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Mothers of Asthmatics

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Out of the Dark Ages...

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Saturday, August 31, 1901, Marcel Proust wrote to his mother about a severe asthma attack he experienced the previous day. Having suffered since age nine, the 31-year-old celebrated French novelist was no stranger to opium, caffeine, iodine, fumigating powders and morphine standard treatments of the day.

Ma chere petite Maman,

*'Misery of miseries or mystery of mysteries?' This is the title of a chapter in one of Dumas's novels, which would apply very well to me at the moment. Yesterday, after I wrote to you, I had an attack of asthma and incessant running at the nose, which obliged me to walk all doubled up and light anti-asthma cigarettes at every tobacconist's I passed, etc. And what's worse, I haven't been able to go to bed till midnight after endless fumigations and it's three or four hours after a real summer attack, an unheard of thing for me.**

Proust struggled throughout his life, never finding his cure. He died of bronchitis and pneumonia at the age of 51.

What is amazing is how much we take our current treatment options for granted. They've made light work of managing allergies and asthma compared to what Proust and our grandparents endured. But how?

We live in an era when most asthma and anaphylaxis suffering and deaths can be prevented. Yet some of us are still walking around like Proust using outdated or outmoded therapies.

Technologies and medications are tools we and our medical care providers can use to live well – *but only if we know they exist and learn how to use them!*

Countless studies show that the right care delivered to the right patient at the right time prevents symptoms, saves lives, and reduces healthcare costs. It's impossible to separate our medications from the devices that deliver them or to manage asthma without the technologies to monitor them.

So here's a look at a few of the technologies and treatments that have changed our world.

Top Ten Innovations in Technology Awards

A panel of AANMA editors, board members, families, and volunteers recently took stock of the innovations and technologies that have changed our world. It was an interesting and challenging process made more difficult by trying to narrow it down to the top 10 within the last 25 years!

The criteria? Must be FDA approved, no gimmicks, designed for the way patients live, and cost effective. Our selection does not imply endorsement, paid advertisement or recommendation that you should change your current treatment plan or therapy.

Award winners were recognized at AANMA's 15th annual Allergy & Asthma Day Capitol Hill event May 9 and 10.

Ventolin® HFA (albuterol sulfate) Inhalation Aerosol with Dose Counter

The first aerosol metered-dose inhaler (MDI) was invented in 1956 by Charles Thiel, an engineer at Riker, now 3M. Hailed revolutionary particularly in contrast to treatment alternatives of the day, the inhaler design has since been reinvented many times by several different manufacturers.

Even so, the technology has limitations. Unless patients are taught to keep track of every sprayed dose, they unknowingly run out of medication before the inhaler is empty. How many emergency department visits and hospitalizations can be attributed to inhalers that "fail to work" because they are empty? What impact on healthcare costs? AANMA asked manufacturers and FDA to solve the problem.

In 2006, Ventolin HFA (GlaxoSmithKline) became the first aerosol MDI with an integrated dose counter. Now, parents can track their children's inhaler use more easily and patients don't need to wonder if the inhaler has medication when needed. For a bronchodilator medication that quickly relieves coughing and difficulty breathing associated with asthma, it is a life-saving change.

In March 2012, ProAir® HFA (Teva Pharmaceuticals) became the second bronchodilator MDI with a dose counter. We are hoping Proventil® HFA and Xopenex HFA® inhalers will soon follow.

EpiPen® (epinephrine) Auto-injectors for Anaphylaxis

Early emergency epinephrine kits prescribed for children and adults with a history of bee sting or food allergy anaphylactic reactions contained a vial of epinephrine, a syringe, an antihistamine, a tourniquet and instructions for use. There was no "training kit." No way to anticipate how you'd administer the medication while swelling up and gasping for air. Either figure it out on the spot or make a mad dash for the hospital. Problem was, patients didn't always make it there alive or soon enough to avoid irreversible brain damage.

Auto-injectors were first developed for military use and filled with medicine to fight the effects of nerve gas. In 1980, an epinephrine-filled version of the device called EpiPen (Mylan Specialty) was approved to treat anaphylaxis.

In the 30 years since, EpiPen auto-injectors have evolved to meet the needs of patients. The device is intuitive to use; the carrying case is also the injector's disposal container.

Most states have laws protecting students' rights to carry and use the devices. Eleven states have or are considering legislation through which schools that meet certain criteria can stock epinephrine auto-injectors for emergency use.

AeroChamber Plus Flow-Vu™ Anti-Static Valved Holding Chamber

Aerosol MDIs may have revolutionized inhalation therapy; however, there was a whole new problem – teaching people how to get the medicine inside their lungs!

Specialized x-ray technology showed that if patients inhaled too fast or too slow,

most of the medication would stay in the mouth and throat and get swallowed, instead of being inhaled deeply into the airways. Respiratory engineers began testing ways to slow the propellant down while keeping medication particles afloat long enough to be inhaled over a matter of seconds.

Early spacer devices developed to direct the medication spray ranged from corrugated plastic tubing, plastic bags, and a football-like hollow contraption. They served a directional purpose but coordinating inhalation with the spray remained a problem.

In 1983, AeroChamber Valved Holding Chamber (Monaghan Medical Corporation) would offer the answer. It could trap and hold or suspend medication particles long enough to be inhaled over a matter of moments rather than split seconds. Designed for use with any standard MDI, the clear devices were also easy to keep clean.

Technology and patient-friendly updates included various sizes and colors with and without masks. Simple instructions were imprinted on the device. However, many parents and caregivers said they needed a way to make sure the patient inhaled the medication.

In 2010, AeroChamber Plus Flow-Vu Valved Holding Chamber (Forest Laboratories) added the valve perched at the top of the device that moves only if the patient (child or adult) inhales deeply enough to empty the chamber. No more guessing. The whole device is about the size of a baby bottle but lighter weight.

AeronebGo Nebulizer

Early nebulizers of the 1800s used hand pumps or steam to change liquid medication (usually an adrenaline derivative) into a mist. Droplet sizes were inconsistent. Heat changed the molecular structure and thus the effectiveness of inhaled medications.

Oxygen or compressed air units converted liquid medications into a mist but the patient was tethered to a mounted device or a noisy, bulky unit that was difficult or time-consuming to clean and required expensive replacement parts. An AANMA survey showed what patients really wanted was a handheld device the size of an inhaler but with the soft mist of a nebulizer.

A variety of new technologies competed to fill that void but it was Aeroneb®Go's OnQ™ Vibrating Mesh Technology (Aerogen) that first caught patients' attention. The palm-size device silently converted liquid medication to a soft mist to be inhaled over a matter of minutes. It could be used in the classroom, at work, at home in bed, or on the playground without lugging a big box, tubing, nebulizer cup, cord and power supply around.

Advair Diskus® (fluticasone propionate and salmeterol) Inhalation Powder Combination Long-Acting Bronchodilator and Corticosteroid

Most people know about bronchospasm – it's the noisy part of asthma that you feel, hear and see evidence of. It tends to come and go, most often without warning. But it wasn't until the early 1980s that researchers discovered bronchospasm's silent partner, airway inflammation. Inhaled corticosteroid medications would soon follow.

In 2000, FDA approved Advair Diskus, the first dry powder inhaler that combined a long-acting (twice daily) bronchodilator with a corticosteroid. The simplicity of the Diskus' outer shell belies the intricacies inside. The dose counter means patients know when it's time to refill prescriptions.

For many patients, Advair Diskus offered asthma and emphysema patients 24 hours of the best breathing most had ever known.

Some would say it worked so well that patients and caregivers forgot to identify and avoid known environmental allergens or to use short-acting bronchodilators for sudden symptoms. Some patients used Advair more frequently than prescribed instead of reporting worsening symptoms to their physicians. A false sense of security may have left still other patients unaware that asthma symptoms can prove fatal.

In 2008, the Food and Drug Administration approved new labeling highlighted in a boxed area to make patients and medical care providers more aware of important information about risks associated with using medications containing long acting bronchodilators.

Niox Mino® Measures Airway Inflammation

In 1989, researchers developed ways to collect mucus cells (sputum) from the bronchial airways for study. The

presence of certain types of cells indicate if inflammatory airway or other disease is present and to what degree.

It takes about a teaspoon of bronchial mucus (coughed from the lungs into a cup or retrieved from the lungs of the hospitalized patient) for the test. The sample must be delivered to the lab within 2 hours. Sometimes, the patient needs to collect samples three days in a row. The test is invasive, expensive, and as such reserved for very sick patients.

In 1993, researchers discovered an easier and less expensive way to detect airway inflammation by measuring the amount of exhaled nitric oxide (eNO) in the patient's breath.

Early eNO detectors were quite large and expensive; however, with continued innovation, the Niox Mino (Aerocrine) technology is now handheld, non-invasive and cost-effective. The test is easy enough for young children, elderly and very sick patients to use.

In 2011, the American Thoracic Society (ATS) published standards for performing measurements of fractional (parts per billion) eNO. Measuring the gas may help patients and caregivers prevent attacks if the levels of nitric oxide suggest increased inflammation. Now, more patients can know whether symptoms are due to airway inflammation associated with asthma and which treatment therapies are likely to produce the best results. An increasing number of health insurance providers now cover the cost of this test.

Respimat® Soft Mist™ Inhaler

Are we on the precipice of an entirely new MDI/nebulizing system? It's so new, who can know? But the Respimat Soft Mist Inhaler technology seems to be engineered from a patient's wish list: lightweight, portable, silent, no batteries to replace, has a dose counter, releases a soft mist without using propellants...what else could you want?

The Respimat Soft Mist Inhaler was developed in 1997 by Boehringer Ingelheim. In 2011, it made its U.S. debut with Combivent®, a combination of albuterol and ipratropium bromide prescribed most often for people with chronic obstructive pulmonary disease. But it's likely we'll see other medications using this technology in the future.

uKnow™ Peanut ImmunoCAP® Molecular Allergy Test

What is it about peanuts that causes allergic reactions ranging from mild to instantaneous life-threatening anaphylaxis? The question has perplexed researchers and terrified parents and patients for years.

Food allergy researchers found that whole peanuts (which are legumes, not tree nuts) contain many proteins capable of producing a positive allergic skin test result. However, a positive skin test to peanut did not necessarily mean that the child would suffer a life-threatening reaction to peanut in the future.

Researchers identified four peanut proteins capable of producing moderate to severe allergic reactions. Another protein is genetically related to birch protein and can produce a tingling sensation in the mouth.

The uKnow Peanut test (ThermoScientific) is the only blood test to determine which of these proteins produce the allergic response. Results help better assess risk factors and create a food allergy management plan.

It takes just one vial of blood which can be drawn at any laboratory but must be sent to the specialized lab at ThermoScientific for analysis. The test is not covered by most insurance plans which is all the more reason to make sure you understand what to expect before ordering it and to make certain you are working with an allergist who can apply the results to your overall treatment plan. ThermoScientific offers financial assistance to patients in need.

Xolair® (omalizumab) Biologic Technology for Allergic Asthma

Xolair (Genentech) is perhaps the most unique of all allergic asthma medications because it interrupts episodes before they can get started. Many patients report Xolair changed their lives.

First marketed in the U.S. in 2003, it is given as an injection. The dose and frequency is determined by a blood test that measures how many allergy cells (IgE) are in the body.

Xolair is the only FDA-approved biologic shown to interrupt the allergic response by blocking IgE reactions.

Even though the drug is costly to develop and distribute, for many patients it is the most cost-effective therapy because it keeps them active in life and out of the hospital. It must be administered in a physician's office.

Xolair is recommended for patients 12 and older whose severe symptoms persist despite use of daily inhaled corticosteroids. Patients should attempt to remove known allergens from the environment where possible before and while using Xolair.

Studies show that when used in conjunction with allergy shots over a period of years, many patients can discontinue both Xolair and immunotherapy with good results.

In 2007, FDA approved new labeling to bring attention to important information patients should know when considering use of Xolair.

Qnasl™ (beclomethasone dipropionate) Nasal Aerosol "Dry" Spray

When FDA banned CFC propellant use in aerosol nasal sprays, patients had no other alternative than to switch to aqueous (water-based) sprays whether they liked it or not.

And plenty of people objected. That's why Teva Respiratory continued product development and in April 2012 launched Qnasl™, the first non-CFC dry aerosol metered-dose corticosteroid nasal spray. Most impressive, it's also the first nasal spray to have an integrated dose counter!

**Suggested Reading:*
"Divine Stramonium": The Rise and Fall of Smoking for Asthma, Mark Jackson; Med Hist. 2010 April; 54(2): 171–194.

Reviewed by Talal Nsouli, MD