



© CHF 2004

# Devices



- Glucometers
- Gastrostomy Tubes
- Nasogastric Tubes
- Insulin pumps
- Continuous Glucose monitoring system
- Closed Loop
- Smart phones/tablets

# Glucometers

## Accuracy

The ISO (International Organization for Standardization, the organisation, based in Geneva, Switzerland, that is responsible for defining the standards) set the standards. They were that 95% of tests are :

- Within  $\pm$  **0.83 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

In 2013 new standards were set and by end of May 2016 these new accuracy standards have to be implemented. They are that 95% of tests are :

- *Within  $\pm$  0.83 mmol/L of laboratory results at concentrations of under 5.6 mmol/L*
- *Within  $\pm$  20% of laboratory results at concentrations of 5.6 mmol/L (100 mg/dL) or more*

This website has a list of which meters meet the new standards :

<http://www.diabetes.co.uk/blood-glucose-meters/iso-accuracy-standards.html>

# Glucometers

## Where

- Heal, toe, finger, ear lobe, arm, thigh, calf, the palm
- Alternative site testing is found to not be as accurate as capillary blood ie if eaten within the previous two hours.



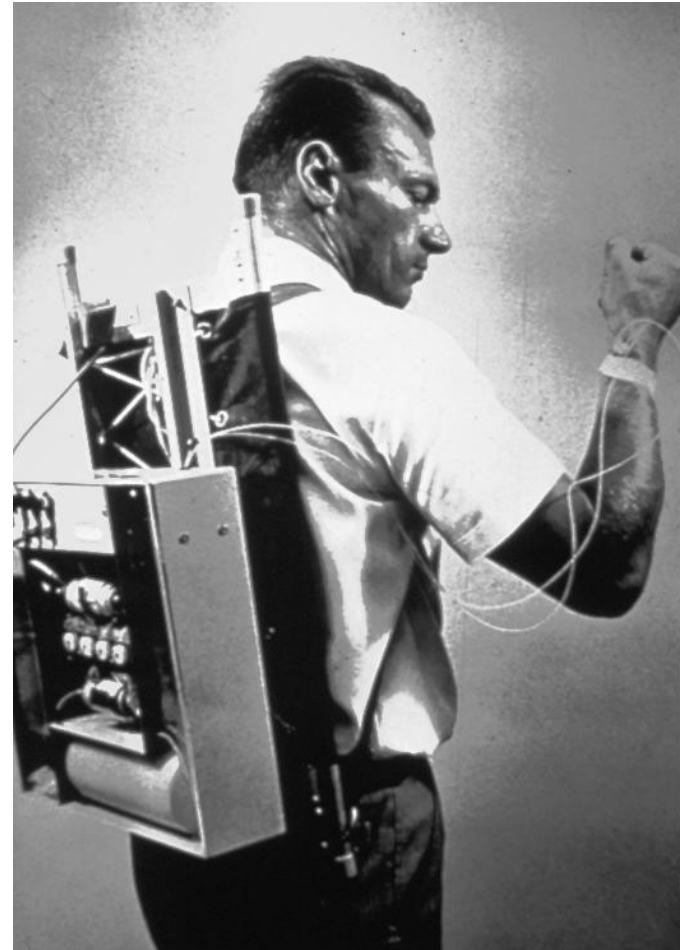
## What can affect readings

- Heat
- Cold
- Too little blood
- Contamination ie food
- Not washing hands
- Not drying hands
- Wiping first drop ! Do you?



# Insulin Pumps

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



# Why pump ?

## Benefits to pumping insulin

- Quality of life
  - MDI not working
  - Aversion to injections and/or needles
  - Less injections
  - Fine tuning of BG levels
  - Feel better
  - Exercise made easier
  - Sleepovers easier
  - Micro managing insulin delivery
- 
- bolus wizards
  - basal patterns
  - sensitivity factors
  - tiny increments
  - tailor basal patterns for illness, sport, weekends



Is pumping easier than MDI  
(multiple daily injections) ?

Sometimes yes  
and  
sometimes no

Definitely harder in the  
beginning  
fine tuning basal rates

Life is more 'normal' when  
pumping as timings do not have  
to be stuck to

You can be more spontaneous  
when pumping

Easier to pump when ill

Easier to pump when doing  
sport

# Continuous Glucose Monitors

Stand alone and integrated

Medtronic :

- Guardian Real Time
- 640G integrated

Animas :

- Vibe integrated

Dexcom

- Dexcom

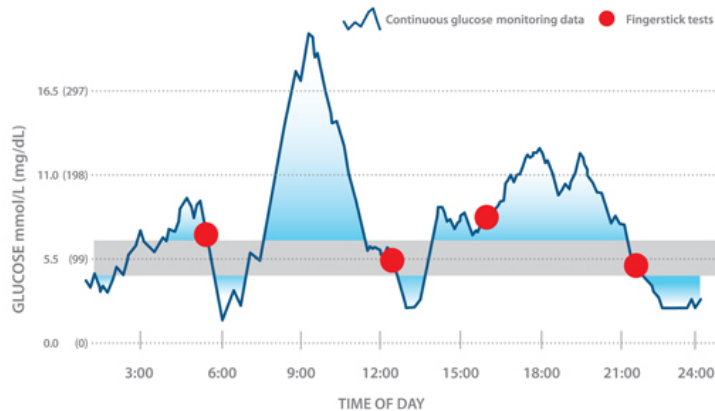
Abbotts

- Navigator
- Libre

Nightscout – with Dexcom  
 Medtronic Veo only



# Why use a CGM



Ipro :

- blind sensor
- Investigate

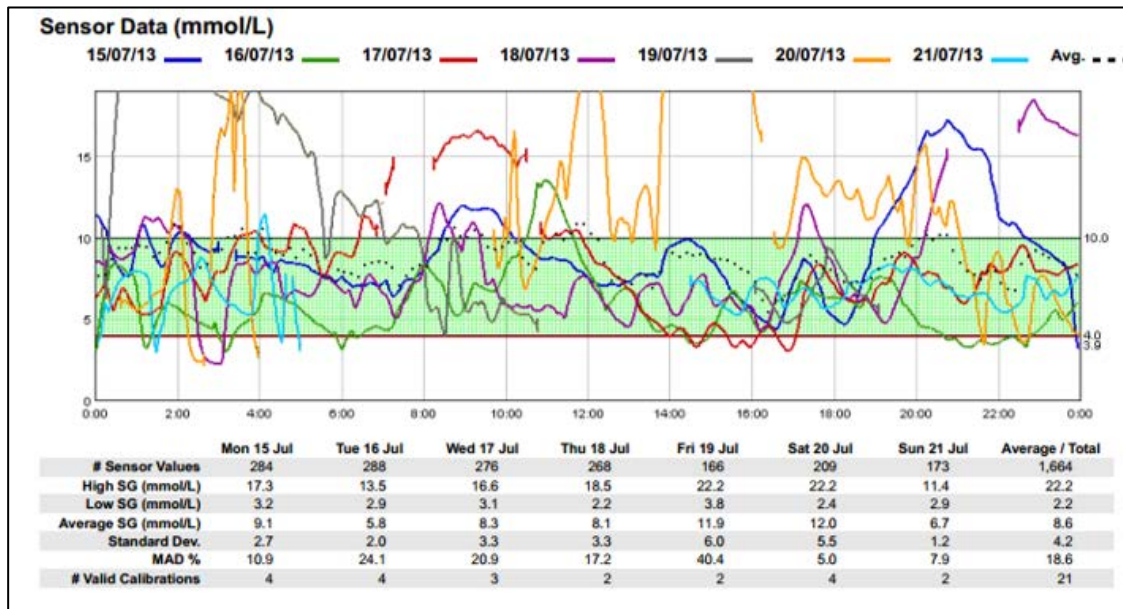
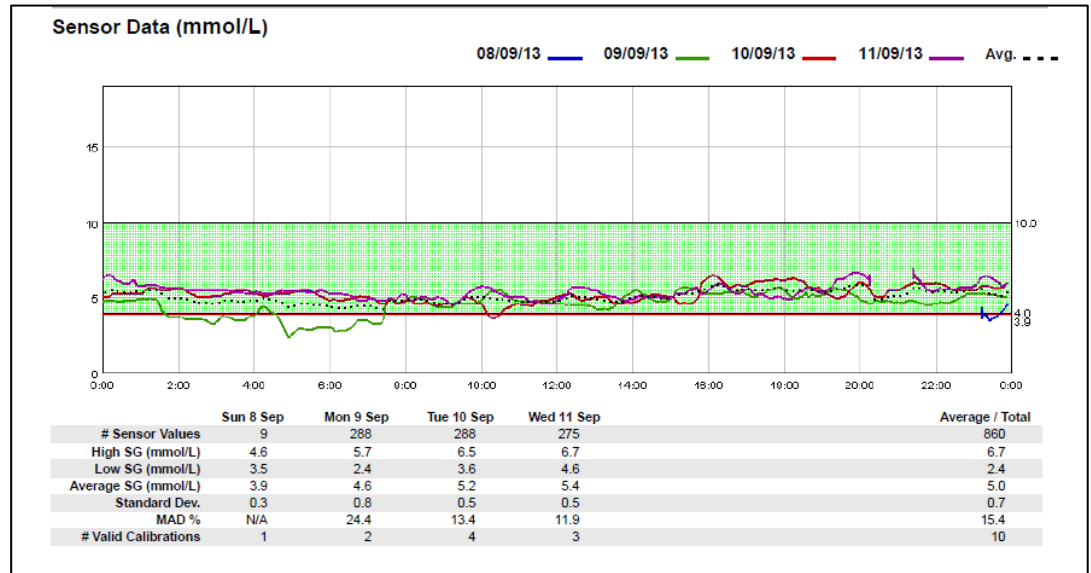
Full time sensor use :

- Warns of hypos and hypers
- Integrated 640 G has Smartguard – stops hypos before they happen
- Proactive and reactive
- Micro manage
- Tweaking basals, food ratios, sensitivity factors





Me



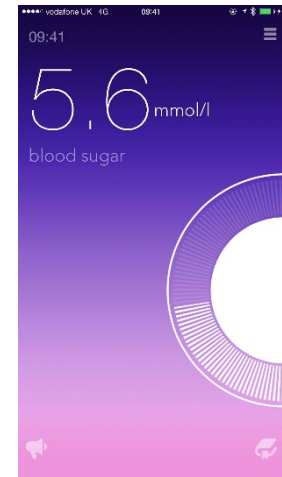
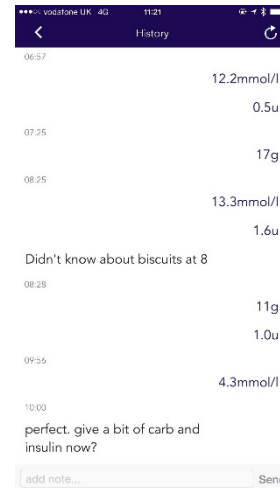
Not me !

# CGM Cost

- Libre is cheapest option but not licensed for under 18's yet but used by many children in Europe, does not warn of hypos but can see trends and patterns to tweak, huge waiting list as they were not expecting the huge demand <http://www.freestylelibre.co.uk/>
- Dexcom G5 is being launched – it has the ok in Europe and is due out very soon. It is supposed to be cheap to rival the Libre and it is compatible with smart phones. <http://www.dexcom.com/en-GB>
- Full CGM is not cheap. Funding is really hard as now funded by NHS England rather than CCG's so what could have been seen to be exceptional circumstances may not be that exceptional if NHS England seeing many similar applications.
- All about reimbursement in Europe and the UK and many other European Countries, as yet, do not have reimbursement agreed.
- Good website to find out more details re pumps, CGM and glucometers in UK: <http://www.inputdiabetes.org.uk/>

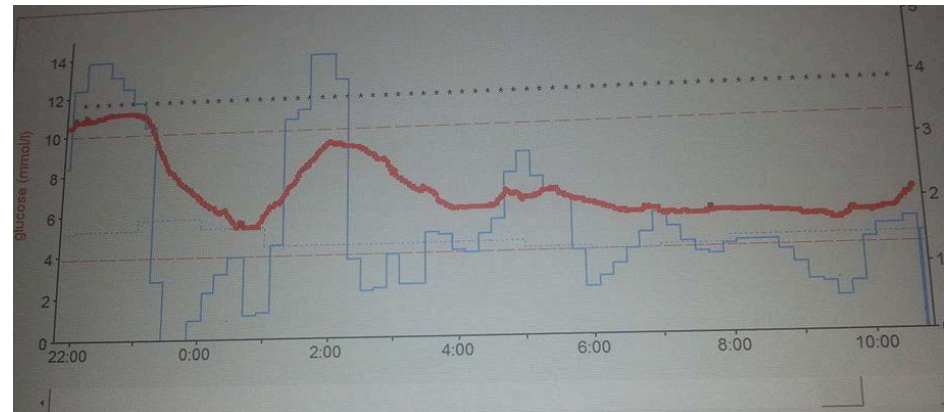
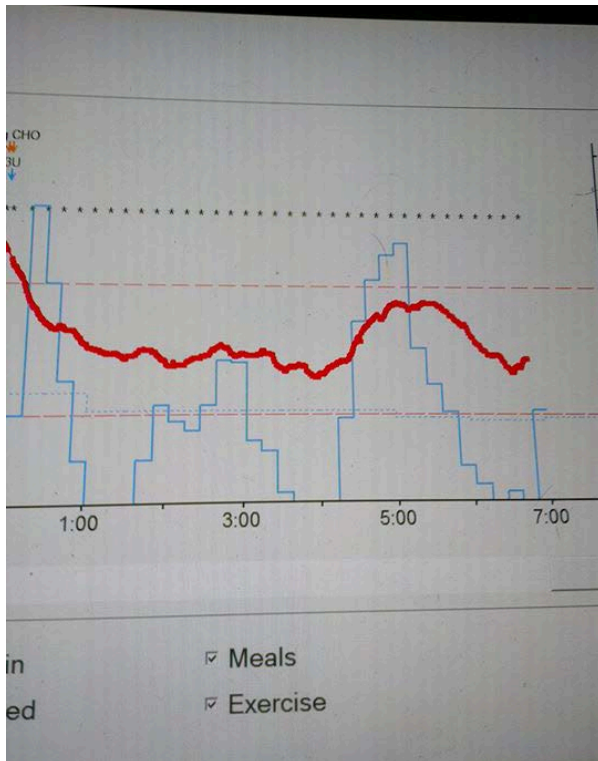
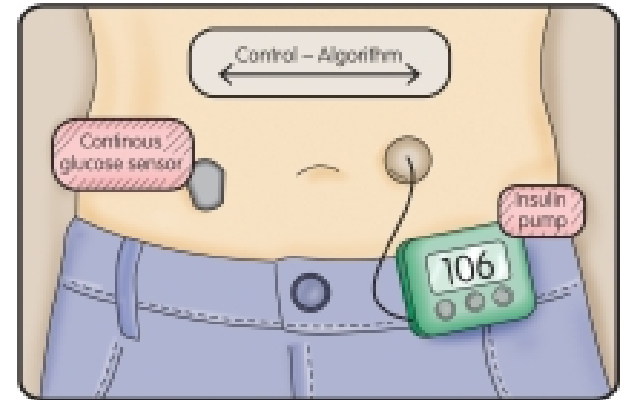
# Smart phones / tablets

- Apps
- Mumoactive app
- <http://mumoactive.com/>
- Nightscout
- <http://www.nightscout.info/>  
#Wearenotwaiting
- Carbs & Cals
- <http://www.carbsandcals.com/>



# Closing the loop

## The Artificial Pancreas



# Which gadget in which country ??????

- ▶ Started asking friends who live in other countries
- ▶ Responses from others living in Australia, Italy, France, Spain, South Africa, USA, Germany
- ▶ Pretty much all said same makes and models – slightly different in USA

## Spain

Pumps :  
Medtronic Paradigm Veo  
Animas Ping  
Accu-chek Espiritu Combo  
Omnipod but not many

Glucometers :  
Aviva Expert, Contour Link,  
Glucomen LX Plus, Optium Neo  
LifeScans – pretty much all that  
you can get in the UK

CGM :  
Medtronic, Dexcom and Abbot's  
Libre

# The End

