorable" inflammation. The specter of being an oxygen dependent "senior" is an unavoidable reality in some who've chosen to avoid controlling the inflammation and the symptoms that go with it in younger life.

Understand that **every** exacerbation results in lung injury. Recovery from minor injury or insult likely takes no less than one hundred days. During those days the propensity for exaggerated response is clearly present. Repeated small injuries can have a cumulative effect with eventual significant lung injury. Recovery from more significant lung injury can be incomplete and a small amount of lung function can be irrevocably lost. That may sound harsh, but a reasonable analogy would be

concussion. A single concussion, as we are continuing to better understand, can be a significant event. Repeated small concussions have a cumulative effect that may not be easily seen in young life and may be better appreciated only years later as various organic brain syndromes. The lungs are similar in that the cumulative effects of small insults may not be regarded as a problem because the lungs have more residual capacity than most will ever need. Couple that with the probability that the cumulative loss of function may not be seen until decades later and you see why many patients can ignore the minor lung injury associated with intermittent wheezing episodes.

In young life (infancy and toddlerhood), the ubiquitous nature of daycare and the near certainty that each year RSV or a very similar viral illness will be contracted, creates a great deal of wheezing that is not asthma. It can be repetitive as repeated viral illness during ("the one hundred days") periods of increased vulnerability produce persistent or repeated wheezing. Even in the hands of the best expert, the decision to regard recurrent wheezing in daycare as asthma can be difficult. Sometimes I wonder if the decision is all that significant. If you put aside the likelihood that asthma would more likely be longstanding or lifelong, then the decision about the diagnostic terminology may be unimportant. The conversation about the "chicken and the egg" and whether viral illnesses produce asthma or the asthmatic then suffered wheezing at the hands of RSV may be a semantical conversation that may just get in the way of effective therapy. I say that because the same medications and dosage choices and regimens are applied to both asthma and persistent post infectious wheezing. Both should be associated with an ongoing synergy between patient, family and physician that continually reassesses airway inflammation and reactivity and results in the use of the smallest amount of daily medication necessary. In this way, both diseases (asthma and wheezing associated with respiratory illness) are treated in such similar fashion that the name is of diminished important. The exact answer about "Is it asthma?" may only be revealed over time, leaving the parent to worry about a child's future in yet another dimension. Parenting, like medicine can be difficult. In the jargon of the day: "It is what it is!"

In summary, asthma is heritable, is a chronic disorder, can be hard to recognize or diagnose, can be effectively treated with safe medications that limit the potential for accumulation of physical limitations as the patient ages. Despite all that is known by patients and physicians alike, some patients choose to avoid medications and embrace the risks of that decision. Talk to your doctor!