Alpha Software Development Team

Personal Insulin Pump

Preliminary Investigation

For Edmund Strange inc

Prepared for: Edmund G. Strange

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# 1. Contact Information

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# 2. Introduction

This Preliminary Investigation outlines our project group’s understanding of the Personal Insulin Pump project proposed by Edmund Strange inc sponsored by Edmund Strange, Edmund Strange inc. The project group leader is Hussain Farbotko-Merabaksh, and the project team members are Nicolas Castilloux, Curtis Collins, Anthony Guevera,Patrick Ings and Brian Reed.The completion date of this project is set for April 28 2012.

# 3. Purpose of the Project

This project aims to improve the way in which diabetes sufferers can perform the everyday task of monitoring themselves for rising levels of glucose in their body and injecting themselves with insulin. Today, diabetes sufferers have to do the injections themselves, this being highly inconvenient and prone to human error. This method of injection is also inefficient on the basis that the optimal amount of insulin to be injected is based on glucose levels as they rise and fall over time, making it easy to inject too much or too little. The emphasis here is on convenience and comfort for the patient.

The insulin pump, which combines the monitoring of glucose with an efficient delivery system into the body, will effectively reduce the human error and discomfort endured by the sufferer. Also, the constant monitoring will allow the pump to determine exact levels of insulin required in each dose, optimizing the patients health, as well as potentially preventing any wasted insulin.

# 4. Users of the Project

The system is aimed towards a wide range of diabetic types. It can be used by any level of diabetic, it is not specifically designed towards the most severe cases, rather, it is meant to help all diabetics. This document is meant for anyone who will be using or maintaining the system, whether that person is a care giver of a diabetic, or the diabetic themselves. The system is designed to be as easy to maintain as the current manual process most diabetics use to check there blood sugar levels, though younger users, or much older users may need assistance.

# 5. Project Scope

## 5.1 Functionality

The Insulin Pump will provide the following functionality:

* Monitor blood glucose levels throughout the day using embedded sensors
* Deliver safe levels of insulin based on blood sugar levels and previous injections
  + Inject no insulin if blood glucose very low, alert user
  + Inject insulin if blood glucose is in a good range but decreasing to an unsafe level
    - Dosage is based on rate of change and current level
  + Inject insulin if blood glucose is in a good range but increasing to a undesirable level
    - Dosage is based on rate of change and current level

## 5.2 Constraints

The Insulin Pump must adhere to the following constraints:

* Must not exceed the budget of $100, 000
* Must be aesthetically pleasing to wear and easily hidden
* Product targeted for Canadian citizens
* Conform to metric measurement system using mmol/L (millimoles/liter)

# 6. Recommendations

The following recommendations have been made for Alpha Software Development Team:

* Obtain research information on the daily lives of an average person suffering from diabetes from Personnel trained to assist persons with Diabetes..
* Normal food intake.
* Doctor’s Guides to health eating for a person with Diabetes broken down to age, height and weight.
* Regular intervals of blood testing.
* Regular intervals of insulin administration.
* Average person’s Blood testing schedule.
* Survey current sufferers of Diabetes.
  + Best time to check blood.
  + Best time to administer insulin privately.
  + Actual Food intake, specifically sugar intake.
  + Daily routine, including time spent exercising.
  + Technical skills operating small devices, understanding how to use small devices.