Blood Glucose Levels
A Study of Correlation Factors

Introduction

This study examines data collected from April 23 to May 29 for a 51-year old male resident of Blair, WI, Dave Stetzer. The study examines R^2 factors derived from scatter plots of various combinations of two variables.

This study, while focused on one person, also includes the results from three other individuals.

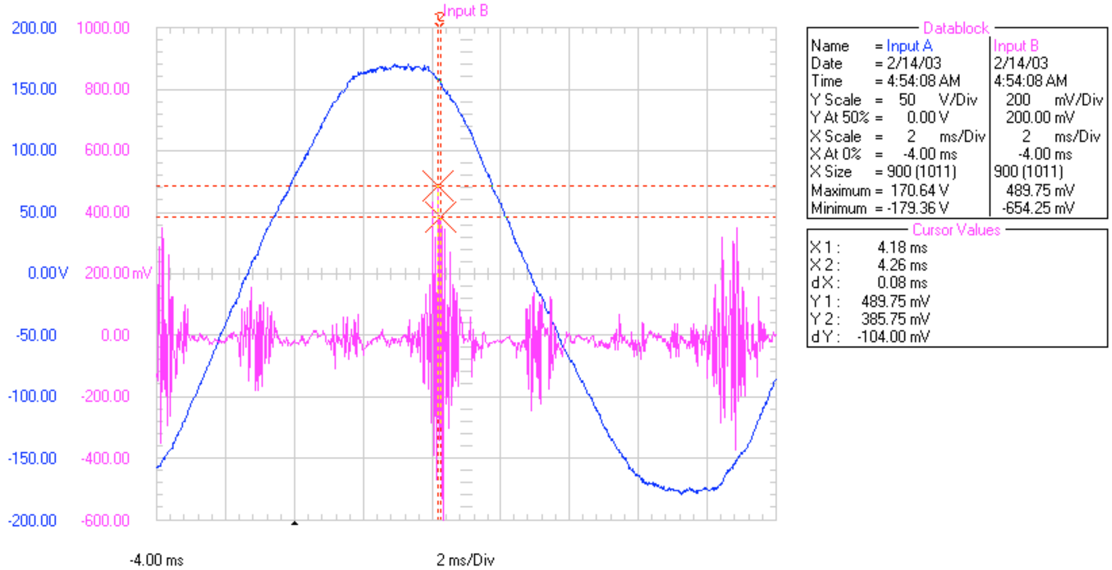
The premise of the investigation began when it was serendipitously observed that being in a location where relatively large **peak** values of high frequency transients that existed on 60 Hz electrical wiring was apparently raising blood glucose levels. Interestingly, when RMS values of dirty power were used, there was almost no effect on blood glucose levels.

We have come to call these high frequency transients, “dirty power”.

“Dirty power” is also referred to as “transients”, “noise” or “stray voltage” and similar terms. Clean power is when the electricity we use is solely in the form of a 60 Hz sinusoidal voltage and current without high frequency components. Dirty power refers to high frequency (>10 KHz) components riding on this sinusoidal wave. Dirty power is a component of the 60 Hz power to which, in our modern electrified world, we are all exposed, in varying degrees. For a complexity of reasons, it is particularly pronounced in Wisconsin, Michigan and Minnesota.

The graph on the next page is an illustration of both “typical “ power (the blue line is the 60 Hz power, including dirty power components—notice the jaggedly lines on the top and bottom, and a picture of the extracted “dirty power” (the pink extremely variable line), which is actually the jaggedly sections of the blue line magnified, and sans the 60 Hz power. The Appendix to this report shows: the filter used to remove the 60 Hz. Basically it is a high pass filter that attenuates frequencies below 10 KHz.

Measurement of dirty power peak-peak values, used in the various scatter plots can be seen in this graph as the highest levels of the pink curves. For example, near the middle of the graphs is a set of cursors (dotted lines, vertical and horizontal) where the measured peak-to-peak value of the dirty power is 104.00 mV (dY in the box labeled “Cursor Values”.



THE WAVEFORM WAS COLLECTED IN ROOM 101 OF THE BRIGHTON SCHOOL. CHANNEL 1 WAS CONNECTED TO THE UTILITY SUPPLIED 120 VAC POWER. CHANNEL 2 WAS CONNECTED TO THE SAME POTENTIAL EXCEPT THROUGH THE GRAHAM UBIQUITOUS FILTER. THE AREA BETWEEN THE CURSORS REPRESENT A FREQUENCY OF 12.5 KILO HERTZ. NO GRAHAM/STETZER SOLLUTIONS FILTERS WERE BEING UTILIZED AT THE TIME. THE AMPLITUDE OF THE BURST SHOWN IS 489 MV.

This picture of dirty power was taken from an oscilloscope in a classroom at Brighten School, Brighten, WI. It is typical of what is seen all over Wisconsin.

The cause of this dirty power comes from the myriad electrical gadgets and equipment we use. Recent changes in the technology have resulted in these gadgets and equipment not drawing their power needs continuously, as they did previously, but intermittently at a high frequency. Home light dimmer switches are but one example. Such “non-linear” drawing of power is reflected back onto the electrical power system. The gadgets our neighbors and we use generate such electrical “dirt” as do certain types of variable speed motors. The “dirt” is also generated by the electrical utilities when they switch their distribution from one circuit to another.

Blood Glucose and Dirty Power: A set of scatter plots and the R^2 factor for each.

The following scatter plots were produced:

1) Blood glucose Vs dirty power (full data set)
2) Blood glucose Vs dirty power (single outlier removed)
3) Blood glucose Vs time of day
4) Dirty power Vs time of day

Dave Stetzer was diagnosed as diabetic. Yet, removed from higher levels of dirty power, he can eat a large bowl of ice cream and a piece of pie without having any appreciable change in his blood glucose levels. However, even without eating, when in higher levels of dirty power, his blood sugar is sharply elevated.

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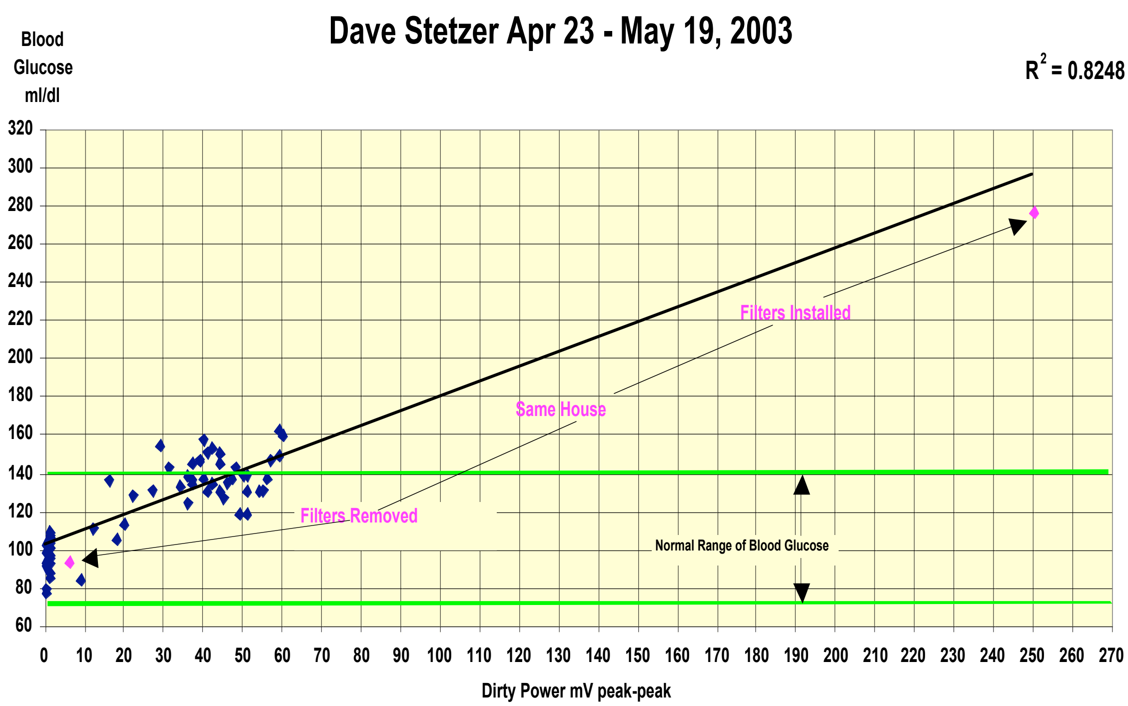
Dave is taking no medicines at this time to control his diabetes diagnoses nor is he otherwise controlling his diet or exercising because of his diabetes diagnoses. On his doctor's advice, he did take glucophage XR tablets beginning April 24th through April 29th. He discontinued taking them because they had no effect.

Below are a set of graphs that show the effect of dirty power on Dave Stetzer's blood glucose levels.

Figure 1
Blood glucose Vs Dirty Power (full data set)



While we can see in this scatter plot that the R^2 factor is large (0.82), there is a single "outlier" data point. The "outlier" and a companion data point are shown in pink. These are 2 measurements, taken 2 hours and 45 minutes apart, in the same house. One hours and 45 minutes prior to removing filters that substantially reduce the dirty power levels, a bacon cheeseburger and a bowl of vegetable beef soup was consumed. The lower left data point is where filters are installed that removes most of the dirty power. The upper left is where these same filters have been removed.

This "outlier" data point is real data, but it does raise the question, what would be the correlation factor if the upper right outlier data point were not there?

The next scatter plot is the exact same set of data, except that the "outlier" is removed.

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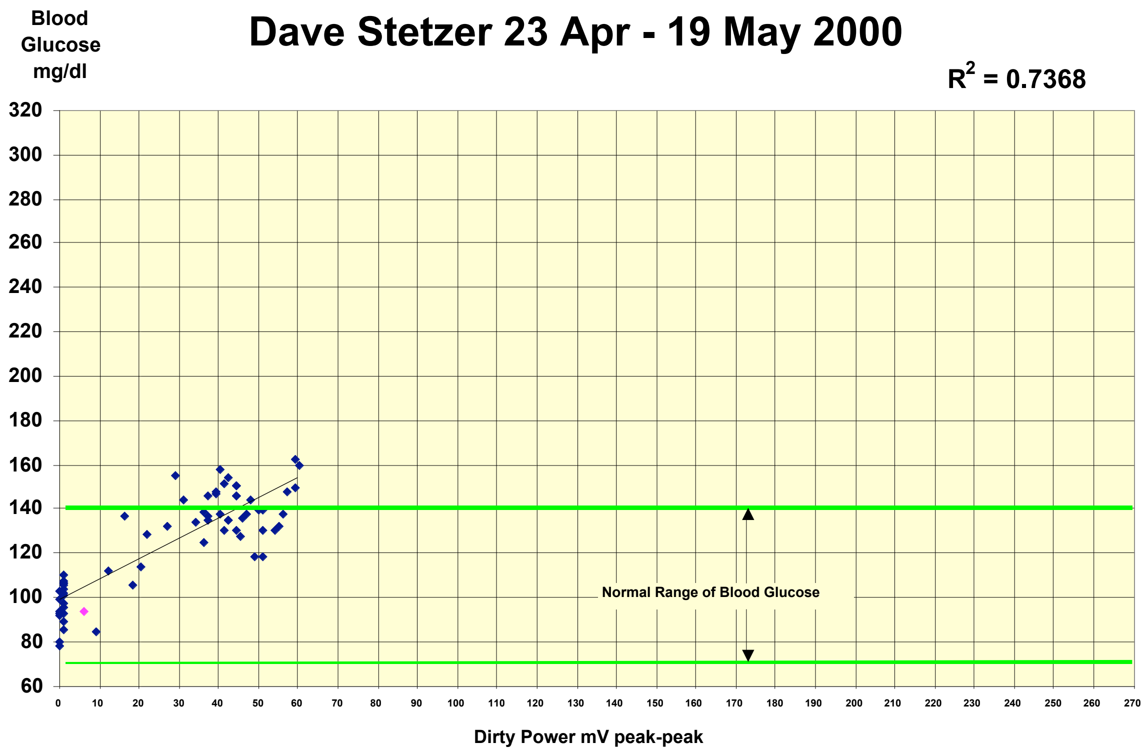
Figure 2

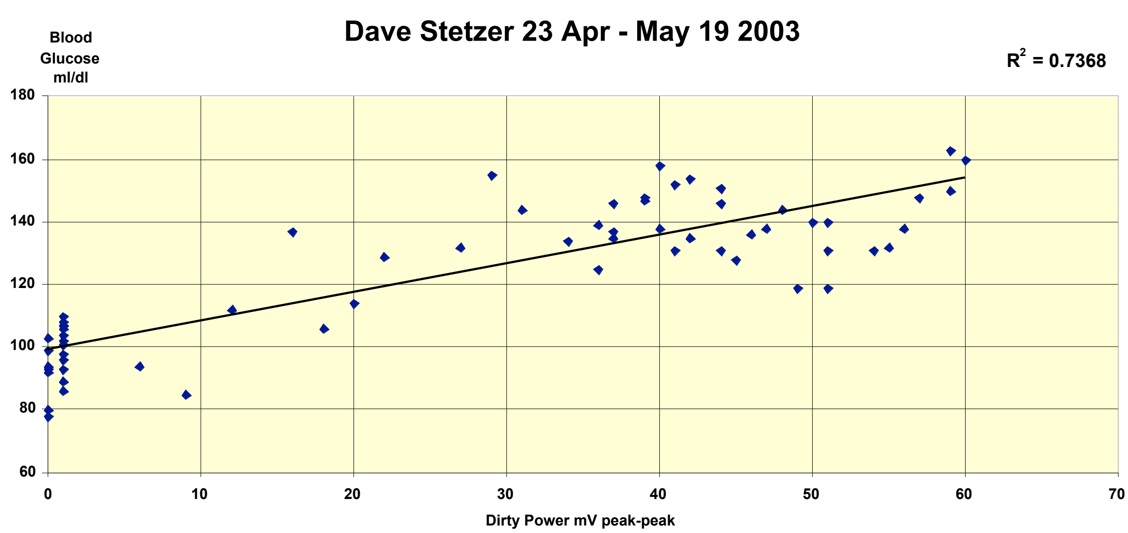
Blood glucose Vs dirty power (single outlier removed)



This plot is to the same scale as Figure 1 and includes the exact same set of data except the "outlier" is removed. We see that the R^2 factor has been reduced from 0.82 to a still respectable 0.74. The next figure is the same plot except that the Blood Glucose and Dirty Power scales have changed.

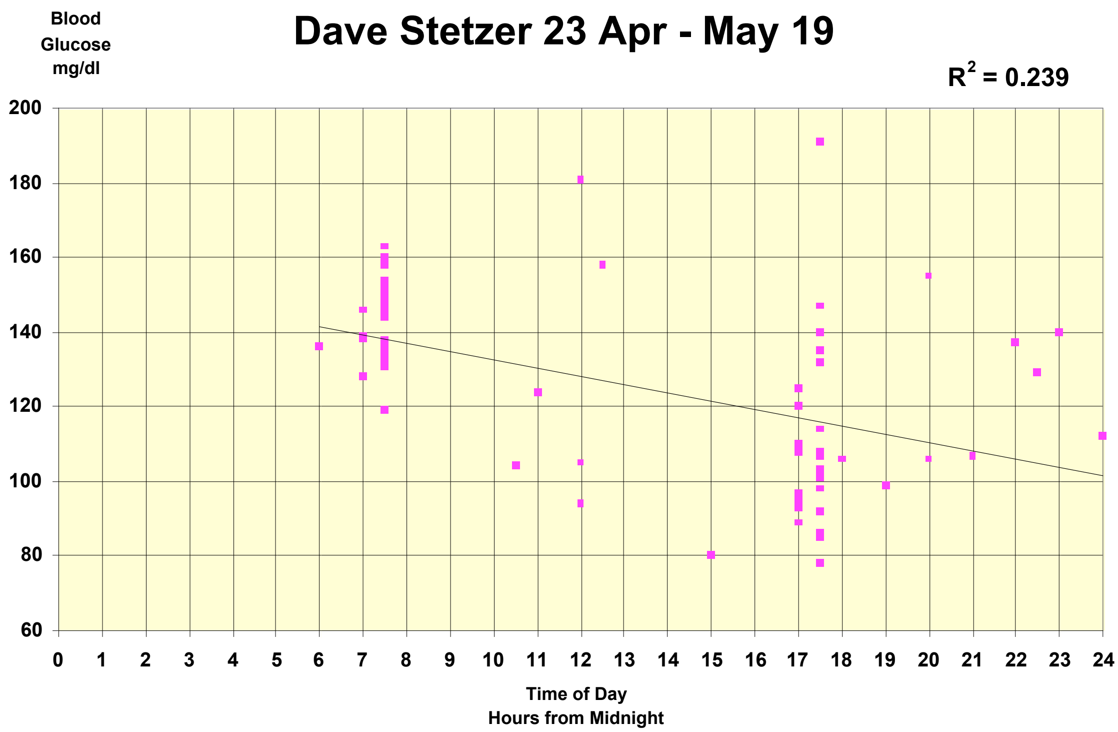
Figure 3

Blood glucose Vs dirty power (single outlier removed & scale change)



Are there some factors, other than dirty power, giving this apparent correlation? We will look at Blood Glucose levels Vs Time of Day.

Figure 4
Blood Glucose Levels Vs Time of Day



The R^2 factor is small when blood glucose is compared to time of day (0.24). Indeed it is difficult to explain why the correlation factor can be so high when we look at blood glucose Vs dirty power and so low when we look at blood glucose Vs time of day, without concluding that dirty power has a profound effect on blood glucose levels.

When partial correlations are examined to remove any time of day effect, the R^2 value is 0.61. The statistical significance is strong ($p < 0.001$).

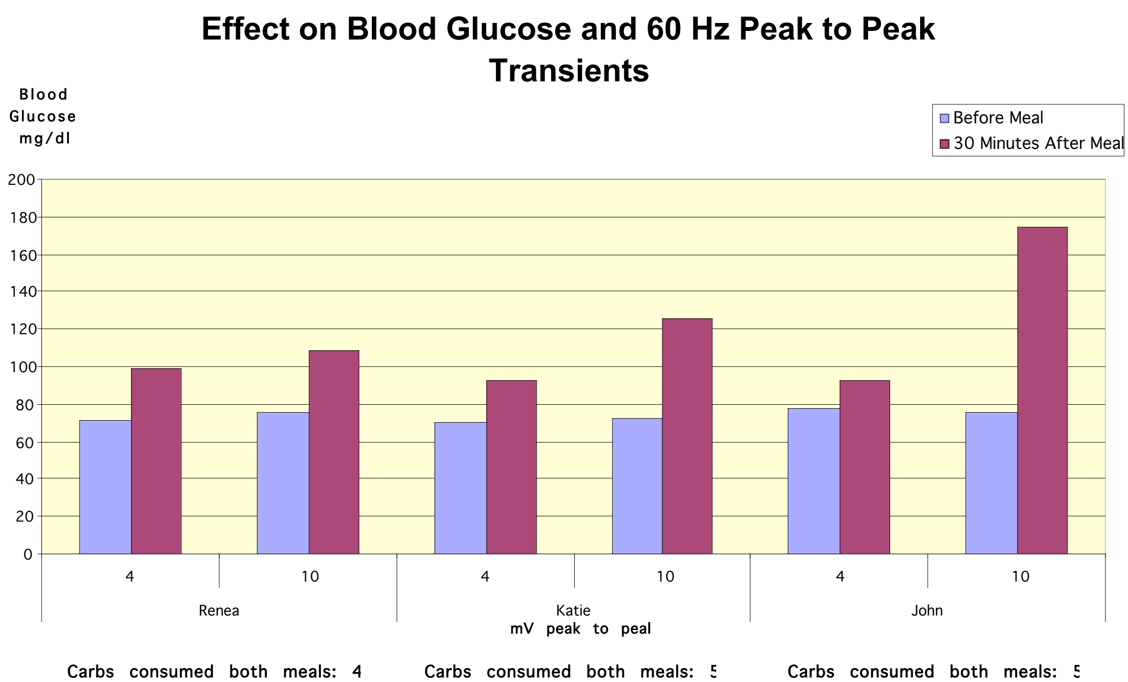
Is the Blood Glucose Meter Affected by Dirty Power?
The glucose meter used to take these measurements is an ACCU-CHEK Advantage. This meter, for calibration, requires a numeric number found with each set of strips, to be entered into the meter. We did the following test to determine if the glucose meter is itself affected by dirty power.

Dave measured his blood glucose levels in a dirty power environment as he would normally. The reading was 138 mg/dl on the blood glucose meter. Then he put another strip in the meter, wrapped the meter in aluminum foil (the foils isolates the meter from all electric and electromagnetic fields), put blood on the strip, and set it on an AC cord plugged in to the wall receptacle (in order to maximize the electric field). The reading was 135 mg/dl. The levels on the dirty power meter were 30 mV during this time. It would appear that the high frequency transient electric fields have very little or no effect on the glucose meter.

Three Other Individuals

All of the above data is for a single individual, Dave Stetzer. The chart below shows the effect of dirty power levels on three individuals. None of these people are diabetic. There are 4 sets of measurements:

1. Before eating in a low-level (4 mV) dirty power environment.
2. Thirty minutes after eating in the same low-level dirty power environment.
3. Next day, before eating in a higher-level (10 mV) dirty power environment.
4. Next day, thirty minutes after eating the identical meal from the day before, in a higher-level dirty power environment.



We can see that blood glucose is consistently elevated (reddish-brown bar) when the dirty power is elevated. This elevation of blood glucose with dirty power elevation is far more pronounced after eating (reddish-brown bar) than before eating.

The table on the next page illustrates this numerically:

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	Dirty Power mV pk-pk	Blood Glucose Before Meal	Blood Glucose 30 Minutes After Meal	Carbs at both Meals	% blood glucose change after eating	% blood glucose change with higher dirty power Before Meal	% blood glucose change with higher dirty power After Meal
Renea	4	71	99	40	39.4%	7.0%	10.1%
	10	76	109		43.4%		
Katie	4	70	93	50	32.9%	2.9%	35.5%
	10	72	126		75.0%		
John	4	78	93	53	19.2%	-2.6%	88.2%
	10	76	175		130.3%		
				Average at low dirty power	30.5%		
				Average at high dirty power	82.9%		
				Average	53.0%	2.4%	44.6%

There are several results to note:

- Increases in blood sugar 30 minutes after eating the same food, on average more increases 2.7 fold (30.5% to 82.9%), when the peak values of dirty power changes from 4 mV to 10 mV.
- Though too small a sample to draw a general conclusion, one person, Renea's, blood glucose is only slightly effected (10%) while the other two are strongly affected (36% and 88%).
- Prior to eating there is almost no effect on blood glucose levels when the dirty power level changes (average of 2.4%).
- After eating, when exposed to a 10 mV peak-peak dirty power electric field, John's 175 mg/dl blood glucose level is sufficiently high to suggest he has diabetes.

It is our supposition that not everyone is sensitive to peak values of dirty power. It is our hypothesis that there is an allergic type of reaction that some people have and others do not. Further, we have observed that those who become sensitive, over time become hypersensitive, not unlike some known allergies (e.g., bee stings).

Conclusion

The data presented strongly suggests that Dave Stetzer's blood glucose is changed by exposure to dirty power. Further, for 2 out of 3 individuals blood glucose is also changed by dirty power.

We believe that this data is sufficient to warrant a formal study to determine if exposure to dirty power electric fields does in fact raise blood glucose levels in sensitive people. We do not believe that all people are sensitive to dirty power anymore than all people are sensitive to pollen, cat dander and other allergenic agents.