

# “Life was short, disgusting and painful” - CE Aretaeus of Cappadocia

Thu, 08/14/2014 - 9:46am

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Diabetes Mellitus has been recorded in early writings dating back as far as 3000 years, with the first descriptions of polydipsia, polyuria and rapid weight loss by the ancient Egyptians. The term diabetes was coined by Aretaeus Cappadocia, who described the disease as something where "life was short, disgusting and painful" somewhere between 80-133 AD. However, it was not until the late 1600s when a British researcher known as Dobson actually confirmed the presence of excess sugars in urine and blood of patients.

Now, fast forward to the generation of Y2K. Unlike early diseases such as small pox, diphtheria, malaria and whooping cough – all ailments that once created suffering, pain and death, have greatly diminished, or in the case of small pox, been eradicated due to advances in modern medicine, Diabetes Mellitus continues to grow – at rates higher than ever before in recorded history. The causes of the influx of Diabetes are numerous and include issues such as sedentary lifestyles, dietary choices and increasing genetic predisposition. The underlying cause is that regardless of the type of Diabetes (Type 1 or II, gestational or stress related), Diabetes is a metabolic disorder where the body does not make any or sufficient amounts insulin or is not able to use insulin effectively to digest food for energy.

The implications of this disease are diverse and include symptoms of increased thirst, passing of excessive urine, the feeling of being overly tired, weight loss, repeated cases of gout, slow healing of wounds and blurred vision. In extreme cases, heart disease, stroke, nerve damage and blindness occur. Although life with diabetes today might not be as accurately described as "disgusting and painful," uncontrolled blood glucose reduces the overall quality, and length of an individual's life.

As the disease has plagued people for thousands of years, it is easy to make the assumption that modern medical tools answer to the demands Diabetes Mellitus puts on patients in both surgical and critical care environments. Additionally, it is easy to think that the tools used to measure blood glucose levels to manage day-to-day health are both advanced and accurate. It is true what is available has saved millions of lives, yet, the tools we depend on for survival are almost as archaic as the disease itself. Better tools are, indeed, needed.

Modest progress has been achieved in blood sugar management tools over the past several decades, although most of it has been in creating more user friendly devices and interfaces. The march towards truly non-invasive devices (no more pricking fingers or drawing blood or other bodily fluid), the "Holy Grail" for the industry, has continued with a few very limited successes. Published data states that an excess of \$3B of venture capital along with an estimated equal

amount of private capital, totaling more than \$6B has been spent over the past two decades in the development of glucose measurement technologies without creating success in this arena.

Current advances include alternative site testing that uses less blood and reduces the pain associated with repeated pricking of fingers. A wristwatch that draws fluid through the skin to make measurements was created and marketed. This was an exciting development in the pursuit of non-invasive measurement, even though it was ultimately removed from the market due to issues of major skin irritation and not being consumer friendly. A multitude of infrared spectroscopy approaches have been attempted, most without much success, although several have shown promise and are still under development by a handful of companies and university laboratories. Minimally invasive continuous monitoring systems have shown promise, but have not been well received in the market due to a number of early challenges and continued issues with lack of accuracy and reliability.

Spectroscopy provides for measurement without drawing blood by using light to penetrate the skin and using properties of that light to make blood sugar measurements. Optically based measurement technologies, using light for measurement, have shown the greatest promise to provide solutions for patient and healthcare professionals' demands for a non-invasive, accurate, hand-held, consumer glucometer for decades. TecMed, Inc. is one of the few surviving companies in this area, in the US or abroad, that has created, proven, and patented optically-based glucose measurement technology that meets the desired and required accuracy and timeliness (frequency of measure) for truly non-invasive blood sugar measurement.

Established companies in the industry, as well as large and powerful new players in the field, tout user friendly mobile apps, data tracking technologies, "big data" solutions and the promising allure of futuristic "wearable" health monitors (watches, contact lenses and ear-buds) that may come to market in the next ten years or so. In the meantime, one would do well to keep an eye on proven and patented IP that is on track to give patients and consumers what they have been demanding: Non-invasive, accurate, convenient and affordable handheld glucometers that are small enough to slide into your pocket and easy enough for a child to operate.

Diabetes isn't going anywhere, but slowly and surely, the tools to help mediate the unpleasant effects of this debilitating disease are making their way into the market place. Be on the lookout for TecMed, Inc., a company fighting to ensure life with diabetes is nothing like the life described by Aretaeus of Cappadocia.