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Insulin Masterclass - Strategies for Type 2 Diabetes Management - Concurrent Workshop Repeated

Friday, 16 August 2013

Start 4:30pm

Duration: 120mins

Picasso



South GP CME 2013

General Practice Conference & Medical Exhibition

15-18 August | Edgar Centre | Dunedin

Insulin Master Class

Presented by:

Prof Jim Mann

Gavin Hendry



insulin
masterclass

Workshop will contain:

- Reference guides for starting and titrating insulin
- Overview on Starting Insulin
- Insulin profiles
- Adjusting insulin Case studies and discussion
- Tricky Situations
 - Steroids
 - Sick days
 - Driving
 - Travel

New Zealand **Primary Care** Handbook 2012

Cardiovascular risk assessment and diabetes screening
Cardiovascular risk factor management
Management of type 2 diabetes

Smoking cessation

Weight management

Stroke and transient ischaemic attack

Coronary heart disease

Heart failure

Prevention of infective endocarditis

Rheumatic fever

New Zealand Society
NZSSD
for the Study of Diabetes



Kidney Health
Te Hauora

STROKE
FOUNDATION

diabetes
new zealand

Heart
Foundation

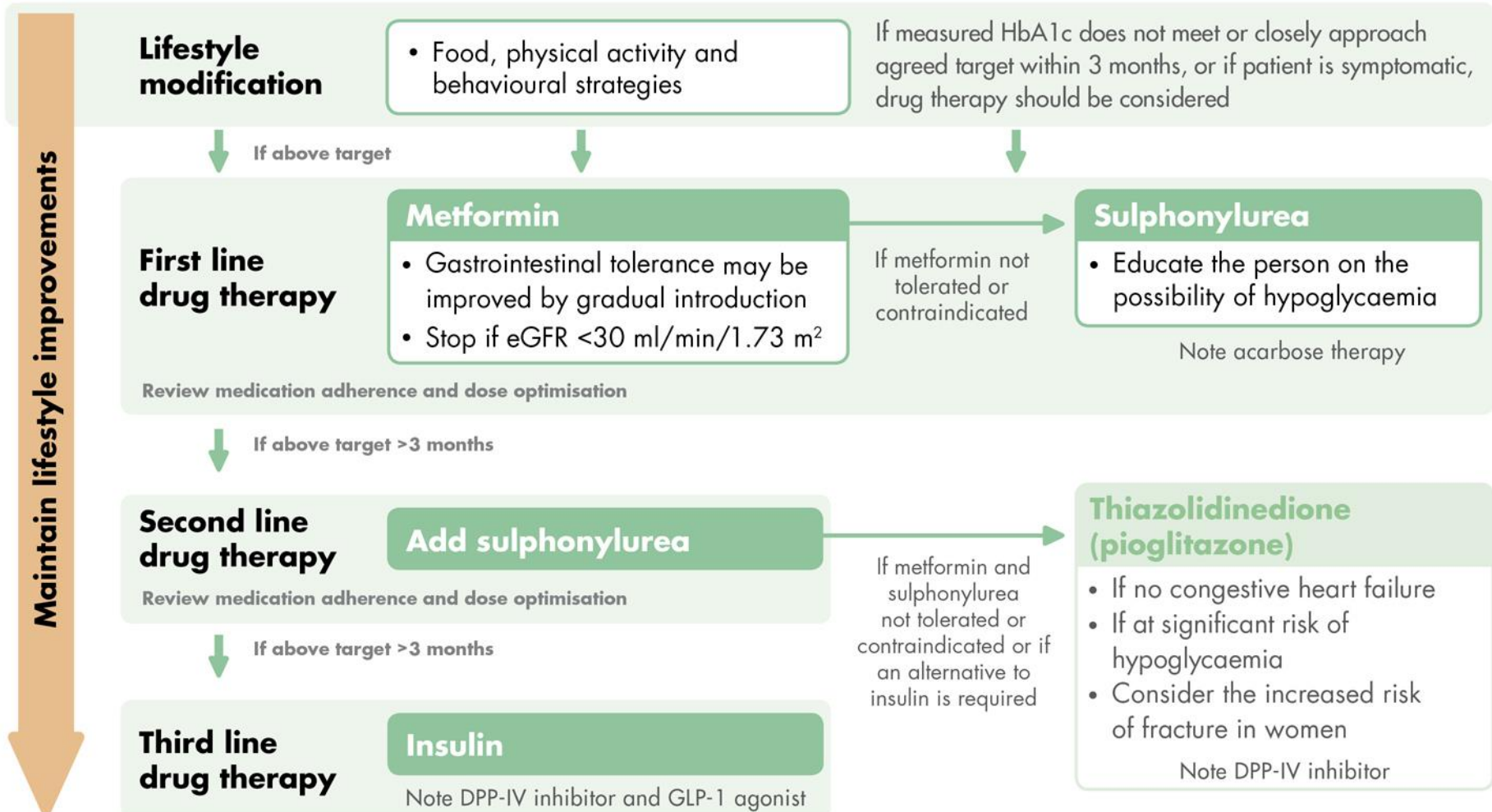
New Zealand
GUIDELINES GROUP
Te Rōpū Rarangi Tohutohu
Promoting Effective Health and Disability Services

Management of glycaemic control

- Target HbA1c 50-55 mmol/mol or as *individually* agreed
- In younger people, tighter control should be considered given their higher lifetime risk of diabetes-related complications
- Any reduction in HbA1c is beneficial

Management of glycaemic control

Target HbA1c 50–55 mmol/mol or as individually agreed



When to consider insulin therapy

Consider if:

- unsatisfactory glycaemic control (measured HbA1c does not meet or closely approach agreed target) or
- signs & symptoms of hyperglycaemia

AND

Management has included:

- diet, physical exercise and behavioural strategies
- review of medication adherence & dose optimisation.

When to consider insulin therapy *cont.*

- Also seriously consider insulin therapy if the person has an HbA1c >65 mmol/L

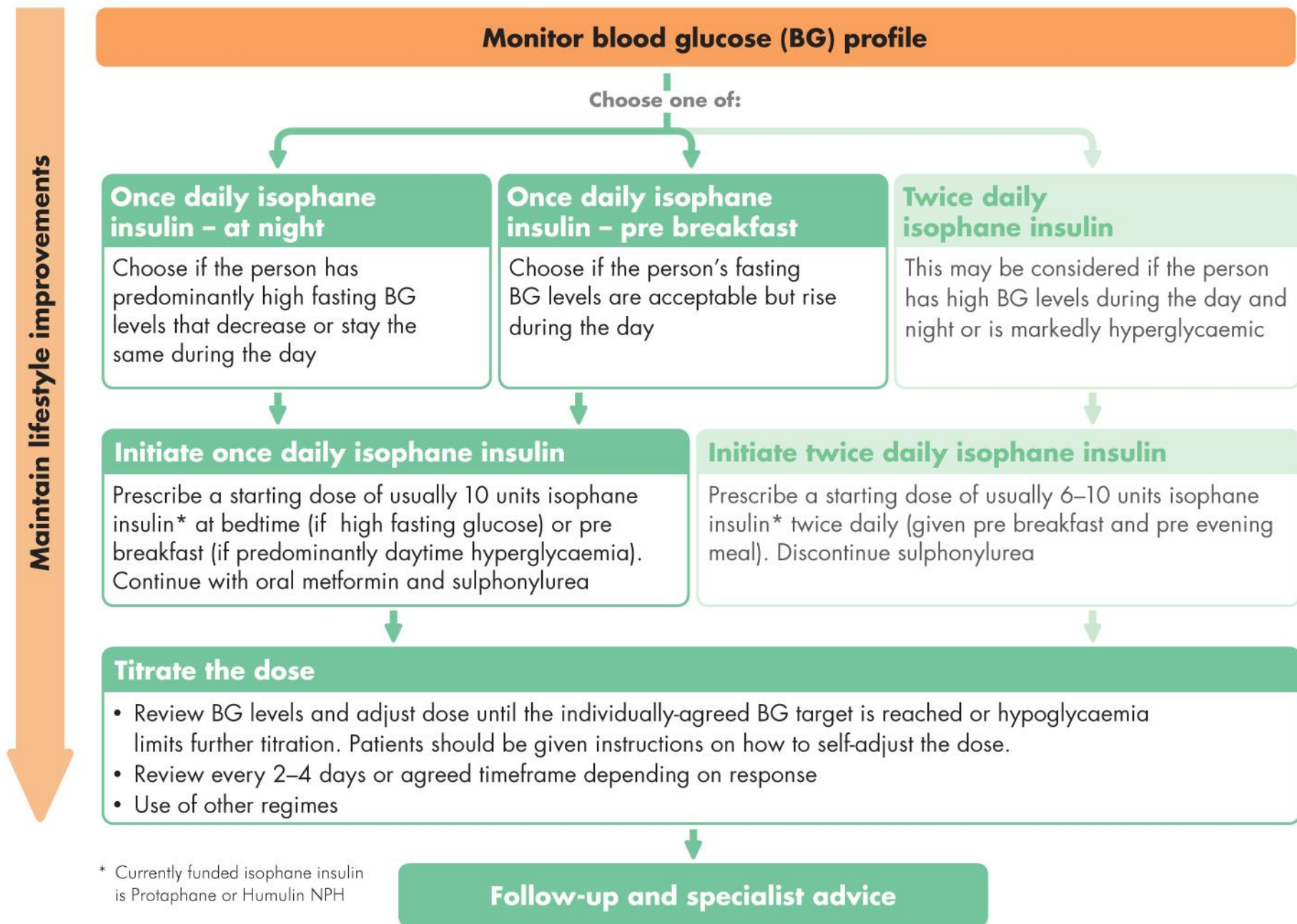
Initiating insulin in primary care

- Assess the individual's readiness for commencing insulin and address their concerns
- Start patient self-monitoring of blood glucose to assist decision-making about choice of insulin regimen
- Encourage the individual patient to take an active role in management

Remember:

- Insulin is not a replacement for a healthy lifestyle.
- It is still important to maintain a healthy lifestyle with regular exercise and appropriate food.

Initiation of insulin in primary care



Note 1

Guide to dose adjustments for initial titration

Table 1. Once daily isophane insulin – at night

Pre breakfast (fasting) BG	Insulin dose increase
Usually >8 mmol/L and never less than 4 mmol/L	Increase dose by 4–6 units
Usually 6–8 mmol/L and never less than 4 mmol/L	Increase dose by 2–4 units
Once receiving >20 units daily 3 consecutive pre breakfast (fasting) BG results higher than agreed BG target AND BG never less than 4 mmol/L	Insulin dose can be increased by 10–20% of total daily dose

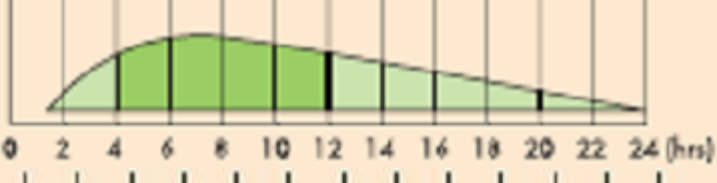
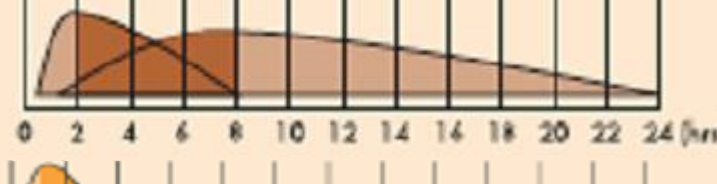
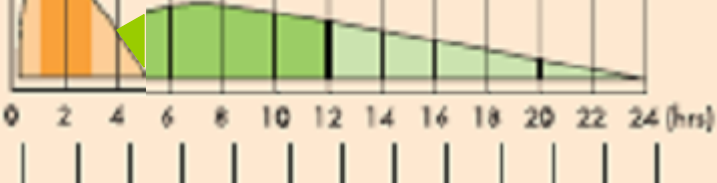
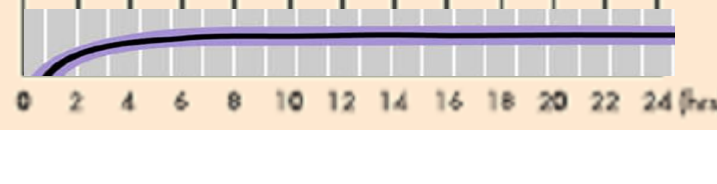
Table 2. Once daily isophane insulin – pre breakfast

Pre evening meal BG	Insulin dose increase
Usually >8 mmol/L and never less than 4 mmol/L	Increase dose by 4–6 units
Usually 7–8 mmol/L and never less than 4 mmol/L	Increase dose by 2–4 units
Once receiving >20 units daily 3 consecutive pre evening meal BG results higher than agreed BG target AND BG never less than 4 mmol/L	Insulin dose can be increased by 10–20% of total daily dose

Table 3. Twice daily isophane insulin

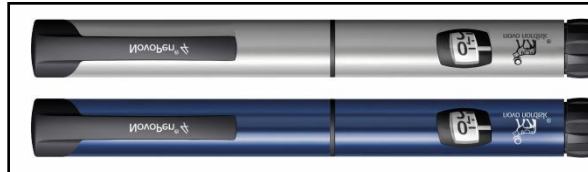
Pre breakfast (fasting) BG	Insulin dose increase
Usually >8 mmol/L and never less than 4 mmol/L	Increase night-time insulin dose by 4–5 units
Usually 6–8 mmol/L and never less than 4 mmol/L	Increase night-time insulin dose by 2–4 units
Pre evening meal BG	Insulin dose increase
Usually >8 mmol/L and never less than 4 mmol/L	Increase pre breakfast insulin dose by 4–5 units
Usually 7–8 mmol/L and never less than 4 mmol/L	Increase pre breakfast insulin dose by 2–4 units
Once receiving >20 units daily 3 consecutive BG results (either pre breakfast or pre evening meal) higher than agreed BG target AND BG never less than 4 mmol/L	Appropriate insulin dose can be increased by 10–20% of total daily dose

Insulin preparations in New Zealand

Insulin Analogues Fast Acting	Apidra Humalog Novorapid		Glulisine Lispro Aspart
Neutral (regular or soluble) Short Acting	Actrapid Humulin R		
Isophane Intermediate Acting	Humulin NPH Protaphane		
Premixed 30% Short / 70% Isophane	Humulin 30/70 PenMix 30		Also available: 40%, 50%
Premixed Analogue 25% Fast / 75% Protamine 30% Fast / 70% Protamine	HumalogMix25 Novomix30		Also available 50%
Long Acting Analogue	Lantus		Glargine

Insulin Pens

USUAL



$\frac{1}{2}$ unit



MEMORY

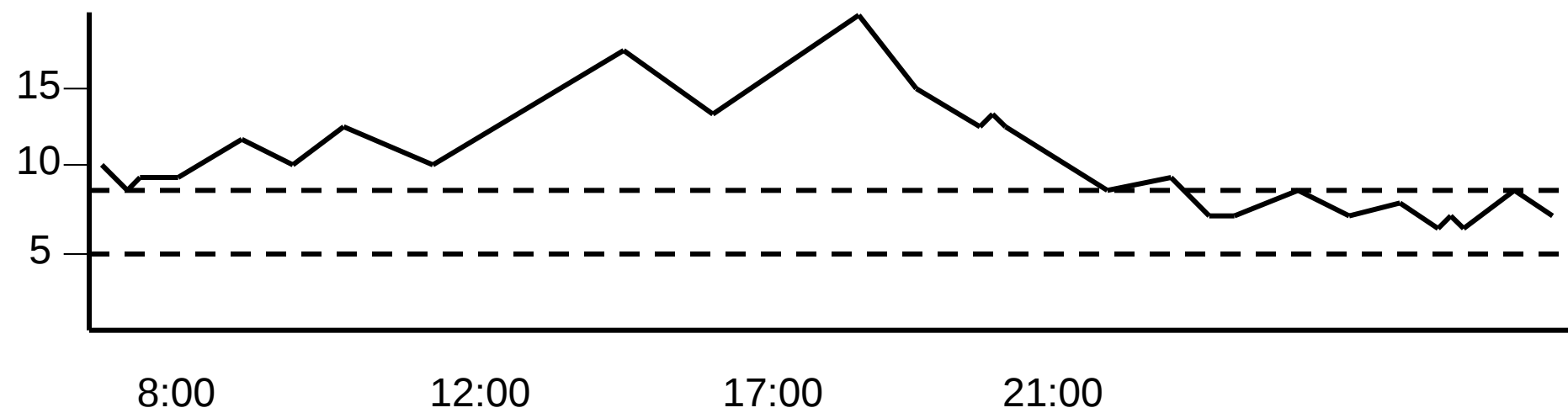


PRE-FILLED



When making insulin adjustments:

- Look for patterns in glucose levels.
- Rule out other influences before making adjustments (food, exercise)
- Which insulin has the most influence leading up to the problem time period?
- Is a dose adjustment needed or introduction of a new insulin?





8:00

12:00

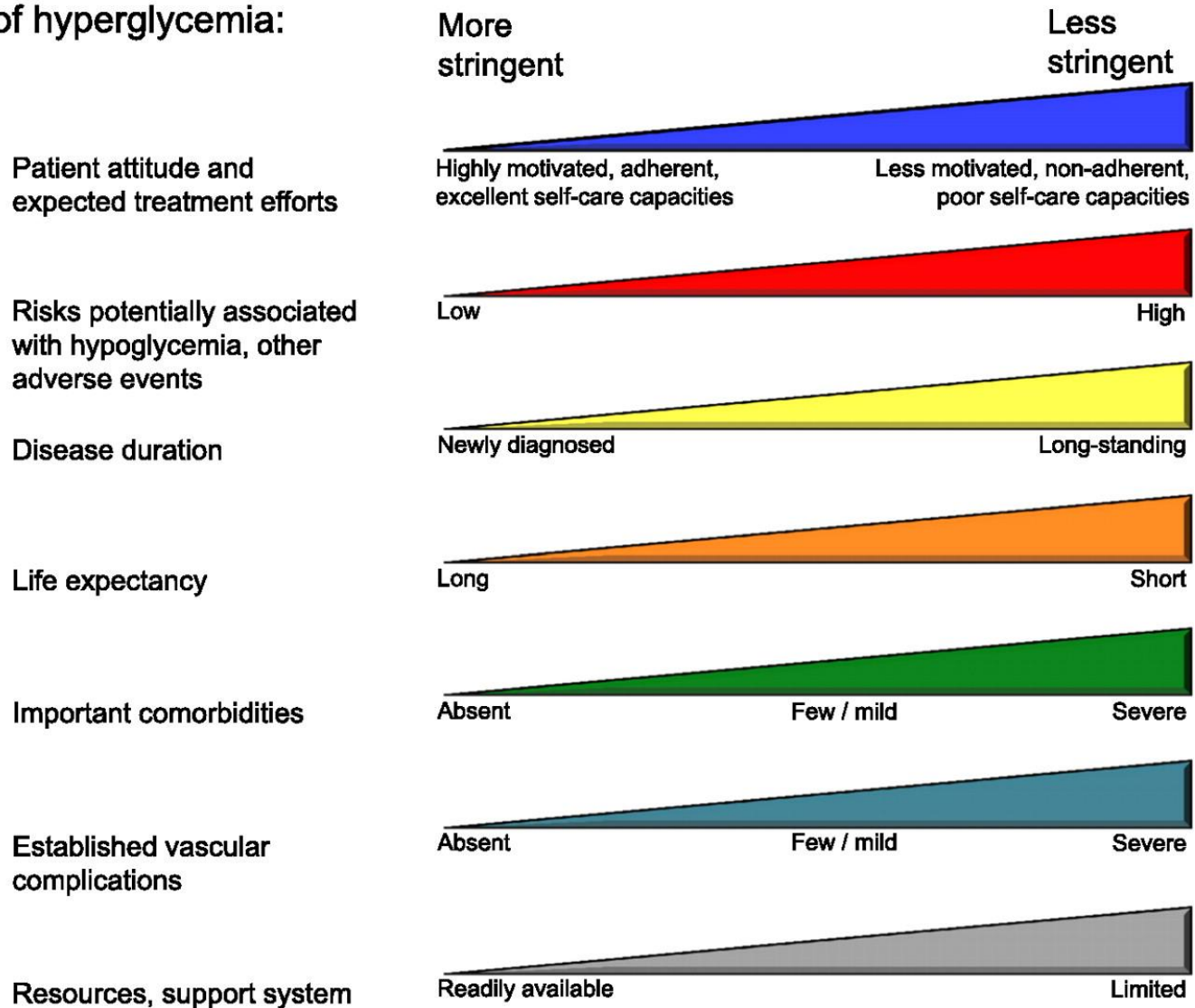
17:00

21:00

Sample Glucose Record Chart

Date	Insulin	Breakfast	Lunch	Dinner	Bed	Pre-Break	After Break	Pre-Lunch	after Lunch	Pre-Dinner	After Dinner	Before Bed or Supper	Over-night	Comments

Approach to management of hyperglycemia:



Case 1

- 56yr old female, type 2 diabetes for 8 yrs
- Started on NPH insulin 6 months ago.
Currently on 42units nocte
- Also on Metformin 850mg tds, Glipizide 10mg bd
- HbA1c has improved from 80 to 69mmol/mol
- Target HbA1c is 53

Case 1: Glucose Records.

[illegible]

Case 1 Continued

- Why is her HBA1c still not on target?
- What information do you need now?

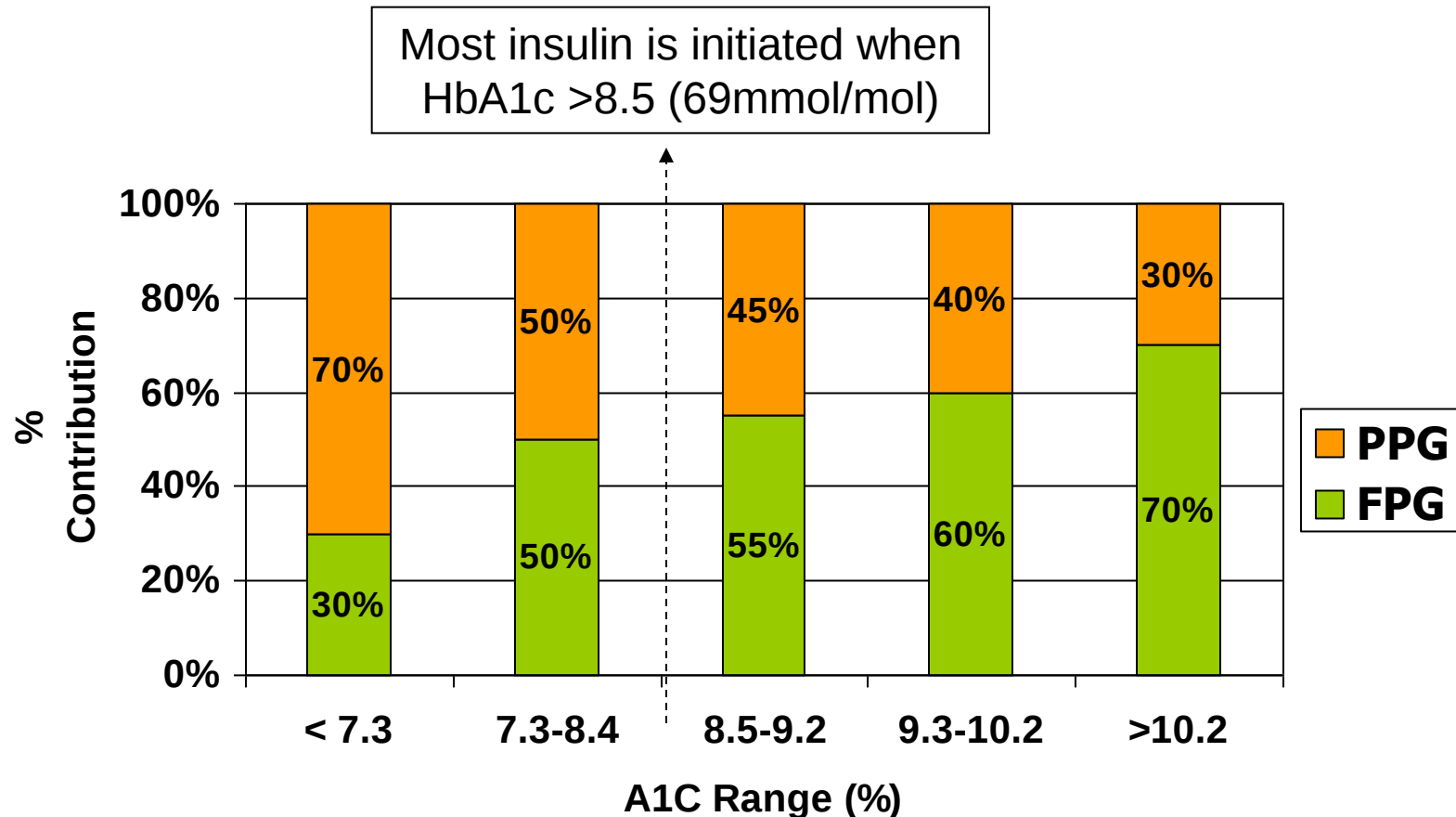
Case 1: intensive testing.

[illegible]

Case 1:Continued

- What options are there to improve her glycaemic control?

As Patients Get Closer to HbA1c Goal, the Need to Successfully Manage PPG Significantly Increases



Adapted from Monnier L, Lapinski H, Collette C. Contributions of fasting and postprandial plasma glucose increments to the overall diurnal hyperglycemia of Type 2 diabetic patients: variations with increasing levels of HbA1c.

Diabetes Care. 2003;26:881-885.

Case 2

- 68yr old female
- BMI 28, microalbuminuria (ACR 12), minor retinopathy
- Metformin 1.5g bd, Gliclazide 160mg bd, pioglitazone (Actos) 30mg daily
- HbA1c has been >90 for last 4-5 yrs
- Has been very reluctant to start insulin

Case 2 continued

- Agreed to do intensive glucose testing over a few days.

Case 2

[illegible]

Case 2: continued

- Agreed to start on daily Insulin
- What are your choices?
- Lantus 12units started and titrated up to 36units nocte.
- Pioglitazone was discontinued.

Case 2: Glucose levels after insulin

[illegible]

Case 2 Continued

- Complains that she has hypoglycaemic symptoms but Glucose levels not lower than 7 so far.
- Is she experiencing true hypo?
- What is causing the symptoms?
- What should be done now?

Case 2 Continued

- Pseudo-hypoglycaemia – True hypo symptoms in patients after lowering Glucose levels but no evidence of biochemical hypoglycaemia ($<4\text{mmol/l}$) due to higher threshold set for body's response to developing hypo symptoms.
- Vicious cycle
- Needs education to break the cycle
 - Reassurance
 - Strategies to manage pseudo episodes
 - Avoiding inappropriate correction

Sample 3

Date	Insulin	B	L	D	B	Pre-Break	Post-Break	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Pre-Supper	Over-night	Comments
1/3	NPH				28	6.2		8.6		9.5		10.3		
2/3						5.8		9.4		11.3		12.2		
3/3						7.1		8.9		10.5		11.7		
4/3						6.6		10.2		12.6		13.2		
5/3						6.7		11.0		13.0		10.9		
6/3						5.2		8.7						

Sample 4

Date	Insulin	B	L	D	B	Pre-Break	Post-Break	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Pre-Supper	Over-night	Comments
1/3	NR	6	6	8		12.2		5.6		7.8				
	Prot	16		16										
2/3						4.1		6.6		7.5		6.8	2.3	
3/3						15.1		8.2		6.4		7.5		
4/3						3.8				8.1		7.8		
5/3						16.2		7.1		6.3		6.6		
6/3						5.2		5.3						

Hypoglycaemia

WHAT level is hypo?

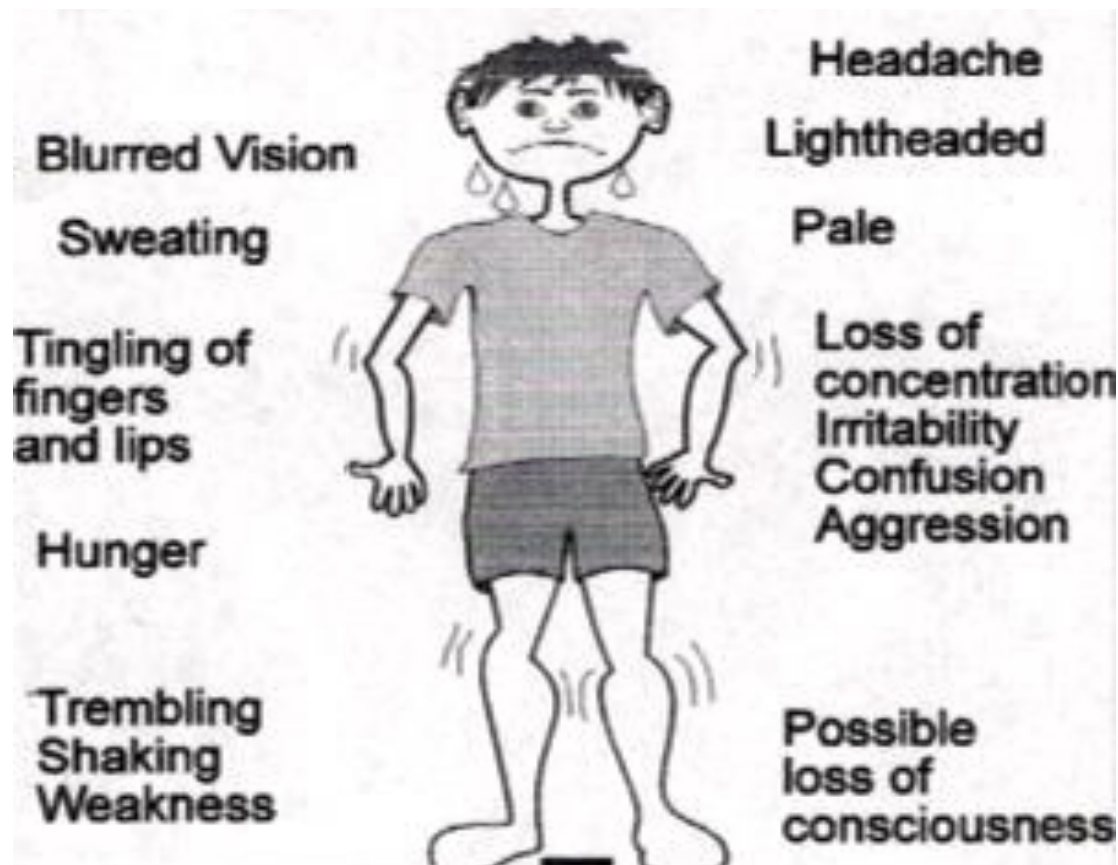
Low blood glucose (less than 3.5-4.0mmol/l)

WHY DOES IT HAPPEN?

- Not enough food / delayed food
- More activity than usual
- Too much diabetes medication
- Alcohol without food

Hypoglycaemia ctd

HOW DO YOU KNOW? Common signs and symptoms include:



Hypoglycaemia ctd

WHAT DO YOU DO? **STOP** and...

- Check blood glucose level
- 10-15g glucose e.g. 5-6 jellybeans;
2-3 glucose tablets;
 $\frac{1}{2}$ glass fizzy drink (NOT 'diet')
- Wait 5 - 10mins. Repeat steps 1 and 2 until BGL $>4.0\text{mmol/l}$.
- Have substantial snack/meal to prevent going low again e.g. 2 crackers; 1 piece of fruit; 1 slice of bread; glass of milk.

Sample 5

Date	Insulin	B	L	D	B	Pre-Break	Post-Break	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Pre-Supper	Over-night	Comments
1/3	Prot	32		22		7.2		8.1		7.8				
2/3						8.4		9.2		7.5		13.1		
3/3						6.2		7.5		5.2		9.3		
4/3						5.5				8.1		9.6		
5/3						6.8		7.3		6.3				
6/3						7.1		8.7						

Sample 6

Date	Insulin	B	L	D	B	Pre-Break	Post-Break	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Pre-Supper	Over-night	Comments
1/3	NPH	30		30		7.2		8.1		11.7				
2/3						8.4		7.2		12.5		13.1		
3/3						6.2		7.5		13.1		13.6		
4/3						5.5				12.7		12.5		
5/3						6.8		6.6		13.8				
6/3						7.1		6.2						

Case 7

- 75yr old man
- Type 2 diabetes for 12 years
- Well controlled on Metformin 850mg bd, Gliclazide 120mg bd, NPH insulin 16u at night.
- HbA1c has been around 50-55mmol/mol for the last few years.

Case 7 continued

- Diagnosed with temporal arteritis and started on prednisone 60mg mane daily.
- Last few days of glucose levels are...

Case 7 continued

[illegible]

Case 7 continued

- What adjustments are needed?
- Could this have been prevented?
- What advice should be given when starting steroids?

Case 8

- 83 year old Type 2 Diabetes for 12 years
- Lives alone
- Creatinine 145-178 eGFR 28-33
- BMI 20
- Metformin 850mg bd, Glipizide 10mg daily, NPH insulin 12units nocte
- Mild dementia, IHD, CORD
- HbA1c has been 42-50mmol/mol
- Low appetite

Sample 8

Date	Insulin	Breakfast	Lunch	Dinner	Bed	Pre-Break	After Break	Pre-Lunch	after Lunch	Pre-Dinner	After Dinner	Before Bed or Supper	Over-night	Comments
Sun										4.1				
Mon						4.2	7.2		8.2	4.2	6.9			
Tues						3.3	7.8	3.9	13.5	6.3			2.9	
Wed						9.1								
Thu														
Fri														

Case 8 Continued

- What are the issues here?
- What HbA1c would you be happy with on this occasion?

Driving

ADVICE FOLLOWING A HYPOGLYCAEMIC EPISODE FOR PEOPLE WITH DIABETES ON INSULIN AND SOME ORAL TABLETS

- Insulin doses and timing of insulin need to be assessed regularly by your G.P. , doctor in E.D., diabetes specialist or diabetes nurse specialist.
- According to Land Transport Safety Authority you are temporarily unfit to drive if you have a hypoglycaemic episode whether driving or not.
- If you have a mild hypoglycaemic episode L.T.S.A. recommend that you do not drive for 1 hour.
- If you have a severe hypoglycaemic episode i.e. when you need someone else's help to treat it, they recommend that you do not drive for 24 hours and to contact your doctor.
- If you had an accident due to a hypoglycaemic episode whilst driving they recommend that you do not drive for 30 days.



Driving cont.

- If you have a hypoglycaemic episode but have no warning symptoms, it is unwise to drive and should discuss options with your doctor or diabetes nurse specialist. You may be advised not to drive until warning symptoms return, this may be several weeks.
- If you are still allowed to drive or allowed back driving, you need to test your blood glucose levels before getting into the car to drive. If your blood glucose level is 6 mmol or more it is safe to drive a short distance. If driving a long distance you need to test your blood glucose levels every hour and maintain a level of 6 mmol or more.
- If you are allowed to drive and your blood glucose level before you drive is less than 4 mmol you should treat your low with glucose followed by a snack. You shouldn't drive again for 1 hour and until your blood glucose level is above 6mmol.



Driving cont.

- If your blood glucose level is between 4 - 6 mmol you need to either eat a carbohydrate snack or find other means of transport / find another person to drive you to your destination.
- Always carry with you and in your car:
something to treat a hypo e.g. jellybeans, glucose tablets, glucose gel.
a carbohydrate snack e.g. 2 crackers, a muesli bar or 1 slice of grainy bread.
blood glucose testing equipment
some identification that you have diabetes e.g. medic alert bracelet
- Please keep regular check ups with your diabetes health professional especially if having frequent hypoglycaemic episodes.



Sick day advice

- In what ways can illness / infection affect blood glucose levels?
- What important things do you need to find out in this situation?



'Sick Day' Advice

Type 1:

- Check BGL 2-4hrly
- Check blood or urine for ketones if BGL >15mmol/l on 2+ occasions (or 1 occasion if patient feels unwell)
- NEVER OMIT INSULIN DOSE
- Maintain fluid intake - aim is 1 glass/hr
- Maintain some energy intake

Type 2:

- Check BGL 4x daily (before each meal and before bed)
- Maintain fluid intake
- Usually continue insulin
- May need to stop Metformin if nauseated, vomiting

Sick Day' Advice continued

Ensure that family/friends know you are sick so they can check on you periodically.

When to notify your doctor?

- Vomiting $\pm$ diarrhoea (persist for more than 12 hours)
- Ketones present in urine
- Unable to maintain fluid intake
- Glucose levels remain above 15mmol/l for 12 hours
- Fever / infection
- Hypoglycaemia not improving after treatment

Interpreting Blood Ketones

Ketone test result	Action required
Blood test: Less than 0.6 mmol/l Urine test: Low / Trace	• This is the normal level. • No immediate action is required. • Follow sick day advice. • Maintain hydration
Blood test: 0.6 - 1.5 mmol/l Urine test: Moderate	• This indicates the beginning of a problem. • Monitor your blood glucose half hourly to 2 hourly depending on progress. • You may need to increase or add insulin doses carefully until your blood glucose levels drop. Usually this will be with the fast acting insulin. • Drink plenty of water to stay hydrated.
Blood test: More than 1.5 mmol/l Urine test: High	• You may be at risk of DKA. • Call your diabetes team or G.P. immediately for advice. • If you cannot contact your diabetes team or GP, you will need to go to the emergency department of your nearest main public hospital.

Travel Advice



Carry a letter from your doctor.

Ask your doctor to write a letter stating your full name, address and date of birth, that you have diabetes, list of medications, your insulin delivery devices (syringes, insulin pens or pumps) and your blood testing equipment. The letter should state that you must be allowed to carry these items with you at all times. Make several copies of this letter.

Carry all your diabetes supplies with you as carry-on luggage.

Checked in luggage can be lost or damaged. Carry enough insulin and medications to last the entire holiday (plus some). Your insulin will be OK out of the fridge for a month as long as it doesn't suffer extremes of temperature such as direct sunlight or freezing. It may be wise to take a spare insulin pen in case one breaks.

Travel Advice continued

Take your blood glucose testing equipment. It is important to check your glucose levels when travelling because your normal routine is upset. Ensure you have plenty of supplies of test strips and lancets and a spare battery for your meter

Always carry hypo treatment supplies. You need to be able to treat hypos and also prevent hypos in the event of delayed meals. Don't be afraid to ask cabin crew for assistance if required. They can supply extra drinks or snacks if needed.



Travel Advice continued

Exercise. Maintain some exercise by walking up and down the aisles periodically and make use of stopovers for some walking around the terminal or waiting lounge. It is also important to do the recommended in-flight exercises to avoid circulation problems.



Travel Advice continued

Understand your diet. Know your carbohydrate requirements and try to be familiar with the carbohydrates you are likely to come across in the countries you are going to e.g. Noodles, pasta, rice etc.

Hydration. Keep well hydrated by drinking plenty of water and/or diet drinks.

Drinking water. Always take care with drinking water and food preparation. In some countries it is unwise to eat salad or have ice in your drinks, where the local water supply may give you vomiting and diarrhoea.



Travel Advice continued

Sick-day care. Have a good knowledge of what to do when sick. Get sick-day advice before you leave. If you have Type 1 diabetes, include ketone testing equipment with your supplies. If you start vomiting or have an infection see a doctor early to get it treated.

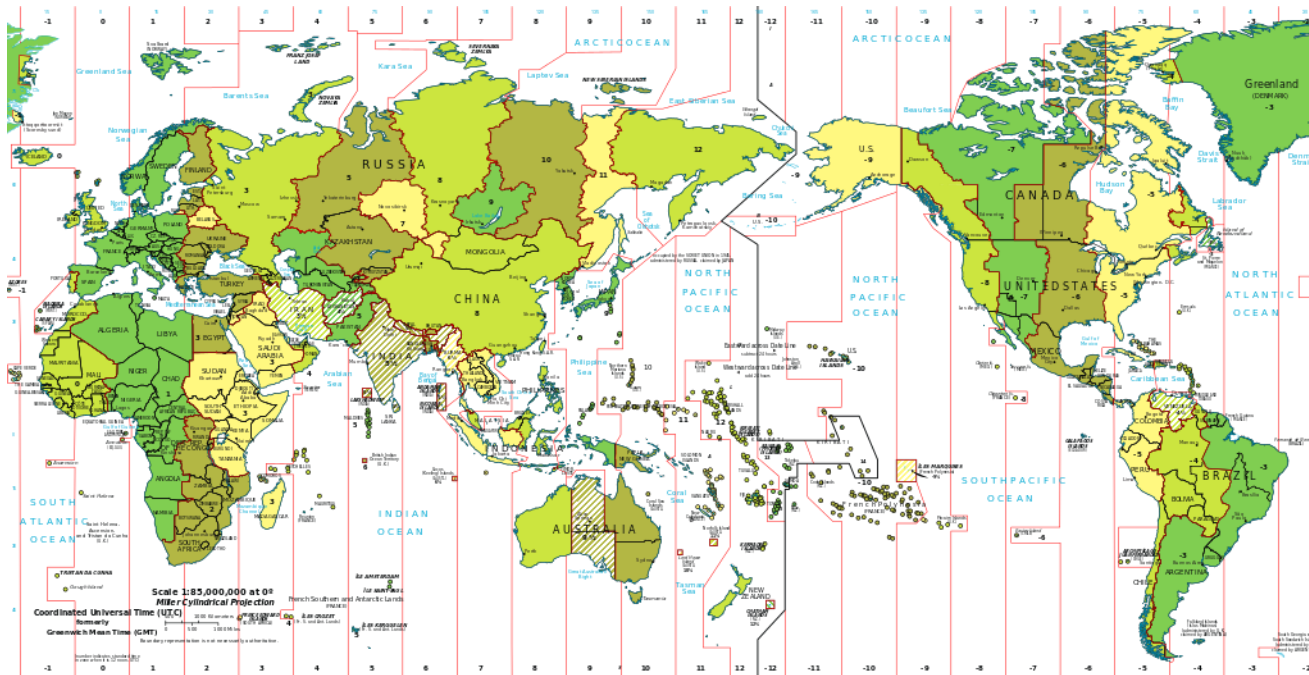
Sightseeing can involve a lot of walking. Insulin doses may need to be decreased especially on days when a lot of walking is planned. Remember to care for your feet. Wear practical properly fitting shoes. Wash your feet daily and change your socks regularly. Perform daily visual foot inspections.



Travel Advice continued

Time Zone Changes. When crossing time zones the timing of medications may appear confusing. If on tablets or insulin try to keep to your regular meal times and insulin times, according to your country of origin, during the journey. When you reach the next country conform to local time. You may need to adjust the amount of longer acting insulin depending on how long ago you had the last dose.

You may find that you need **less** insulin on the day of arrival if travelling **east** and **more** insulin on the day of arrival when travelling **west**.



Any further issues we may have missed?



Can you see the end of the day yet?

