DEVICES

Pumps
CGM
G tube
Glucometers
Closed Loop
Glucometers

Are they accurate?

- standards set by the International Organization for Standardization
- Within $\pm 0.83 \text{ mmol/L}$ of laboratory results at levels under 4.2 mmol/L
- Within $\pm 20\%$ of laboratory results at levels over 4.2 mmol/L

What can affect readings:
- Heat
- Cold
- Too little blood
- Contamination

Where?
- Alternative sites
Insulin Pumps

Benefits to pumping insulin

- Quality of life
- Less injections
- Fine tuning of BG levels
- Feel better
- Exercise made easier
- Sleepovers easier
- Micro managing insulin delivery

- 1963 Dr Arnold Kadish
- Next pump in 1976
- NICE guidance endorsed first UK pump in 2003
Different pumps

- Medtronic
- Animas
- Accu Chek
- Omnipod
- Dana

- bolus wizards
- basal patterns
- sensitivity factors
- tiny increments

www.inputdiabetes.org.uk
Continuous Glucose Monitors

Stand alone and integrated

Medtronic:
• Guardian Real Time
• Veo integrated

Animas:
• Vibe integrated

Dexcom
• Dexcom

Abbotts
• Navigator
Full time sensor use:

- Proactive and reactive
- Micro manage
- Tweaking

Ipro:

- blind sensor
- Investigate
Sensor Data (mmol/L)

<table>
<thead>
<tr>
<th>Date</th>
<th>Sun 8 Sep</th>
<th>Mon 9 Sep</th>
<th>Tue 10 Sep</th>
<th>Wed 11 Sep</th>
<th># Sensor Values</th>
<th>Average / Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>288</td>
<td>288</td>
<td>275</td>
<td></td>
<td>860</td>
</tr>
<tr>
<td>High SG (mmol/L)</td>
<td>4.6</td>
<td>5.7</td>
<td>6.5</td>
<td>6.7</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Low SG (mmol/L)</td>
<td>3.5</td>
<td>2.4</td>
<td>3.6</td>
<td>4.6</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Average SG (mmol/L)</td>
<td>3.9</td>
<td>4.6</td>
<td>5.2</td>
<td>5.4</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>0.3</td>
<td>0.8</td>
<td>0.5</td>
<td>0.5</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>MAD %</td>
<td>N/A</td>
<td>24.4</td>
<td>13.4</td>
<td>11.9</td>
<td>15.4</td>
<td></td>
</tr>
<tr>
<td># Valid Calibrations</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Not me!
Closing the loop!

The Artificial Pancreas

- Who?
- Where?
- When?

http://www.jdrf.org.uk
Just three things make an artificial pancreas

1. An insulin pump
2. A CGM – continuous glucose monitor
3. An algorithm

- What is an insulin pump?
- What is a continuous glucose monitor?
- What is an algorithm?

At the moment we are the algorithm

It is a sophisticated computer programme which makes decisions without human input

Trials are taking place but are top secret
What is a Gastrostomy?
Types of Gastrostomies.
These are the main types of devices used at GOSH:

<table>
<thead>
<tr>
<th>Percutaneous Endoscopy Gastrostomy (PEG)</th>
<th>Malecot tube</th>
<th>Balloon device (tube or button)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A flexible polyurethane tube which is passed down the throat and into the stomach. The end of the tube is brought out through a small incision in the abdomen to allow access for feeding.</td>
<td>A flexible rubber tube (catheter) which is inserted through an incision in the abdomen.</td>
<td>There are two types available: a gastrostomy tube and a button or low profile device.</td>
</tr>
<tr>
<td>Can stay in place for about 18 months</td>
<td>Usually a temporary device for the first six to eight weeks, and is then replaced by a balloon device (see right).</td>
<td>The tube can stay in place for about three months, and the button for about six months to one year.</td>
</tr>
<tr>
<td>Held in place using a disk inside the stomach</td>
<td>Held in place using wide, flat wings inside the stomach, but may need to be temporarily stitched to the skin</td>
<td>Both are held in place in the stomach using a small balloon filled with water.</td>
</tr>
<tr>
<td>A feeding adapter may need to be attached for each feed, depending on the type of equipment used.</td>
<td>It must be secured with tape and the position tested before each feed</td>
<td>A feeding adapter may need to be attached for each feed, depending on the type of equipment used.</td>
</tr>
<tr>
<td>Removed using an endoscope</td>
<td>Removed by the clinical nurse specialist. No surgery is necessary.</td>
<td>Removed by deflating the balloon.</td>
</tr>
</tbody>
</table>
Questions on Care Management?