**Introduction**

**AIDA**: An educational simulator of glucose-insulin interaction and insulin dosage & dietary adjustment in diabetes mellitus

**Case Scenario - 0001 - "Joy Wilson"...**

This woman is on three injections of short and / or intermediate acting insulin each day, with a split-evening dose. She wants to start a family, but consistently has had quite high blood glucose levels in the early afternoon, despite numerous attempts to normalize her control in anticipation of becoming pregnant. Clearly she could decrease the amount that she eats, but this would not be ideal during pregnancy. Using **AIDA** it is possible to see if you can adjust her insulin doses to improve her glycaemic control. The image below shows the **AIDA** data entry screen where details of the current regimen are displayed. Information about the dietary intake, insulin dosage regimen and blood glucose measurements are recorded.

These are the input data which will be used by the **AIDA** model. When simulated, two graphs will be shown on the graphical simulator display. The upper graph will show the "observed" blood glucose readings (o) recorded via the data entry screen, while the lower graph will provide a composite display of information regarding insulin and carbohydrate intake. Superimposed on these graphs, as shown below, are the predicted steady state blood glucose and plasma insulin profiles as calculated by the **AIDA** model. Note: **AIDA** can display blood glucose data in both mmol/l and mg/dl – although units of mmol/l are used on this flyer. To convert mmol/l to mg/dl simply multiply the blood glucose values by 18.

The purpose of **AIDA** is to demonstrate the glycaemic effect of changes in either the dietary intake or insulin regimen – as either a self-learning or demonstration exercise. Having performed a baseline simulation you can change any of the input variables shown on the **AIDA** data entry screen to demonstrate the glycaemic effect of such changes. For example you could simulate what would happen to a hypothetical patient's blood glucose profile if the carbohydrate content of breakfast was increased by 10g or if the supper time Humulin S dose was decreased by 4 units, or the injection time moved earlier or the meal time shifted later. You could replace a split-evening dose insulin regimen with 2 combined injections per day or transfer the patient to Humulin M3 or Mixtard 30/70 in place of the previous short- and intermediate-acting preparations, or perhaps try the case scenario with a 'pen regimen' taking Ultratard nocte and Actrapid three times daily.
For example we may use AIDA to simulate what would happen if Joy forgot to take her morning insulin injection. The image below shows a simulation of the predicted effect on her blood glucose profile. The current (latest) blood glucose simulation is shown as the thicker black line while the previous simulation is shown as a thinner line.

As can be seen, omitting her morning insulin injection would send Joy markedly hyperglycaemic in the afternoon and leave her at significant risk of developing diabetic ketoacidosis. AIDA can also be used to simulate the opposite situation where Joy takes her insulin, but rushes off to work without having breakfast. The image below shows a simulation of this situation ...

AIDA can do a great deal more than it is possible to show on this flyer. This sheet however is only intended to give you a "flavour" of what AIDA can manage. All cases provided within AIDA can be experimented with – the intention being to create an educational / learning experience for patients and their relatives, students and possibly health-care workers. Not all the functions incorporated within AIDA will necessarily be of use to all users. However, it is hoped that AIDA may help improve understanding of the ways in which interactions between insulin and diet can affect the blood glucose profile of insulin dependent (type 1) diabetic patients.

NOTE: AIDA is not intended for individual patient glycaemic prediction, individual patient management or therapy planning. Furthermore AIDA cannot generate individual patient specific therapeutic advice. Changes in therapy should always be discussed with a doctor.

About AIDA

AIDA has been developed by a medical doctor, a computer scientist, and a diabetic patient. It is being made available without charge as a non-commercial contribution to continuing diabetes education.

Both a demonstration version of AIDA and the full interactive program can be obtained free of charge via the Internet from:

http://www.2aida.org

Should you not have Internet / Web access, more information about AIDA can also be obtained from: Dr. Eldon D. Lehmann, Department of Imaging (MRU), Imperial College of Science, Technology and Medicine, NHLI Royal Brompton Hospital, London SW3 6NP, U.K. – or by electronic mail from:

www@2aida.org

To be automatically informed by email when 'AIDA for Windows' becomes available – please send a blank electronic mail (e-mail) note to subscribe@2aida.org to join the very low volume AIDA e-mail announcement list.