

## In with the good air...out with the bad!

By John R. Goodman BS RRT

Inhaling medications to treat respiratory disease is nearly as old as recorded history itself. Over 3,500 years ago Egyptian priests were treating patients with asthma by having them breathe the vapors of black henbane.



Black Henbane



Eber's Papyrus



Oracle at Delphi

Black henbane is a plant that grows wild and was well known to ancient physicians. It is rather a toxic drug that induces powerful hallucinations. It is known to have both sedative and anti-spasmodic properties. In fact it is known that the “oracles” at Delphi regularly inhaled its vapors or ingested its seeds before making some of the most important prophecies in the lives of the ancient Greeks. This was described in great detail in the “Ebers” papyrus which dates to 1554BCE. Of course there were no nebulizers in that time period, so the henbane leaves were simply thrown onto hot bricks and the patient breathed in the smoke produced. Henbane is toxic, and will kill you in sufficient doses, so no experimenting please.

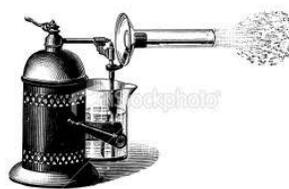
Dr. John Mudge developed the pewter tankard inhaler in 1778, using opium to treat unrelenting cough. Opiates are a powerful anti-tussive agent. Think Codeine!



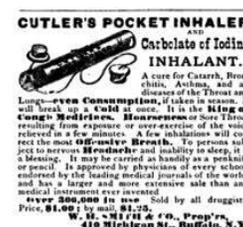
Tankard inhaler



Old German inhaler



Dry powder inhaler



Portable inhaler

From my research, Mudge's tankard *inhaler* marks the first time “inhaler” is used in print. Another English physician of the time (Philip Stern) did something even more radical. In

1768 he published a book titled “Medical Advice to the Consumptive and Asthmatic Peoples of England.” His genius was in the fact that this was the first book aimed at the *people* of England rather than his peers. It was quite controversial at the time.

Meanwhile back in China, opium inhalation had had a long history of being used beyond just recreational use. As early as 2600BCE a Chinese text by Huang-Ti identified the use of Ma-Huang to treat shortness of breath. It is now known that Ma-Huang contains Ephedrine, a mild to moderate bronchodilator. Ephedrine was found in dozens of OTC cold remedies until the recent FDA crackdown on Ephedrine containing compounds. Ephedrine of course, is utilized in the manufacture of amphetamines.



Huang-Ti



Ma-Huang berries



Ephedrine liquid



Ephedrine pills

A wide variety of drugs were vaporized and inhaled in the ancient world. These include stramonium, marijuana, and even arsenic! Believe it or not, chicken soup to break up lung congestion first shows up in an Arab textbook written in 1190AD. In 1802, Gent published on the use of burning the leaves of *Natura Stramonium* and breathing in the fumes to treat asthma. Stramonium has a very strong anticholinergic effect and works much like atropine (or today Atrovent) in helping to relax constricted airways.

It must be noted that the chief driver of the development of inhalation therapy would have been the treatment of consumption, the term commonly used for Tuberculosis. Asthma and COPD were as yet rare diseases. Since the germ theory had not yet been postulated much less proven by Pasteur and Koch, large numbers of agents were “vaporized” in the hope of finding the magic bullet to stop both the spread of the disease, and to decrease the number of deaths due to Tuberculosis. These agents included the following: arsenic fumes, hemlock, iodine, carbonic acid, boiling tar, chlorine inhalation, seaweed, stramonium, lobelia, ipecacuanha, digitalis, hydrocyanic acid, turpentine, and sulphuric ether. The cure was commonly worse than the disease.

By the 1840's routine smoking of tobacco, marijuana, stramonium, and opium became quite acceptable to the medical profession. In 1864 the first dry-powder inhaler was patented, although the first dry powder drug, Potassium Chlorate turned out to be (for the patient) worse than the asthma attack itself! By 1867 the British Pharmacopeia was the first to

recognize 5 different medications for vaporization. By the end of the 19<sup>th</sup> century, a bewildering array of inhalers had been invented and patented.

However, this was also a period of time where outright medical quackery began to develop. In addition to inhalers, other advertised cures for asthma included magnetism, electricity, and ultra-violet rays. By the 1890's oxygen bars were developing in an alarming and haphazard way. In France, in 1891 an oxygen bar was located in Saint Raphael, beneath (you guessed it) a casino.



Electricity could cure many ills



The traveling Quack



Igor, turn on the lightning machine!



Frank started to get a funny feeling that his doctor was a quack.

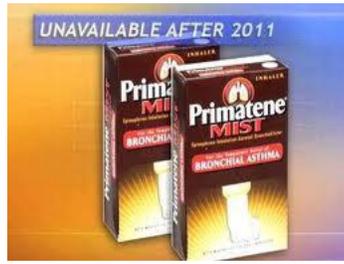
Kind of like the AFLAC duck

In 1906 the FDA began to place controls on both the ludicrous medical claims, and promotional tactics of entrepreneurial quack cures. By the early 1900's it was known that adrenal extracts could be used to treat asthma. Further investigations identified these extracts as adrenalin. This discovery went on to become the scientific foundation of what we have now come to know as the modern age of pharmaceutical inhalation therapy for patients with all types of lung disease.

In the 1930's Adrenalin Chloride (epinephrine) became a readily available product for asthmatics in the general population. Over the next 20-30 years a number of new medications and delivery systems were developed and marketed. In fact a dry-powder inhaler to deliver penicillin was developed by 1948. It was just two years later that Reeder and Mackay treated pneumonia with an inhaled corticosteroid, and in 1955 Foulds used hydrocortisone in a powder form. His work ultimately led to the discovery of beclomethasone around 20 years later.



Auto-inject Epinephrine

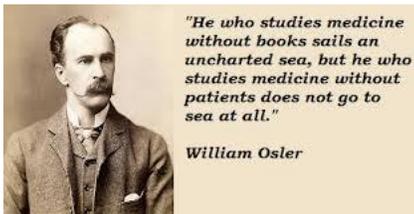


Primatene mist gone!

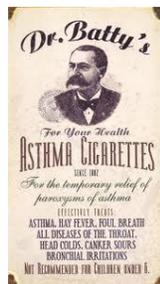


EpiPen for emergency use in the field

Another interesting yet rarely discussed aspect of “inhalation therapy” was the introduction of asthma cigarettes to the adult asthmatic patient population. It was well appreciated that to get the swiftest and most reliable effect on relaxing the smooth muscles of the airways, direct application of the medicant of choice would be best for the patient. It seemed logical therefore for physicians of the time to prescribe smoking one or more of the agents listed above, to get the most beneficial effect. No attempt was made to measure the harm caused by the act of smoking itself, but rather all efforts were directed to minimizing symptoms of shortness of breath and much labored breathing. As late as 1902, William Osler, possibly the most famous physician in the world at the time, was a strong believer in the pivotal role of smoking and fumigating as being both therapeutic and prophylactic. Osler felt that a cigarette with the addition of atropine would most definitely “give a feeling of relief in cases of mild to moderate asthma or emphysema.



William Osler believed in Smoking “Asthma” cigarettes



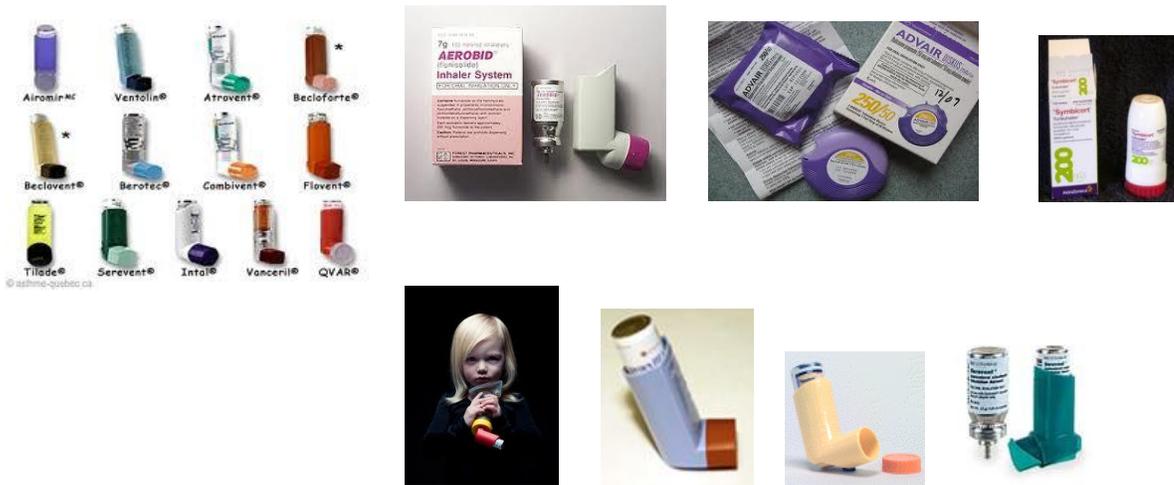
Dozens of brands of asthma cigarettes were on the market in the days before FDA regulation



By the 1950's the role that inflammation plays in an asthmatic attack was being thoroughly studied. Drug companies began to seek more selective agents to decrease the inflammatory component of asthma and COPD, while also becoming more selective in either stimulating, or blocking the action of neurotransmitters in the smooth muscle cells located within the respiratory airways. Another dramatic development in this area of study was the invention of the pressurized meter dose inhaler in 1956. During the decades of the 50's the relationship between smoking tobacco products and the development of lung cancer, COPD, and other lung diseases also became well known and highly published.

Thankfully, by the end of the 1960's a combination of newly developed medical formulations for asthma, chronic bronchitis, and emphysema, technical developments in drug delivery systems, increasing prosecution for smoking opium, and marijuana, and shifting cultural attitudes towards smoking (especially in public places) all combined to undermine any clinical support for smoking stramonium or any other plant preparation in order to relieve or prevent asthma attacks. And as Martha Stewart would say "That's a good thing."

The pulmonary patient of the 21<sup>st</sup> century has a wide variety of targeted medical therapies. Just a few of the medicants currently offered are shown below. Be vigilant! New agents are periodically added to the list as they pass through the maze of FDA paperwork and clinical trials.



Although each of the above devices has a different mechanism of action, the goal is exactly the same. "In with the good air...and out with the bad."