

Automated Control of Insulin Levels

DRA Project Report 06-05

There are an estimated 14.6 million Americans with diagnosed diabetes, of which almost 5.3 million are ethnic minorities. There are huge disparities in the treatment of those with diabetes. A key factor in reducing severe complications and resultant disability and death is aggressive management to keep blood glucose under control. For those with advanced disease on insulin this requires frequent finger sticks for blood glucose testing and possibly multiple insulin injections per day. A closed loop insulin delivery system could facilitate better glucose control reducing the excess morbidity of poor, minority and underserved patients.

A closed loop insulin delivery system has three major components. First there is a biomonitoring device that automatically checks the blood glucose level at appropriate intervals. This information is sent electronically to a small programmed computer that assesses the situation and determines when and how much insulin needs to be administered to keep blood sugar in good control. The third component is an insulin pump that is instructed to inject the right amount of insulin into the person's body. This type of device is currently under development and is likely to be available in the next 10 years.

Currently, an open-loop "advise you" device is available. This type of device provides continuous glucose monitoring and "advises" the patient regarding the amount of insulin needed. A surgically implanted insulin pump has been recently approved in Europe that could be combined with continuous glucose monitoring, and is expected to be approved in the US in the next 2-3 years. However, the continuous glucose monitoring system is costly and complicated to use as is the surgically implanted insulin pump. People interviewed saw the pump as useful for severe diabetics who were highly intelligent, well educated and committed. Most of the underserved population do not have the severity of disease, nor meet the educational level and compulsive meticulous management requirements for selection. In addition, there is the problem of high out-of-pocket expenses. Based on the above, committee members did not see the current "advise you" open loop system as worthy of a major DRA effort at this time.

Recommendations:

- **Periodically monitor progress for reconsideration once a specific technology appears to be a winner**
- **Consider further committee research to evaluate the potential of a simple, fast point-of-care A1c testing device to see if a better model is needed for Community Health Centers and doctors' offices**
- **Consider further committee research to evaluate whether a polypill for type 2 diabetes would be worthwhile in reducing disparities**
- **Consider further committee research to evaluate the status of noninvasive glucose monitoring device development to see if there are realistic opportunities for DRA to accelerate development for reducing disparities**
- **Conduct a literature review of the current data and identify gaps in research to better focus DRA efforts on the most important disparities for diabetes and its co-morbidities**

Review the full report at: http://www.altfutures.com/dra/Automated_Insulin_Control.pdf. For more information on the DRA Project, visit our website at www.altfutures.com/draproject.

"The challenge is not only to anticipate the future, but to create it."