



Dr Helen Lunt

Diabetes Physician
Clinical Associate Professor,
University of Otago,
Christchurch



Mr Rab Burtun

Diabetes Nurses Specialist
Waitakere Hospital, Waitemata
DHB

Thursday, August 11, 2016

(Room 3)

8:30 - 10:30 WS #5: Starting Insulin in Primary Care

11:00 - 13:00 WS #11: Starting Insulin in Primary Care (Repeated)

The Diabetes Nurses Team

Diabetes Nurse Specialists (Educators)

Waitakere (Tel :021813629)

- *Rab Burtun*
- *Margaret Dempster*
- *Jenne Pomfret*

North Shore (Tel:021815463)

- *Lisa Sparks(Team Leader)*
- *Coral Skipper*
- *Nicola Holmes*
- *Ligy Abraham*
- *Lynn Randall*
- *Shellie Burnett*
- *Joanna Naylor*
- *Mahala Ensor*
- *Narrinder Shergill (Research)*
- *Judith Wallis (Research)*

Where do we start??????????



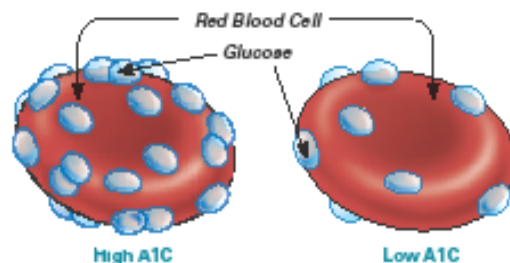
Dear Dr

➤ Thank you for seeing Mr Tough guy who is a 48 yrs old builder.

- Type 2 for 8 yrs ,on
- Metformin 850 mg bd
- ,Glipizide 10 mg bd ,
- Hba1c is :99mmol/mol(11.2%.)
- Says he take his pills everyday.
- Does not monitor BS says he feels well.
- Has Hypertention ,Hyperlipedemia ,microalbuminuria, early retinopathy was found at last retinal screening.
- Smokes 20 cigs a day.
- Very reluctant to go on Insulin.
- Used to be rugby player. Stopped about 7 yrs ago.
- Says he can beat Diabetes!!!

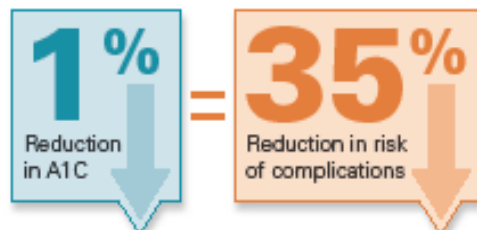
How to prevent complications?

What is A1C?



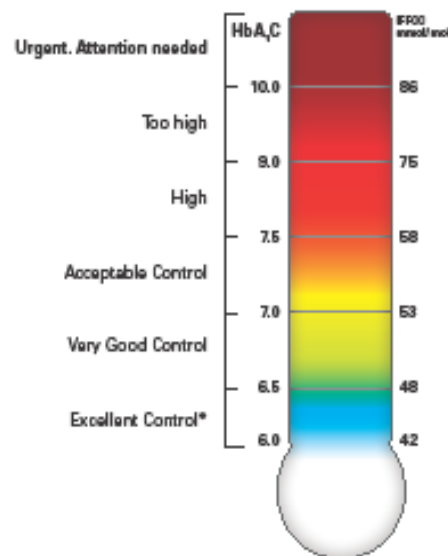
Work on your A1C

American Diabetes Association.
Implications of the United
Kingdom prospective diabetes
study. *Diabetes Care* 2003;
26(Suppl. 1): S28-32



Diabetic Control

HbA_{1c} Thermometer

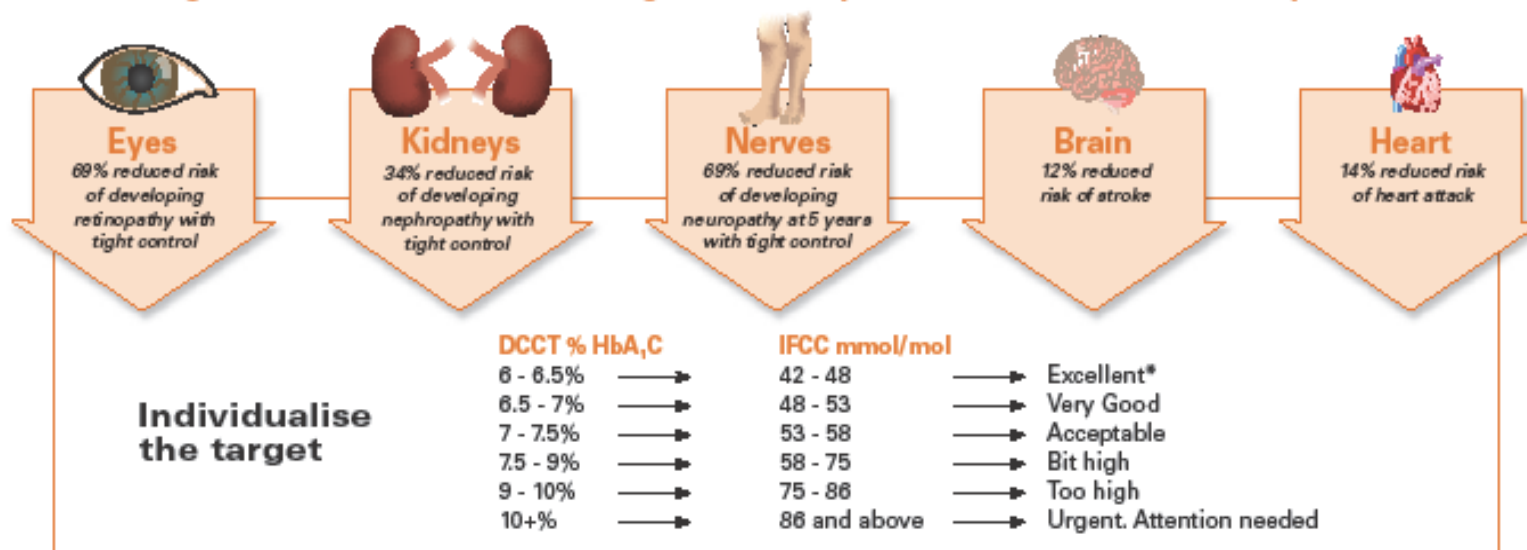


*The targets for everyone is less than 7% or 53 mmol/mol though targets should be individualised. **Caution should be taken with targets lower than 7 for those on insulin and sulphonylureas due to risk of hypoglycaemic events.**

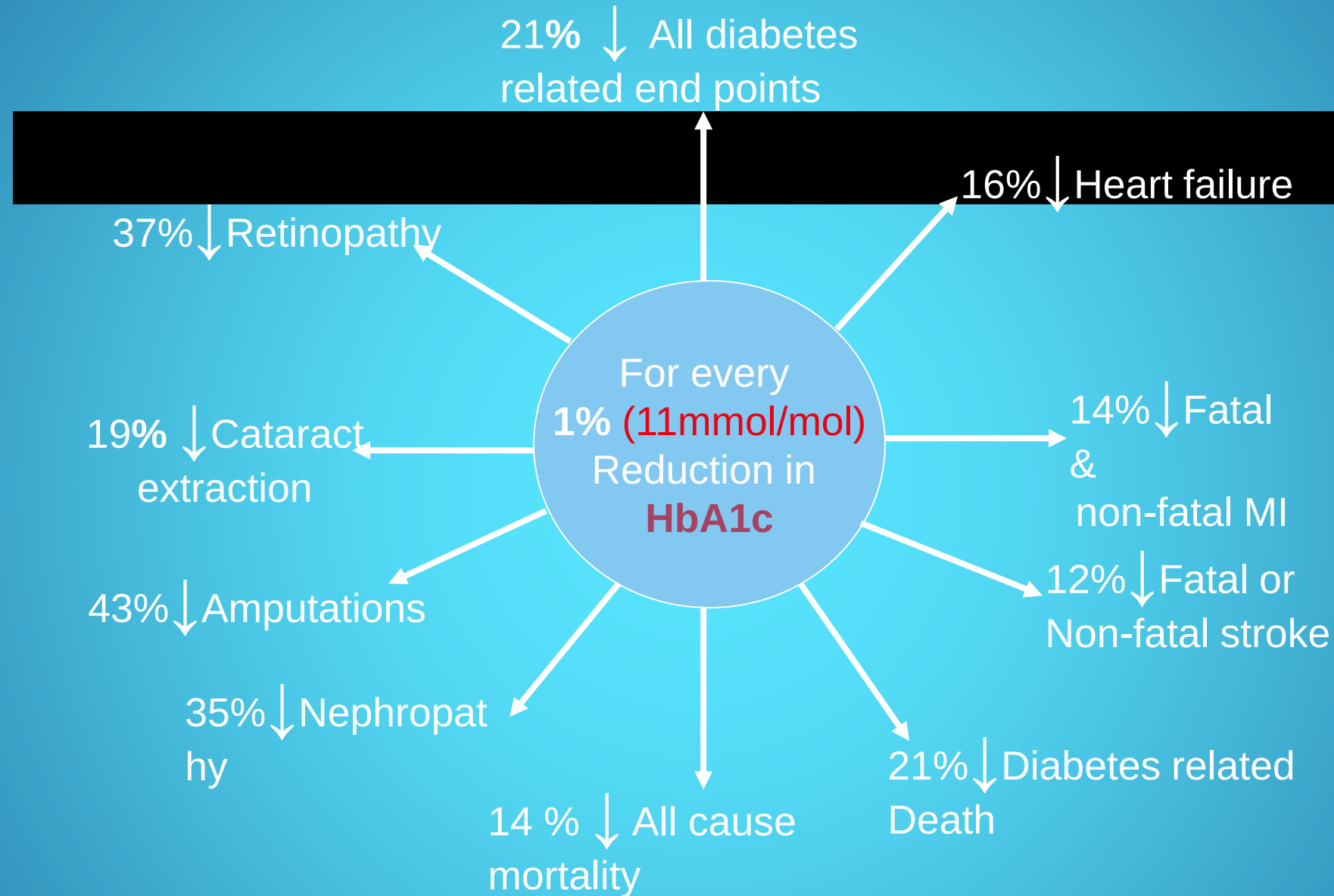
HbA_{1c} is the best test of overall diabetic control.

If your HbA_{1c} is 8% or 64 mmol/mol or more, please contact your nurse or doctor.

Being in control or intensive management* can prevent diabetes-related complications



Developed by:
Rob Burton,
Diabetes Nurse
Specialist



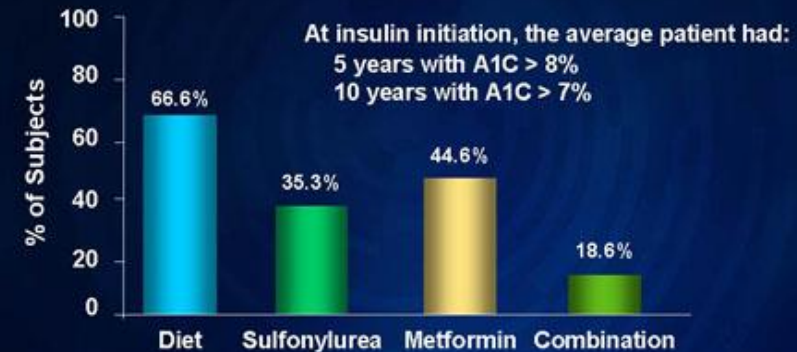
Progressive nature of Diabetes

- **Before insulin initiation, patients may have spent an average of about 5 years with an A1C >8% or 64 mmols/mol and nearly 10 years >7% or 53 mmol/mol**
- **At diagnosis, up to 50% of a patient's β -cell function may have been lost, and may continue to decline by about 4% annually**
- **Remind patients that diabetes is a progressive disease and that their treatment plans may be adjusted over time. An overall treatment plan to lower A1C consists of diet, exercise, and diabetes medication, which may include insulin.**
- **50% of Type 2 needs to go on Insulin within 7 yrs (UKPDS)**
- **Let patients know fear of insulin is not uncommon. Help them understand the facts about insulin therapy**

Clinical Inertia:

"Failure to advance therapy when required"

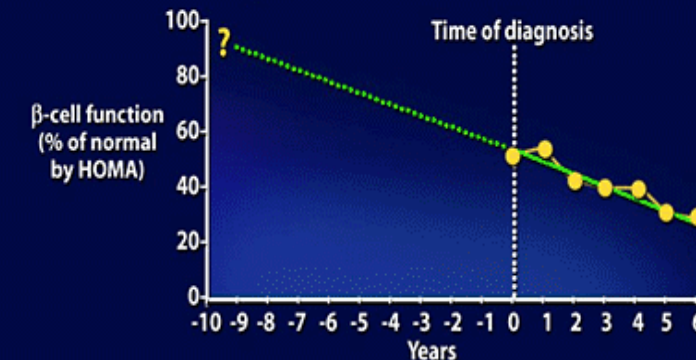
Percentage of subjects advancing when A1C > 8%



Brown JB et al. *Diabetes Care*. 2004;27:1535-1540.

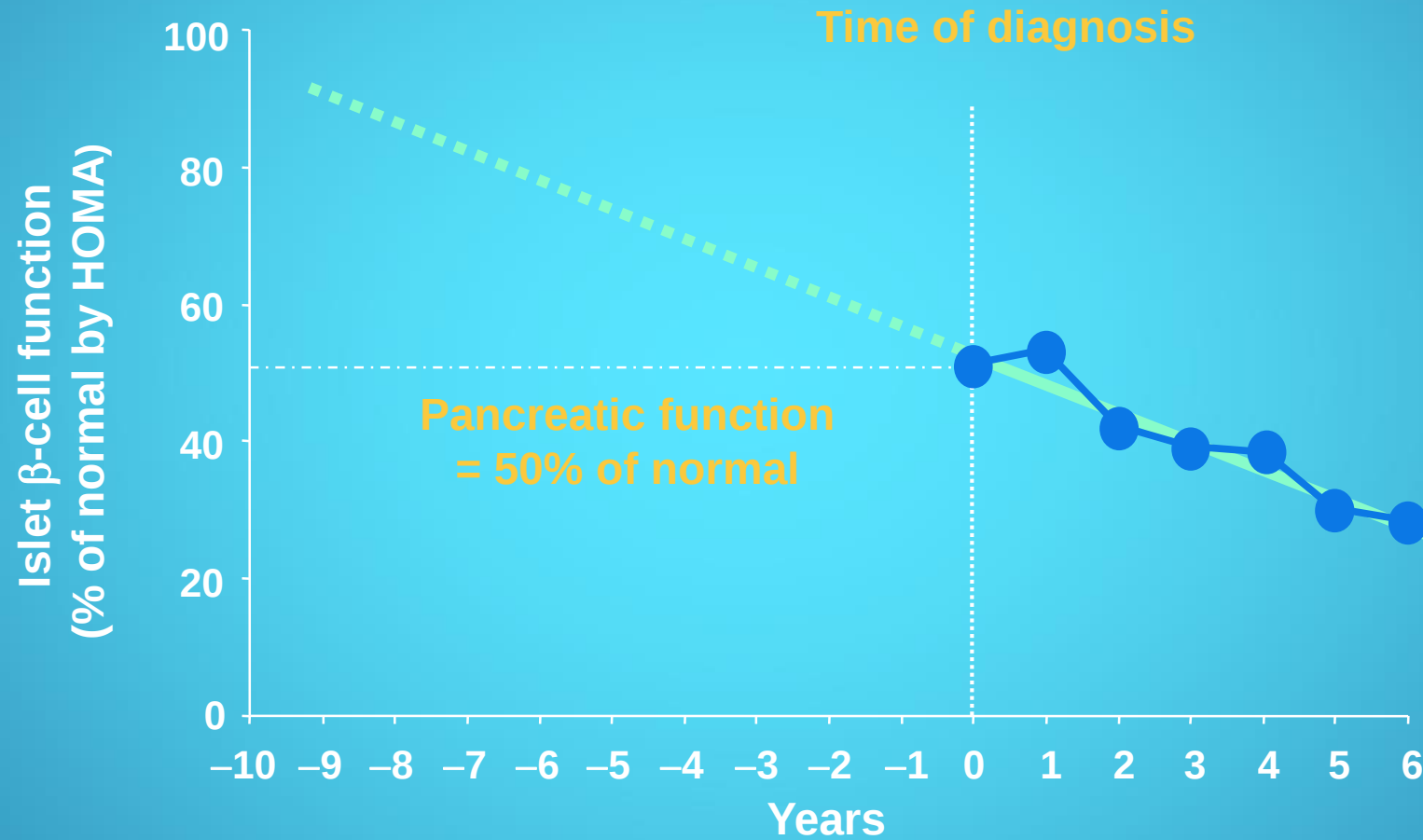


Decline of β -Cell Function in UKPDS Illustrates Progressive Nature of Diabetes



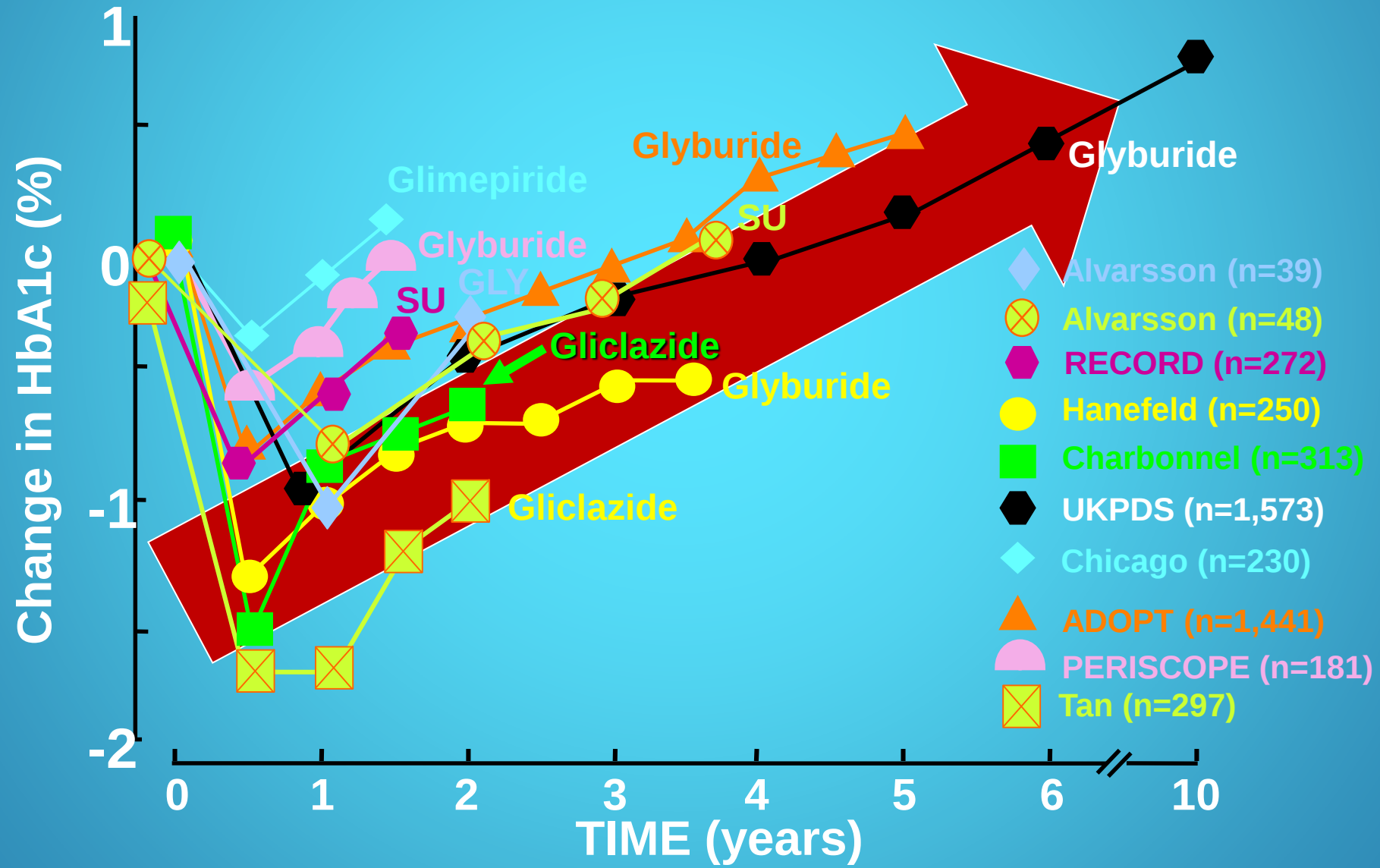
Adapted from Holman RR. *Diab Res Clin Pract*. 1998;40(suppl):S21-S25.

UKPDS: Islet β -cell function and the progressive nature of diabetes



HOMA = homeostasis model assessment

DURABILITY OF GLYCEMIC CONTROL WITH SULFONYLUREAS



Many factors contribute to fears of insulin!!

Cost? the pen looks nice and expensive!
!can I afford that??

Disease getting worst!!
Some people have morphine injections

Hypoglycaemia!! Seen friend or neighbour call ambulance!!
Fitting!! Was scary!!

Pain!!does it go into a vein??Seen it on TV Huge needle and drug addicts have to find a vein!!Too complicated!!



Its forever!!
Addiction??
Once you on it you stay on it ??
Cultural beliefs :is it from

Lifestyle change!!
Travel/work/beer ?? Will I still be able to go out and have sweets puddings etc??

Insulin causes complications!!Aunt Nelly was well into her 80s until she went on Insulin she was dead after 3 months on Insulin

Personal failure!!!
am a loser !!why I cant beat this ???!!Why have I failed???

Continued!!

- **Failure??**

- Reframe the perception of failure and self-blame.
- Educate patients that insulin helps to replace what the body isn't adequately making to lower blood glucose
- Remind your patients that insulin may be an appropriate choice for them since it is effective at lowering A1C when added to an overall treatment plan
- Educate patients about what they can do by making healthy food choices and increasing their physical activity .Address problem of SNACKS or eating in between meals ??????

- **Lifestyle change**

Many patients believe that taking insulin will greatly disrupt their lives.

- Inform patients that insulin may help control blood glucose and lower A1C1
- Present insulin as another effective option to add to their daily diabetes management routine
- Patients may find that insulin can become a normal part of their routine

- **Pain**

If fear of pain is deterring your patient from taking insulin, consider the following:

- Insulin is injected in the fatty layer just under the skin where there are fewer nerve endings and injections generally cause little discomfort
- Tell patients that many people on insulin are surprised by how soon they get used to the injections
- **Get Partner or Friend ,parent or Children to try needle first!**
- **Provide information about insulin benefits, Would sleep better, have more energy, not feel constantly tired, low mood, thirsty, thrush in women!!!, improve erectile dysfunction in men!!!!**

The higher the Hba1c is when Insulin is started the more weight is gained which makes sense .The more the the Glycosuria is the more calories they will keep when Insulin is started .

Hba1c when Insulin started	Weight Gain
12% (108 mmol/mol)	5-10 kg
10% (86 mmol/mol)	3-6 kg
7.5% (58 mmol/mol)	0.5-1kg

Weight Gain....Why?

- ☐ Decreased glycosuria
- ☐ Due to improved BG control
- ☐ Aggressive or over-tx of hypoglycemia
- ☐ Defensive eating to prevent hypoglycemia

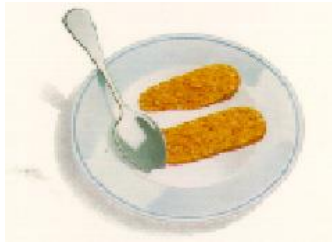
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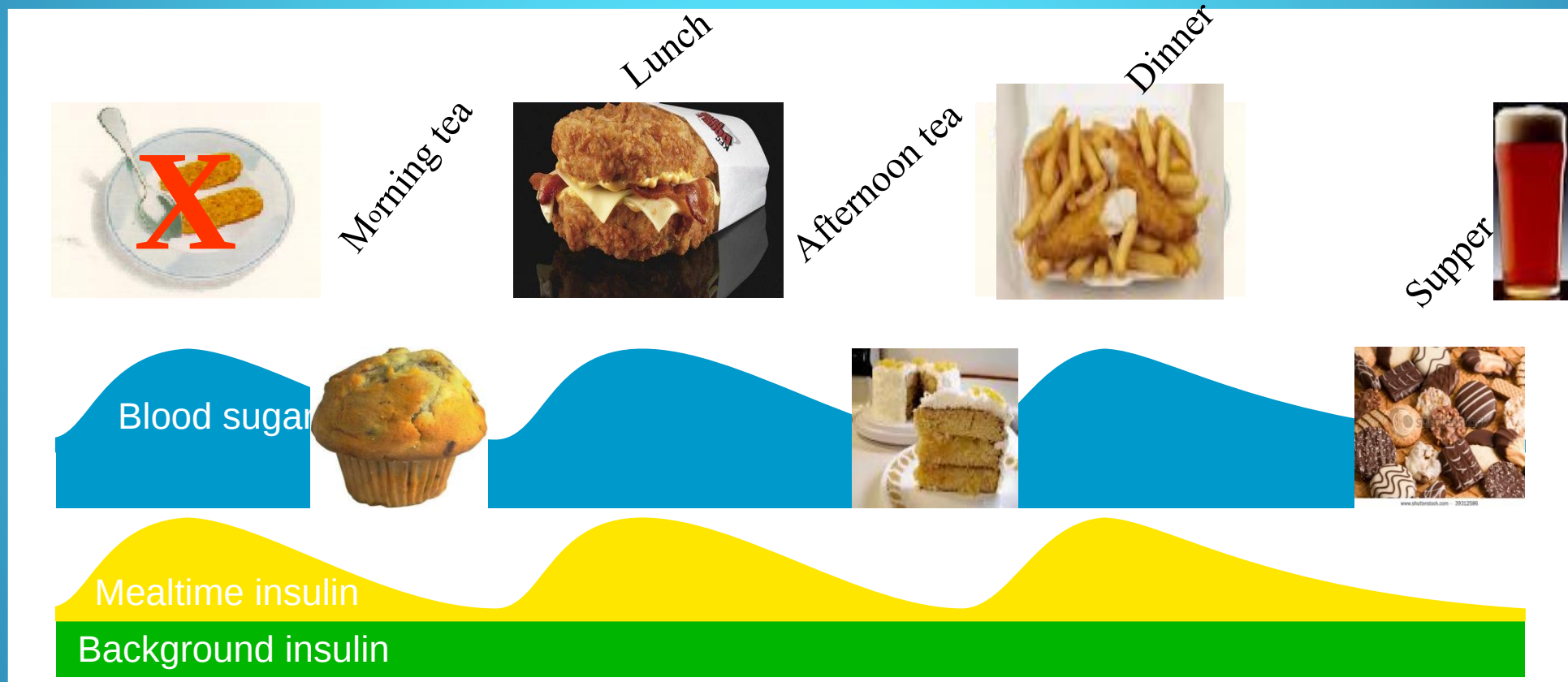
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Normal Insulin Profiles



ABNormal Insulin Profiles



NOVO NORDISK DIABETES TREATMENT RANGE¹

	Brand	Presentations	Schematic Insulin Profile	Insulin Delivery Devices
Modern Insulins	NovoMix[®] 30 30% Rapid-acting & 70% Protaminated insulin aspart (lys)	FlexPen [®] 3mL Penfill [®] 3mL* Vial 10mL	 Onset: 10 - 20 minutes Peak: 1 - 4 hours Duration: 24 hours	NovoPen[®] 4 NovoPen[®] 3 Demi Glucagon Glucagen[®] HypoKit
	NovoRapid[®] Rapid-acting insulin aspart (lys)		 Onset: 10 - 20 minutes Peak: 1 - 3 hours Duration: 3 - 5 hours	
	Levemir[®] Long-acting insulin detemir (lys)		 Peak: 3 - 14 hours Duration: Up to 24 hours	
Human Insulins	Actrapid[®] Short-acting human insulin (lys)		 Onset: 30 minutes Peak: 1 - 3 hours Duration: 8 hours	
	Protaphane[®] Long-acting human insulin (lys)		 Onset: 1.5 hours Peak: 4 - 12 hours Duration: Up to 24 hours	
	Penmix[®] 30 & Mixtard[®] 30 30% Short-acting & 70% Long-acting human insulin (lys)		 Onset: 30 minutes Peak: 2 - 12 hours Duration: Up to 24 hours	
	Penmix[®] 40 40% Short-acting & 60% Long-acting human insulin (lys)		 Onset: 30 minutes Peak: 2 - 8 hours Duration: Up to 24 hours	
	Penmix[®] 50 50% Short-acting & 50% Long-acting human insulin (lys)		 Onset: 30 minutes Peak: 4 - 8 hours Duration: Up to 24 hours	

NovoCare[®] Customer Care Centre 0800 733 737 | www.novonordisk.co.nz

NovoMix[®] 30 (as of 1st July 2012), NovoRapid[®] and Human Insulin are fully funded prescription medicines. Levemir[®] is an unfunded prescription medicine for which charges will apply.

1. Adapted from Approved Data Sheets. In clinical practice, the duration of insulin action may be shorter or longer than the durations specified. Variations between and within patients may occur depending upon injection site and technique, insulin dosage as well as diet and exercise.

*Penfill[®] is available for use in Novo Nordisk durable insulin delivery devices.

Before prescribing please review Data Sheet available from www.medsafe.gov.nz or from NovoCare[®] Customer Care Centre 0800 733 737.

Novo Nordisk Pharmaceuticals Ltd, PO Box 51268 Pakuranga, Auckland. www.novonordisk.co.nz

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Lilly Insulin Range[®]

Brand Name ^{2,3}	Type of Insulin (generic name) / Product Description	Presentation	Schematic Action Profile ⁴
Humalog[®]	insulin lispro Rbe RAPID-ACTING	10mL vials and 3mL cartridges	Onset: 0-15 mins Peak: 1 hour Duration: 3.5-4.5 hours
Humulin[®] R	insulin neutral (Soluble) SHORT-ACTING	10mL vials and 3mL cartridges	Onset: 30 mins Peak: 2-4 hours Duration: 6-8 hours
Humulin[®] NPH	isophane (NPH) INTERMEDIATE ACTING	10mL vials and 3mL cartridges	Onset: 1 hour Peak: 4-10 hours Duration: 16-18 hours
Humalog[®] Mix25[®]	25% insulin lispro, 75% insulin lispro protamine suspension Rbe PREMIXED INSULIN LISPRO	3mL cartridges	Onset: 0-15 mins Peak: 1 hour Duration: 16-18 hours
Humalog[®] Mix50[®]	50% insulin lispro, 50% insulin lispro protamine suspension Rbe PREMIXED INSULIN LISPRO	3mL cartridges	Onset: 0-15 mins Peak: 2 hour Duration: 16-18 hours
Humulin[®] 30/70	30% insulin neutral, 70% isophane (NPH) PREMIXED INSULIN	10mL vials and 3mL cartridges	Onset: More rapid than NPH alone Peak: 2-12 hours Duration: 16-18 hours

HUMAPEN LUXURA CAN ONLY BE USED WITH LILLY 3mL INSULIN CARTRIDGES, BEFORE PRESCRIBING PLEASE REVIEW THE PRODUCT DATA SHEET.



Once-A-Day. 24 Hours.

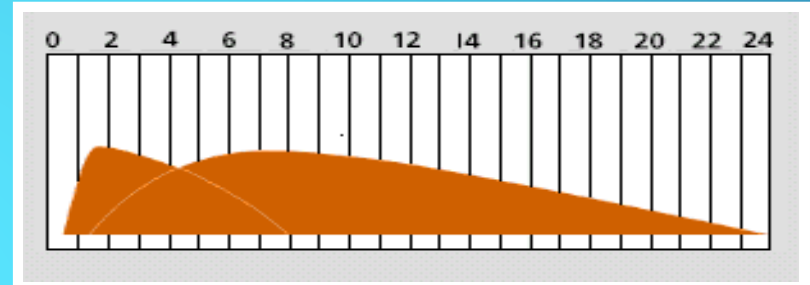


- Encourage patients to maintain recommended levels of blood glucose, blood pressure, microalbumin, and cholesterol through diligent adherence to therapy.
- Promote lifestyle changes, such as meal planning and mild-to-moderate exercise.
- Establish a schedule for timely routine screenings for diabetes-related complications.
- Advocate patient participation in diabetes self-management classes at a local -recognized diabetes program.
- Empower patients with all of the information, tools, and training necessary to successfully manage their diabetes at home.
- Reinforce the importance of the patient as the key decision maker in his/her own care but emphasize that they can always rely on the guidance of the healthcare team.
- Acknowledge that bumps in the road are to be expected, the best lessons learned are those that patients figure out on their own, and self-management of chronic conditions requires ongoing behavioural monitoring.
- Stress that the goal of the entire healthcare team is for the patient to achieve overall targets and not perfection.

Premixed Insulins/ Biphasic Insulins

Humilin 30/70(lilly) or Penmix 30/70(Novo Nordisk)

- Pre-mixed combinations of short and intermediate acting insulins (biphasic)
- Cloudy (needs re-suspending)
- 5 different combinations (30, 40, 50)
 - e.g. 30/70 Mixture = 30% fast acting + 70% intermediate acting
 - **Onset 30 minutes**
- Peak 2 - 8 hours
- Duration up to 24 hours



Type 2 Diabetes Insulin Options

- **Basal**

- NPH / Protophane at bedtime and/or a.m.
- Glargine(Lantus) once daily at any time of the day
(Now Funded for all Type 2)
- Detemir once or twice daily (*not funded in NZ*)

- **Premixed**

- Premixed once or twice a day

- **Pre Mixed Analogues** :Humalog Mix 25 ,Humalog Mix 50/50(*Injected before breakfast and before dinner*)GOOD FOR POST PRANDIALS
Novomix 30/70 : *Now Funded in New Zealand*

- **Meal-time insulin or Basal + one or Basal Plus 2**
- Multiple daily injections (meal-time + basal)

4 TREATING To TARGET IN TYPE 2 DIABETES

708
T2DM
on dual
OAD



Add biphasic insulin
twice a day

Add prandial insulin
three times a day

Add basal insulin
once (or twice) daily

Year 1
Comparison of three
single insulin regimens,
added to OADs*

Years 2 and 3
If HbA_{1c} >6.5%, stop sulfonylurea and add a
second insulin formulation

Add prandial insulin
at midday

Add basal insulin
before bed

Add prandial insulin
three times a day

* Intensify to a combination
insulin regimen in year one
if unacceptable hyperglycaemia

Three-arm trial in 708 patients with type 2 diabetes from 58 UK and Irish centres
Evaluating addition of three different analogue insulin regimens to dual oral antidiabetic therapy
Open-label randomisation to:
Twice a day biphasic insulin (NovoMix 30)
Three times a day prandial insulin (NovoRapid)
Once a day basal insulin (Levemir) before bed, with a morning injection added if necessary

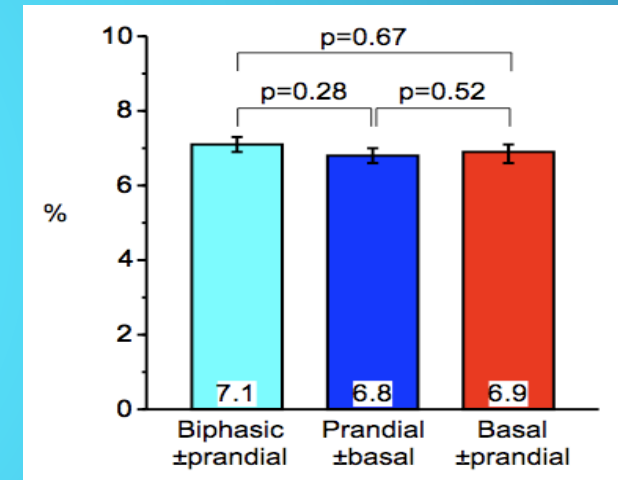
Results Comparisons

Results – Harms:

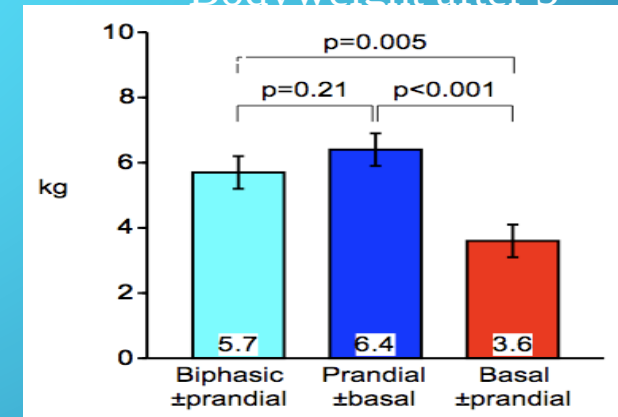
- **Basal Insulin:** gained less weight than those in the biphasic or prandial insulin groups
- **Weight gain in Kg**
 - Basal +1.9 kg
 - Bi-Phasic + 4.7 kg and
 - Prandial + 5.7 kg, $P < 0.001$).
- The weight gain was significantly higher in the prandial group than the biphasic group ($P = 0.005$).
- **Basal group:** significantly less likely to experience more severe hypoglycaemia than those in the biphasic or prandial groups (median: 0, 3.9 and 8.0 events per patient per year).

Results – benefits:

- The reduction in HbA1c from baseline:
 - 1.3% in the **biphasic** group,
 - 1.4% in the **prandial** group
 - 0.8% in the **basal** group
- Hba1c after 3 yrs

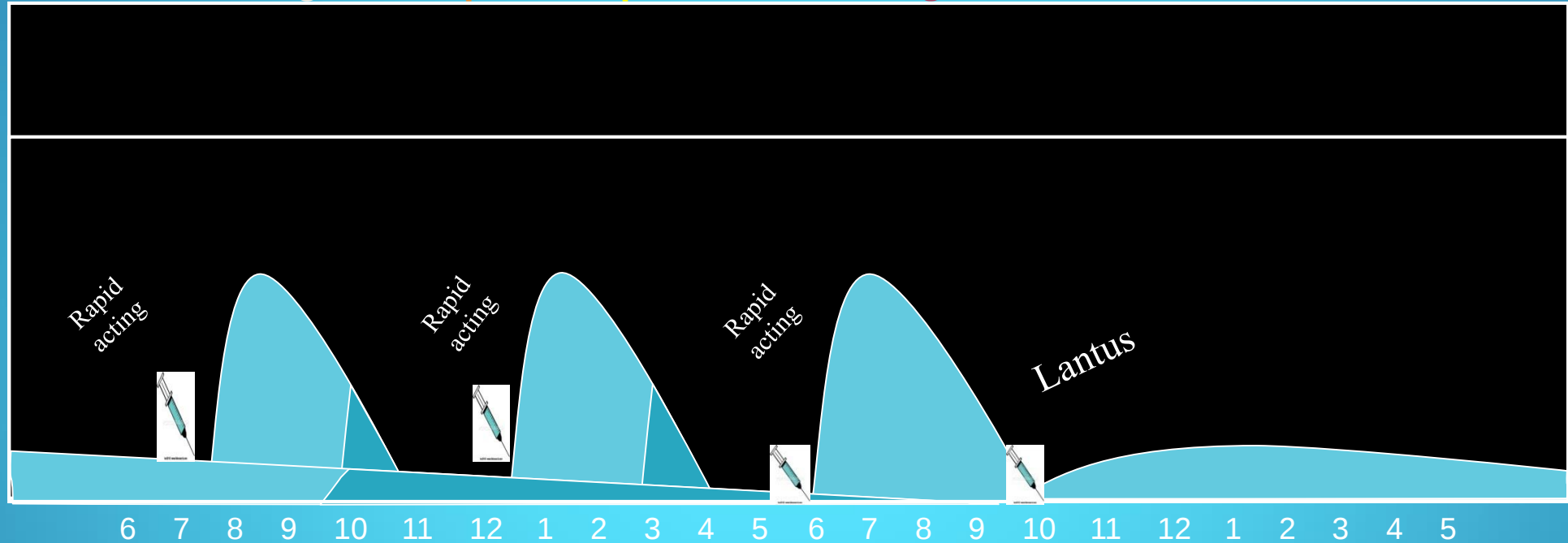


Bodyweight after 3



4 Injections Per Day
3 rapid acting + 1 long Acting
(Basal Bolus)

using Novorapid or Apidra or Humalog and Lantus



Breakfast



Lunch



Evening Meal



Sleep

Background



Dose Addjustment For Normal Eating

5 day structured education for type 1 diabetes

Self management, confidence and competency

Started in UK in 2000 (Scotland in 2005)

BMJ 2002; 325; 746-751

DAFNE

- **Beginnings in Germany**

- A five day structured training program was created in Germany in the 1980s. It was designed by the diabetes team at the Diabetes Centre in Dusseldorf, led by the late Michael Berger. This inpatient program focused on intensive insulin therapy and the self-management of type 1 diabetes (references 1 - 3).
- The educational approach is based on the Assal model of "therapeutic education" (4). People learn to match their insulin dose to their food on a meal-by-meal basis. The aim is that they can keep healthy blood glucose control without a higher risk of severe hypoglycaemia. They can then continue this with minimal support from their diabetes team.

- **Across to the UK**

- In 1998, the Dose Adjustment For Normal Eating (DAFNE) Project in the UK looked at creating a course based on the Dusseldorf model. The main change was that people would attend the course on an outpatient basis (5). A similar outpatient course was developed in Graz, Austria, led by Thomas Pieber (6). The Austrian course produced equally successful 12-year outcomes to those shown by the Dusseldorf model in Germany (7). This approach has now been widely adapted and developed across Europe.
- The UK-based DAFNE Study Group translated the curriculum and carried out a randomised controlled trial of the Dusseldorf approach. The results showed significant improvement in glycaemic control, without increased risk of severe hypoglycaemia. Participants' quality of life and treatment satisfaction were also significantly improved (5). Over 15,000 people with type 1 in the UK have now done a DAFNE course.

- **Down under to Australia**

- Diabetes teams from Victoria, Queensland and Western Australia visited the UK for DAFNE Educator training in November 2004. These teams started to run DAFNE courses in Australia for people with type 1 diabetes in 2005. Over 2000 people have now completed the course in Australia.
- In Australia, we call the program "OzDAFNE". There are now OzDAFNE courses in most Australian states. DAFNE has also spread to nearby countries like New Zealand and Singapore. You can find your nearest centre [here](#).

DAFNE – Dose Adjustment for Normal Eating for Adults

- 5 day structured training programme
- 4-5 injections a day
- 4-5 blood tests a day
- Free diet
- Insulin dose to match carbohydrate intake
- Reduce HbA1c
- Improved QOL



DAFNE Timetable

Monday	Tuesday	Wednesday	Thursday	Friday
09.15-09.45 AR Introduction	09.15-10.30 AR/RA Group Discussion: Individual blood glucose levels	09.15-10.30 AR/RA Group Discussion: Individual blood glucose levels	09.15-10.30 AR/RA Group Discussion: Individual blood glucose levels	09.15-10.30 AR/RA Group Discussion: Individual blood glucose levels
09.45-10.45 AR What is diabetes?				
<i>10.45-11.00 Coffee</i>	<i>10.30-10.45 Coffee</i>	<i>10.30-10.45 Coffee</i>	<i>10.30-10.45 Coffee</i>	<i>10.30-10.45 Coffee</i>
11.00-12.30 AR Nutrition 1 Identify carbohydrates	10.45-12.30 AR Nutrition 2 Putting carbohydrate estimation into practice	10.45-12.30 AR Nutrition 3 - Food Packaging - Recipes	10.45-12.30 AR Nutrition 4 - Alcohol - Eating out - Healthy eating/ weight control	10.45-12.00 SC Annual review and screening
				12.00-13.00 SC Questions For The Doctor
<i>12.30-13.30 Lunch</i>	<i>12.30-13.30 Lunch</i>	<i>12.30-13.30 Lunch</i>	<i>12.30-13.30 Lunch</i>	PUB!!
13.30-15.00 RA Self monitoring	13.30-15.00 RA DAFNE insulin adjustment	13.30-15.00 RA HYPOGLYCAEMIA (Relatives/partners welcome)	13.30-15.00 RA Sick Day Rules	14.00-15.00 RA + AR Quiz
				15.00-15.30 RA + AR Evaluation and follow up arrangements
<i>15.00-15.15 Coffee</i>	<i>15.00-15.15 Coffee</i>	<i>15.00-15.15 Coffee</i>	<i>15.00 – 15.15 Coffee</i>	<i>Close</i>
15.15-16.15 RA All about insulin	15.15-16.15 RA Insulin injection technique	15.15-16.15 RA Managing physical activity	15.15-16.15 RA Social aspects (Pregnancy, travelling, driving and insurance)	
16.15-17.00 RA/AR Group Discussion: Individual blood glucose levels	16.15-17.00 RA/AR Group Discussion: Individual blood glucose levels	16.15-17.00 RA/AR Group Discussion: Individual blood glucose levels	16.15-17.00 RA/AR Group Discussion: Individual blood glucose levels	

Process of Carbohydrate Counting

◆ Lunch

- 2 slices wholemeal bread = 30g
- Packet of crisps = 15g
- Total 45g
- 1 unit per 10g = 4.5 units of insulin



◆ Main meal

- ◆ 4 Roast Potatoes = 40g
- ◆ Small Yorkshire pudding = 10
- ◆ Total = 50
- ◆ 1 unit per 10g = 5 units of insulin



- Dinner BS is 16.9 mmols
- Correction will be : $16.9 - 7(\text{Target BS}) = 9.9$ mmols over target
- If 1 unit of Novorapid lowers BS by 3 mmols
- $9.9 \text{ divide by } 3 = 3.3$
- Therefore at lunch I will need to take 5 units for my 50 grams of carbs + 3 units correction = Total to inject 8 units .
- Only correct at mealtimes and bed
- Do not correct in between meals to avoid stacking of insulin causing hypos .
- Calculate carbs + correction . Take insulin and eat.
- IF exercise depending how intense will need to reduce insulin by 30-60%
- CP = Carb portions
- QA=Quick acting
- BI=Basal Insulin

DAFNE Targets



Target Blood Glucose Levels (mmol/l)	
Before Breakfast	5.5 – 7.5
Before Other Meals	4.5 – 7.5
Before Bed	6.5 – 8.0

HbA₁C = 6.0 – 7.0%

Evidence



- 0.5 % reduction in HbA_{1c}
- Improvements in QoL
- No increase in hypoglycaemia
- No weight gain

BMJ 2002; 325; 746-751

NICE Guideline 60, Diabetes UK report



Course exceeded expectations and is highly recommended. Fantastic opportunity to go back to the beginning and reassess all aspects of diabetes control.

Thank you for persuading me to attend. I had been apprehensive but feel that I have benefitted hugely from the course.

The course has given me confidence to not let diabetes rule my life as much as it currently is.

What a positive week! I learnt more in a week than the past 30 years. No lecturing or negativity. Great week!

The DAFNE course is fantastic! I feel completely refocused and am now equipped to take control of my diabetes instead of it controlling me!

Eight DECADES OF DIABETES

SUCCESS RECOGNISED

Waitakere Hospital diabetes nurse Rab Burtun always thought (**now 87yrs**) Winsome Johnston deserved a medal – so he set about ensuring his inspirational patient receive just that.

On 12 September Mrs Johnston will be the first New Zealander to be awarded the Diabetes UK Macleod Medal for living successfully with insulin-dependent Type 1 diabetes for more than (**81 yrs**) She will also receive Diabetes New Zealand's Sir Charles Burns Memorial Award.

“I tell my patients about Win's story every day. She's living proof that it's possible to live long and well with diabetes. She's an inspiration to everybody – me included,” Rab says.

A Type 1 diabetic himself, Rab was diagnosed 30 years ago and wrote to Diabetes UK last month to share Winsome's story because of the motivation and encouragement it offers others.

“She hasn't got a single complication of diabetes, she's had three successful pregnancies – one with twins -and now has eight grandchildren and two great-grandchildren.

“Pregnancy itself is an achievement for people with diabetes because their blood sugar

