

# Controlling Diabetes Through the Use of Technology

by Ben E. Brady

## Diabetes, the silent epidemic

Most people that know me know that I have Diabetes. Why? Not because I go around moaning about it, but because I tell them about the disease to warn them of the epidemic with which we are faced.

I am not a doctor or other health care professional, I am simply a person who is now afflicted with Diabetes who would like to do whatever I can to let others know how to avoid Diabetes if at all possible and how other people who are afflicted with the disorder how best to manage their Diabetes and maintain a better quality of life.

In the United States there are approximately 17 million diabetics and approximately 160 million in the rest of the world.

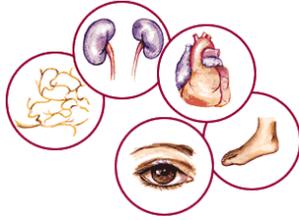
Here in the Central Valley of California there are approximately 400,000 diagnosed diabetics. There are estimated to be an additional 300,000 who are undiagnosed at this time who actually have the disease. Note this is not for the entire state of California. This is just for the Central Valley! We have a much greater population of Hispanic and American Indian people who are at a much greater risk of developing Diabetes than do non-Hispanics or American Indians.



So just what is Diabetes? Put into very simple terms, Diabetes is a metabolic disorder in which the body either does not produce enough of the hormone Insulin (Type I) or in which the body cannot actually use the Insulin that is being produced (Type II).

The causes of Diabetes are still largely unknown. There have been many studies performed to try to actually find the cause but thus far the results have been less than conclusive.

Some studies attribute the cause of Type I Diabetes to the use of cow's milk and the presence of a particular protein which triggers the destruction of the beta islet cells in the pancreas responsible for the production of insulin, while other studies speculate the cause of Type II Diabetes to be a complication of obesity brought on by a lifestyle of little exercise and consumption of mass quantities of complex carbohydrates. There has been speculation regarding the genetic disposition of Diabetes as well, but that also seems to be speculative.



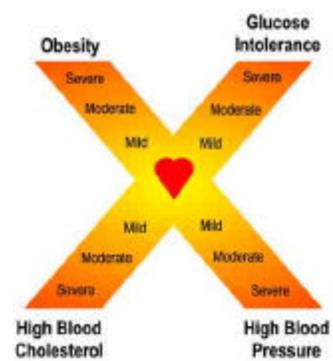
What is known for sure is that Diabetes is the leading cause of amputations of limbs, primarily feet, and the leading cause of blindness. It is also the leading cause of kidney failure and transplants as well. Diabetes also affects the central nervous system which controls your heartbeat, respiration and digestion. Statistics also show it is the leading cause of heart attack. It is estimated that by 2030, Diabetes will be the

leading cause of death here in the United States. This article will serve to help educate people who have diabetes to get better control and people who don't have diabetes to better understand how to minimize the likelihood of Diabetes.

### **A little personal history**

Prior to my diagnosis in August of 2001 I had been seeing a doctor for about 9 months for abdominal distress that was unexplained. During a routine physical the doctor said to me, "I think you might have Syndrome X." "What is that?" I asked. "Well, we are not sure exactly what it is but we know that it is."... Needless to say I left the doctors office scratching my head.

It turns out that Syndrome X is a disorder purportedly caused by a diet of high carbohydrates and lack of exercise, which results in extremely high triglycerides and cholesterol. Syndrome X is generally considered to be a precursor to diabetes. Unfortunately, the doctor that offered that diagnosis did not give me that information. Not that it would have actually done any good as you will see.



For the next few months I did as much reading as I could about Syndrome X and changed my diet accordingly. Unfortunately, it was far too late to impact the real problem, Diabetes.

During the first week of August 2001 things were not going well at all. Sitting in the living room one evening watching television I had all of what appeared to be the symptoms of a heart attack. Now at 45 years of age and a family history of heart disease, this really frightened me.

Unfortunately, for my wife Rita and I, the small hospital in our community had just closed down their emergency room facilities and were on the verge of closing the hospital altogether. Rita and I got into the car and made the 45 minute ride to the hospital in Fresno.

When we arrived I immediately went into triage and was hooked up to an EKG monitor and blood was taken to test for the presence of enzymes in the blood that indicate an actual heart attack. The blood tests came out negative and the EKG was normal. I was released and told to come back if my symptoms returned.

Two nights later the pains in my abdomen were excruciating. I was doubled over in pain and Rita suggested that we go up to the ER once again. So once again we climbed into the car for the trip to Fresno.

When we reached the ER I explained my symptoms and suggested they do whatever test they need to do to determine whether or not I had an ulcer as all of the indications were that was what was wrong.

They took blood for a test to detect H. Pylori bacteria, reported to be the cause of approximately 80 percent of stomach ulcers.

About an hour later the doctor came back to me and said, “Well, you don’t have an ulcer, but did you know you are a diabetic?” The news hit me like a club over the head. My blood glucose reading was 340. They gave me a shot of insulin and then sent me home with instructions to see my doctor the next day.

When I went to the doctor the next day my blood glucose was 622 and once again I was given insulin and Glyburide, an oral medication used to stimulate the production of insulin by the pancreas. After a month of taking the Glyburide my treatment regimen was changed to injections of insulin.

The reason for my telling you how I was diagnosed is to drive a point home. Most people who are diagnosed with diabetes are diagnosed as a result of the disease being out of control and a lack of recognition to the early warning signs of the disorder.

Looking back, I had all of the warning signs except for the last one, loss of consciousness, but at the time I was certainly not familiar with them!

- Increased thirst
- Increased hunger (especially after eating)
- Dry mouth
- Frequent urination
- Unexplained weight loss (even though you are eating and feel hungry)
- Fatigue (weak, tired feeling)
- Blurred vision
- Numbness or tingling of the hands or feet
- Loss of consciousness (rare)

Now that I was armed with the diagnosis the next step for me was to obtain as much knowledge as possible about diabetes as I could. First stop, one of the major book stores close to the hospital.

I found a very good book on diabetes written by Dr. Richard Bernstein called “The Diabetes Solution”. Apparently, Dr. Bernstein was a Type I diabetic who was an engineer and went back to college to become an M.D. and subsequently an endocrinologist. The book provided some very good insight into the management of diabetes, especially from the standpoint of a Type I diabetic. Some of the information could easily be adapted for the Type II diabetic, as I was diagnosed, who was using insulin as their treatment regimen.

One thing that I found out during my educational process about Diabetes, according to the Diabetes educator that I saw just after my diagnosis, on the average a person has Diabetes for approximately 5 – 7 years before it is actually diagnosed

### Testing, testing, testing...

One of the tools that my doctor gave me during my visit was a brand new blood glucose meter. At the time I didn't know this amazing tiny device was going to be my best friend and one of my secret weapons in the management of my Diabetes.

Notice that I said “my Diabetes”. This is an important distinction. Diabetes is a very personal disorder. It really is different for everyone. What is a successful treatment regimen and diet for one person may not be the same for another. So how does one deal with a disease that varies from individual to individual? We each have to find out what works for us. The only way to do that is to become educated about diabetes and do some personal experimentation and study.



The best way to do this is to get a good blood glucose meter, a good carbohydrate counting guide and a sharp pencil to keep a log of your blood glucose readings, carbohydrate intake and medication usage. I know, this sounds like a lot of work. Trust me when I tell you it *is* a lot of work, but your health and the quality of your life depend upon it. And it is work well worth doing if you want to keep your eyes, feet, heart and kidneys intact.

Doing the blood glucose testing is, according to most people with Diabetes, by far the most painful aspect of the disease. The reason for this is the ends of our fingers are loaded with sensory nerves, which makes them particularly sensitive to the finger sticks that are necessary to draw blood for testing. There are ways to minimize the pain. Until technology advances far enough to test blood glucose by non-invasive means, the only way will continue to be to test by drawing blood.

First of all, I would suggest that you obtain a blood glucose meter that will allow you to test on an alternate site, such as your arm. The three meters I have had very good experiences with are the LifeScan OneTouch Ultra, the TheraSense FreeStyle and the FreeStyle Tracker. I have used other meters as well, however I recommend these three above all others for one reason alone: *portability*. Not only portability of the meter itself, which is very important, but portability of the test site as well!



I have found, in talking with many diabetics, that the single biggest reason they do not test their blood glucose as often as they should is the pain associated with the finger sticks. The second biggest reason is that most of the meters on the market are not

small enough to be easily carried with you all of time. For women this is a problem because the meter takes up room in their purse, but for men it is an even bigger problem because we typically do not carry one. The third reason most expressed by those asked was the cost of the test strips. (A note to all glucose meter manufacturers: make it as small as possible, easy to carry for both men and women and less expensive to test!)

I especially like the carrying case of the OneTouch Ultra because it can be easily attached to your belt using the Velcro strip on the back. It is about as small as it can be and still hold everything you need, a vial of test strips, lancing device, extra lancets and a small bottle of control solution.



The FreeStyle is approximately the same size as the Ultra but the carrying case is a bit more bulky and you cannot easily carry it, although it will fit into the side pocket of a business suit, it is a bit too large. The FreeStyle Tracker is a module that fits into the Springboard slot on a Handspring Visor PDA and will be discussed later on in this article.

All three meters allow you to test on your arm or other site. If you want to use the LifeScan Ultra to test on your arm, you will have to contact LifeScan to obtain a special clear cover for the lancing device that comes with the Ultra. The FreeStyle meters come with both the clear and opaque covers with the meter.

Right out of the chute I will let you know that if you are not currently experiencing any complications from Diabetes the most expensive component of managing your disease will be the cost of the test strips for your blood glucose meter. Prices vary widely.

The 'dirty little secret' in the Diabetes testing industry is that once you get a diabetic patient using a particular meter, you can make a lot of money from the sale of the test strips. Just as Gillette made the safety razor cheap and makes its money selling razor blades, the Diabetes blood glucose meter manufacturers routinely provide doctors with the meters for a reduced price (sometimes even free) in order to capture the future sale of strips.

For example, 100 One Touch Ultra test strips will cost you approximately \$75.00 while 100 FreeStyle test strips will cost approximately \$69.95<sup>1</sup>. Usually purchasing them online will give you a bit of a discount but then you must factor in the shipping costs. There is one online site that I have found that provides a pretty fair discount and free shipping.<sup>2</sup>



<sup>1</sup> [www.diabetesnet.com](http://www.diabetesnet.com)

<sup>2</sup> <http://www.shavethis.com/diabetesstrip.html>

The cost at the prices noted above is between 69 and 75 cents for each test. It is easy to do the math to determine what your daily costs will be depending upon the number of tests you do each day.

The best advice I can give to you is to do some very aggressive shopping. The same strips mentioned above at the site noted in footnote 2 at the bottom of the page are \$59.99 and \$49.99 respectively.

Now you might say to yourself “My doctor has told me I should only test once a day, that doesn’t seem like it would be too costly.” Trust me, testing once a day will be better than not testing at all, however it will not give you the knowledge you need to manage your Diabetes and maintain a good quality of life. Ultimately, you will start losing your toes, eyesight and kidney function, a lot faster than someone who actually tests the way they should.

My experience has been that you should test your blood glucose before each meal and approximately 1 and ½ hours after eating. This post-prandial, or after meal, testing is the most important testing you can do. Why? Because it gives you the information you need in order to adjust your diet in order to manage your Diabetes better. You should also test your blood glucose before going to bed and, if you don’t eat breakfast right away after rising, when you awaken in the morning. This is a total of 8 tests a day.

Diabetics who drive a vehicle should also test just prior to their getting behind the wheel. If you are going on a trip of more than a couple of hours, you should stop and test every couple of hours. The last thing you need in your day is an accident due to the sudden onset of hypoglycemia. You also need to test your blood glucose any time you have any symptoms of hypoglycemia. These tests can save your life!



**Insert the test strip**



**Obtain a blood sample**



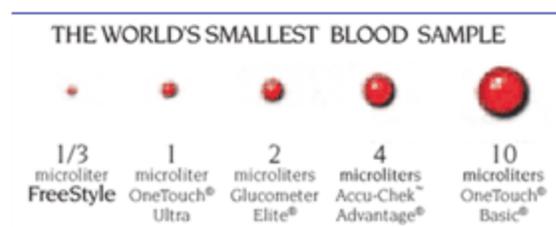
**Apply blood to strip**



**Read and record results!**

Testing your blood glucose is very easy and with the meters I have recommended above, it is also very fast. Older meters used to take upwards of 1 minute or so. The newer meters determine your blood glucose level in as little as 5 seconds.

Now, I am sure, you can see the value in being able to test your blood glucose from an alternate site. If you do this kind of testing on your fingertips you will quickly have some pretty sore paws. I know this from experience, my



doctor did not tell me that I could test on my arms and the Diabetes educator I went to see shortly after I was diagnosed didn't tell me either! I had to find out for myself by going to the LifeScan web site and reading about the OneTouch Ultra meter<sup>3</sup>. After using the OneTouch Ultra for a year, I found out about the TheraSense Freestyle line of meters which actually require less blood than the OneTouch Ultra. This is especially helpful to diabetics who have a difficult time in obtaining a blood sample from their fingers due to circulation problems, another complication of Diabetes.

All of this testing is *absolutely necessary* if you are a newly diagnosed diabetic or if you are a diabetic who has never gotten control of your disease. Once you have gotten control and you understand which foods you need to watch out for and have adjusted your eating habits you can 'lighten up' on the testing a bit. However, you should test at least one day a week on the 8 test a day schedule. Using this method of testing I was able to go from a newly diagnosed diabetic with an hbA1c result of 11.0 to a 5.5 (normal) in approximately 120 days.

Even though I was able to gain control quickly that is no reason to slack off. My last 3 hbA1c tests, in the past year, were 5.5, 5.6 and 5.4 respectively. The hbA1c blood test is a measurement of blood glucose over a period of time, usually from 60 to 90 days depending upon the lab standard used. It is not particularly useful by itself as a tool for diagnosis however it is an indicator as to how well you are managing your Diabetes.

### **Analysis paralysis**

The other important aspect of testing your blood glucose is that you *must* log the results. All of the blood glucose meters that you can buy come with some sort of paper log book to keep a diary of your measurements. The paper log is good but if you want to really manage your Diabetes it is just not enough.

Two of the meters, the OneTouch Ultra and the TheraSense Freestyle, discussed in this article also have the ability to store information in a database on a PC, but that is usually not very convenient, especially if you have to travel.

I have found, by my own experience, that keeping the information about one's blood glucose testing and carbohydrate intake in a paper log book does not do one much good when trying to gain control and analyze how well one is doing. This is where using technology in the management of Diabetes is absolutely crucial in terms of gaining control quickly and keeping control over the long term.



Enter the ubiquitous Personal Digital Assistant or PDA. In my opinion, the best friend of a diabetic next to their blood glucose meter. As far as I am aware, the only software available for assisting in the management of your Diabetes runs on Palm OS based devices. I am sure there will be software available soon for the Pocket PC devices but I currently do not know of any.

---

<sup>3</sup> [www.lifescan.com](http://www.lifescan.com)

There are many different devices available however the best one in my personal opinion is the Handspring Visor Prism<sup>4</sup>. Any Handspring model could be used, but the Prism has a very nice color screen that is very easy to see in the dark and also uses rechargeable Lithium-Ion batteries. The Prism is not in production any longer, but you can still purchase one from Handspring if you buy a refurbished unit. The cost is approximately \$199.

The other Handspring model that I would suggest is the Handspring Visor Pro, it doesn't have a color screen but it does have the rechargeable battery and 16 Mb of RAM.

The reason I recommend the Handspring line of organizers is the TheraSense FreeStyle Tracker. The Tracker is a Springboard module for Handspring PDAs. It will not work with a Palm or Sony organizer.



If you don't have any plans on getting the FreeStyle Tracker, the other software discussed later on in this article will work just fine for you on organizers from Palm or Sony. I recommend the Sony Cliè PEG-T6665c (\$349.00)<sup>5</sup> or the Palm m515 (\$249)<sup>6</sup>.

The biggest reasons I recommend the units mentioned above is the use of a color display. This is extremely important for diabetics as the monochrome displays on other models are just too difficult to see in the dark. Especially, if as a diabetic, you happen to be visually impaired. The other consideration is the amount of memory contained in these organizers. You are not going to cut it with a 2 Mb Palm OS device. Minimum requirements are 8 Mb for the software used to record blood glucose and keep track of carbohydrate intake.

### **Digital Logbooks**

I have personally used all of the software described below in the day to day management of my Diabetes. I do not receive any compensation from the authors or publishers of the software. As a veteran programmer for 30 years and a 'practicing diabetic' it is my opinion that I am uniquely qualified to render an objective opinion regarding the functionality and usefulness of the various software packages. All of these software solutions are extremely affordable.

### **GlucoPilot**

The first software package you should know about is called GlucoPilot<sup>7</sup> (\$29.00). Of all the software available for the PDA platform, this is by far the most comprehensive when it comes to providing you with good analysis of the data you need to manage your Diabetes.

---

<sup>4</sup> [www.handspring.com](http://www.handspring.com)

<sup>5</sup> [www.sonystyle.com](http://www.sonystyle.com)

<sup>6</sup> [www.palm.com](http://www.palm.com)

<sup>7</sup> [www.healthetech.com](http://www.healthetech.com)

While this is the best of the stand alone software packages for keeping track of your blood glucose, carbohydrate intake and insulin usage, I have to let the reader know up front that support from HealtheTech is pretty lousy. I have never received a response from them regarding any questions about GlucoPilot.

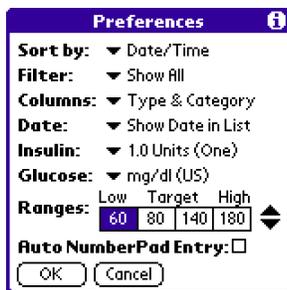


GlucoPilot was originally written by Scott Hanselman<sup>8</sup> and subsequently sold to HealtheTech. The current version is 1.6, which now supports color on the Handspring Prism however my initial experience was with version 1.5. It took quite a bit of work to track down the author of this software in order to request the addition of color functionality. Originally, I made my request to HealtheTech and they ultimately were required to contact Scott (who is a great guy and an awesome Palm OS programmer) and have him implement the desired functionality.

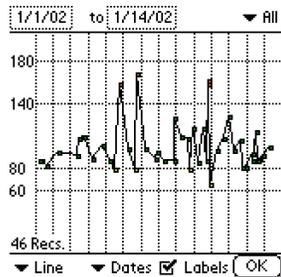
Installation is accomplished by downloading GlucoPilot from the HealtheTech web site and then hot syncing to your PDA, just as most Palm OS based software is installed.

GlucoPilot is very easy to use and provides the most comprehensive reporting I have seen in any Palm OS application. Data entry is very quick and you can record a blood glucose reading in less time than it takes to actually do the test. Navigation is held to a minimum by allowing you to enter data directly into the list shown in the initial screen. Reports are a quick tap away from the main screen.

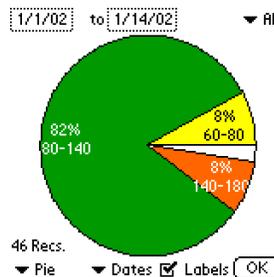
The options settings are easy to understand and can be set for measuring blood glucose in mg/dl (US) or mmol/l (Canada & Australia). You can also customize your target range so the software can provide the appropriate feedback to let you know when your blood glucose measurements are outside of your personal target range.



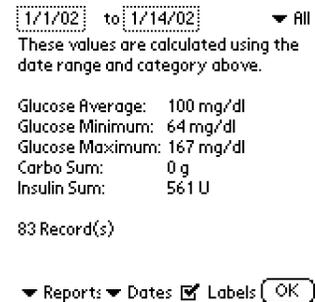
Options Settings



Line chart



Pie chart



Summary report

Reporting options provide multiple views of your data in line, pie and modal day charts as well as a histogram view. This combination of report functionality enabled me to very quickly gain control of my Diabetes and keep track of how well I was progressing.

<sup>8</sup> [www.tweak.org](http://www.tweak.org)

The first time I showed my doctor the reports on the PDA he was astounded and asked where he could get the software to recommend to his other diabetic patients.

This software is solely contained in the PDA and does not have a companion program for your PC.

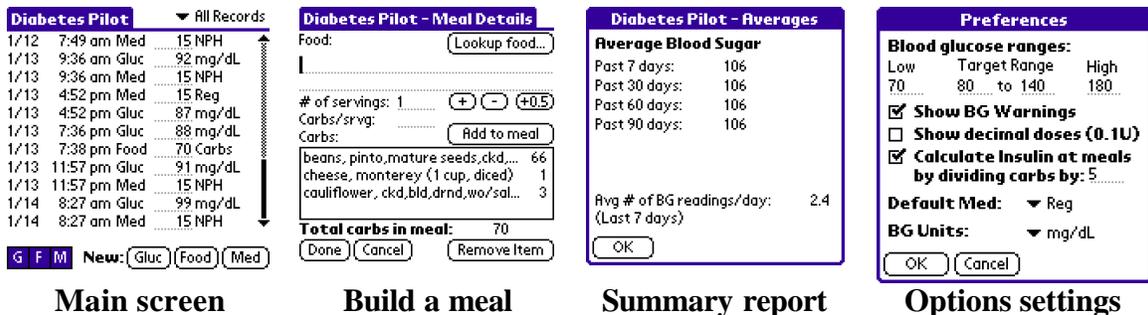
### Diabetes Pilot

Using the previously mentioned software really piqued my interest in finding other software available for the PDA to manage Diabetes. Through my search I found Diabetes Pilot<sup>9</sup>. (\$24.00, portions donated to the Juvenile Diabetes Foundation).

Installation is very much the same as GlucoPilot, you download the Diabetes Pilot software from the web site and then you must also download the Food Database separately. You install them onto your PDA by using the hot sync installer.

While being very similar to GlucoPilot, Diabetes Pilot has an integrated food database of more than 5000 items, which provides you with some very interesting capabilities. You can 'build' a meal and calculate the total carbohydrate intake for the entire meal and you can then calculate the amount of insulin required. This is very handy, especially for diabetics who are new to using insulin in their treatment regimen.

Unlike the publisher of GlucoPilot, the author of Diabetes Pilot is very responsive and answered my email queries in a very timely manner and he also implemented several of my suggestions to make the software easier to use and more comprehensive.



The reporting capabilities do not come close to those of GlucoPilot but if the reporting is not that important to you, then by all means get this software. This software is solely contained in the PDA and does not have a companion program for your PC

<sup>9</sup> [www.diabetespilot.com](http://www.diabetespilot.com)

## TheraSense FreeStyle Tracker

After having used both of the packages above for about a year, I finally saw an article in a magazine about a new blood glucose meter that would plug into a Handspring PDA. I was very intrigued by this idea and had wondered why anyone had not yet come out with such a device. (The biggest reason for the delay is in the approval process of the FDA) It just seemed like a natural extension to the PDA, particularly the Handspring models as there are so many different Springboard modules available for all kinds of expansion capabilities, from MP3 players to digital cameras and more.

I contacted my doctor and found that due to conflicts with contractual agreements between my HMO and LifeScan, the makers of the OneTouch Ultra, he could not provide me with one of the Freestyle Tracker meters. I was on my own.

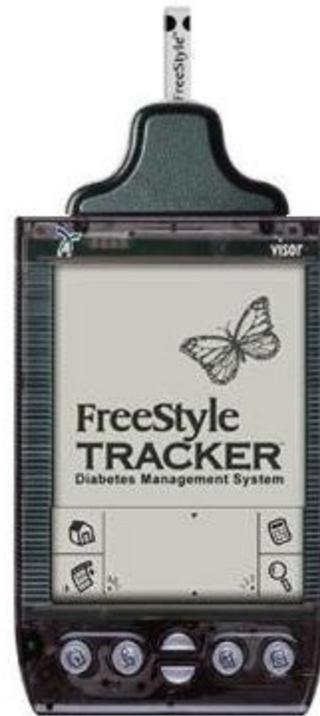
I contacted TheraSense to find out how to obtain a Freestyle Tracker module for my Handspring Visor and was able to purchase a module and strips to get started. If you purchase the Freestyle Tracker from TheraSense you get a Handspring PDA, the Tracker module and a starter kit with a lancing device, control solution and strips for \$194.00 (after a mail in rebate). Most of the cost of this is the Handspring PDA. If you already have a Handspring PDA, as I did, you can purchase the Tracker module with the starter kit alone.

Using the Freestyle Tracker is a breeze!

After you run the initial installation on your PC, and do a hot sync to install the software onto the PDA, you simply plug in the module and the software automatically loads and runs in the PDA. You are presented with an easy to see display, very important for diabetics with vision problems, and clear, concise animated graphical instructions with regard to actually performing the blood glucose test. The first animation instructs you to insert a test strip into the slot located at the top of the Tracker module.

The next screen provides the calibration information for the strip to be used in the test. All meters require the calibration of test strips before you can use them to test. Usually the calibration number is printed on the label pasted on the vial containing the test strips. Once you have adjusted and confirmed the calibration number displayed on the screen matches that on the label of the test strip vial you are ready to perform the test.

Again, you are prompted by a graphical animation instructing you to obtain the blood sample to test and apply the strip to the sample.



The test results are then displayed and you are given the opportunity at this time to make notes regarding the test and to categorize them. The test results are then automatically entered into the database. At this point you can then remove the test strip and then remove the module as well.

The Tracker is very forgiving when taking the actual blood glucose test. For example, if you are one of the unlucky diabetics who just can't seem to get enough blood for a test (very unlikely given the extremely small size of the blood sample required by the Freestyle series of meters) you can apply an additional sample for up to a minute.



The test strips for the Tracker have the capability to use either side of the strip (but not both) which makes it convenient if you are right or left handed. Another 'plus' that I found while using the Tracker is that the strips are easier to handle because they are slightly larger than the strips for the OneTouch Ultra and they are white instead of black, which makes a huge difference in low light conditions.

One drawback, compared to the OneTouch Ultra was the packaging the strips came in. Both companies use a small one inch diameter vial to hold the strips. Freestyle strips come 50 to a vial. Ultra strips come 25 to a vial. While this may not seem to be a big deal, it is when you are trying to get a strip out of the vial with your finger. There is not a lot of room in a vial of 50 strips to insert your finger to obtain a single strip. I had to routinely dump a number of strips out in my hand in order to obtain one. Once I had completed enough tests to bring the number of strips down to 25 it was much easier to insert my finger and pull out a single strip.



**Log details**



**Log compare**



**Pie Charts**



**Summary**

The reporting capabilities in the Tracker software rival that of GlucoPilot however the date ranges are much more limited. The reports available are line, pie and modal formats

as well as a summary report. Unfortunately, the charts are not in color as they are in GlucoPilot.

One very nice feature is the ability to compare days within the log book. This is something that I have found to be very useful on occasion.

Tracker also has an integrated food database to look up carbohydrate values but it does not allow you to build a meal and calculate the total carbohydrate intake as does Diabetes Pilot. If the Tracker software were to provide this functionality it would be the ultimate in Diabetes management software.

Another nice feature that is not found in any of the other PDA based software is the ability to store information regarding your treatment plan and calculate insulin dosages according to the information stored about your plan.

The Tracker software also comes with a companion program for the PC in order for you to see the log details. However, it is severely lacking in reporting capability. It would have been nice for TheraSense to provide some more extensive reporting on the PC.

I recently took a trip for a few days across the country and this was a good time to test the Tracker in terms of ease of use, particularly for those of you who are business travelers with Diabetes. The Tracker worked flawlessly. It was very convenient to use during the trip and I was able to eliminate the carrying of a separate meter and strips.



Another very nice feature to note that is if you have a stand alone Freestyle meter you can use the same test strips with the Tracker. When you are traveling this can be an important feature. You can pack your Freestyle meter to use in an emergency and not have to worry about using a different brand of strips. (Other meter manufacturers such as LifeScan have different strips for use with different meters, often a point of confusion when purchasing new strips for your meter.) For those of you who are working and traveling away from home a great deal, this is definitely the ideal solution.



There is only one real drawback to the Tracker. The carrying case that comes with the module is the same carrying case that comes with the stand alone Freestyle meter. It is approximately 4 ½ inches wide by 5 ½ inches tall by 2 inches thick. Not exactly something that is easy to carry. I was able to get around this limitation by obtaining a new RhinoPak 2000 carrying case from RhinoSkin<sup>10</sup> (\$29.95) The RhinoPak 2000 provides some additional storage so this case makes a great addition to any PDA, but it is especially welcome for use with the Tracker.

---

<sup>10</sup> [www.directcase.com](http://www.directcase.com)

TheraSense really should address this issue by creating a carrying case for the Tracker. Better yet, they should commission RhinoSkins to make them a custom case. If they were to do this it would certainly enhance the usefulness of the product and dramatically reduce the objection created by the bulky carrying case they currently ship with the product.

Of the three meters I have mentioned here in this article, I personally prefer using the Tracker due to the convenience the automation of the record keeping affords and the increased portability compared to the Freestyle or the OneTouch Ultra.

Check with your doctor about obtaining a Freestyle Tracker. If he is not familiar with it, give him a copy of this article or have him go to [www.therasense.com](http://www.therasense.com).

*Ben E. Brady lives in Dinuba, California, with his wife Rita, approximately 45 minutes south of Fresno in the heart of the Central Valley. A programmer for more than 30 years, Ben is active with the Tule Fog PC Users group and provides instruction to others who need assistance with technology as well as presentations to groups of all types. He can be reached via email at [bbrady@iname.com](mailto:bbrady@iname.com)*