Workshop 3
Switching Insulins

Insulin Leadership Summit

THE FUTURE OF TYPE 2 DIABETES IN PRIMARY CARE FROM SANOFI-AVENTIS

Goal of workshop

Insulin switching – make the necessary move

Ensure participants are confident with

- ☆**Recognising when insulin should be changed**
- ☆**Understanding switching algorithms**

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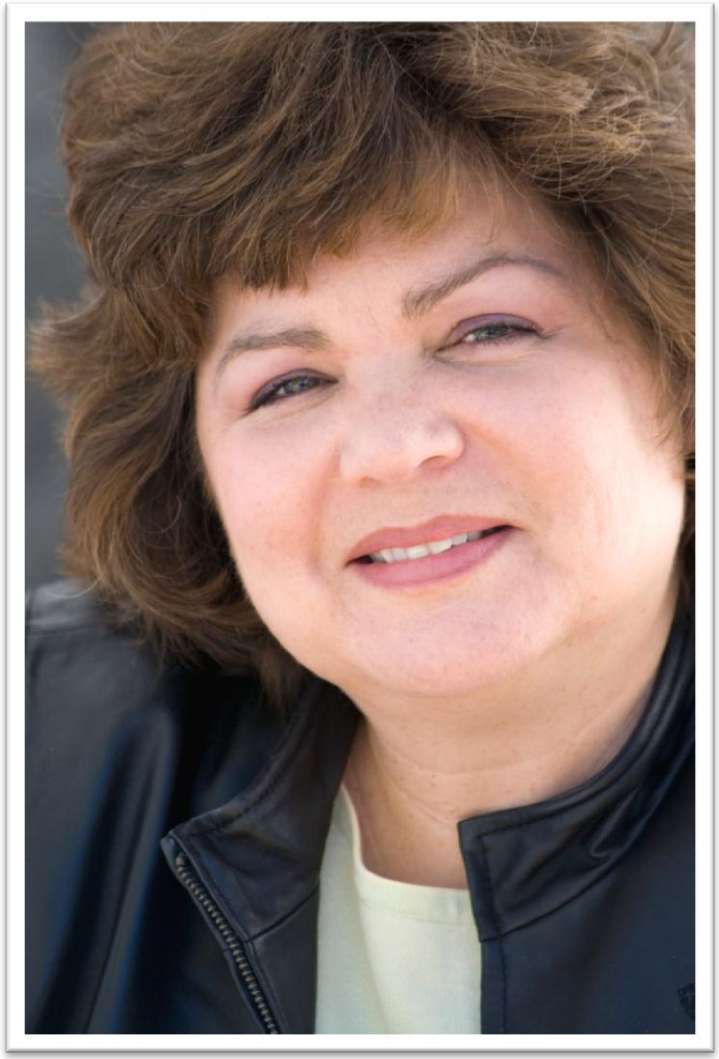
Jackie



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Medical history

- ☆ 56-year-old teacher
- ☆ History of hypertension
- ☆ Diagnosed with diabetes 5 years ago
- ☆ Commenced premixed insulin 8 months ago
- ☆ Has come to see you as she is concerned about her weight: put on 9 kg since she started insulin
- ☆ She is also having morning hypos

Medications

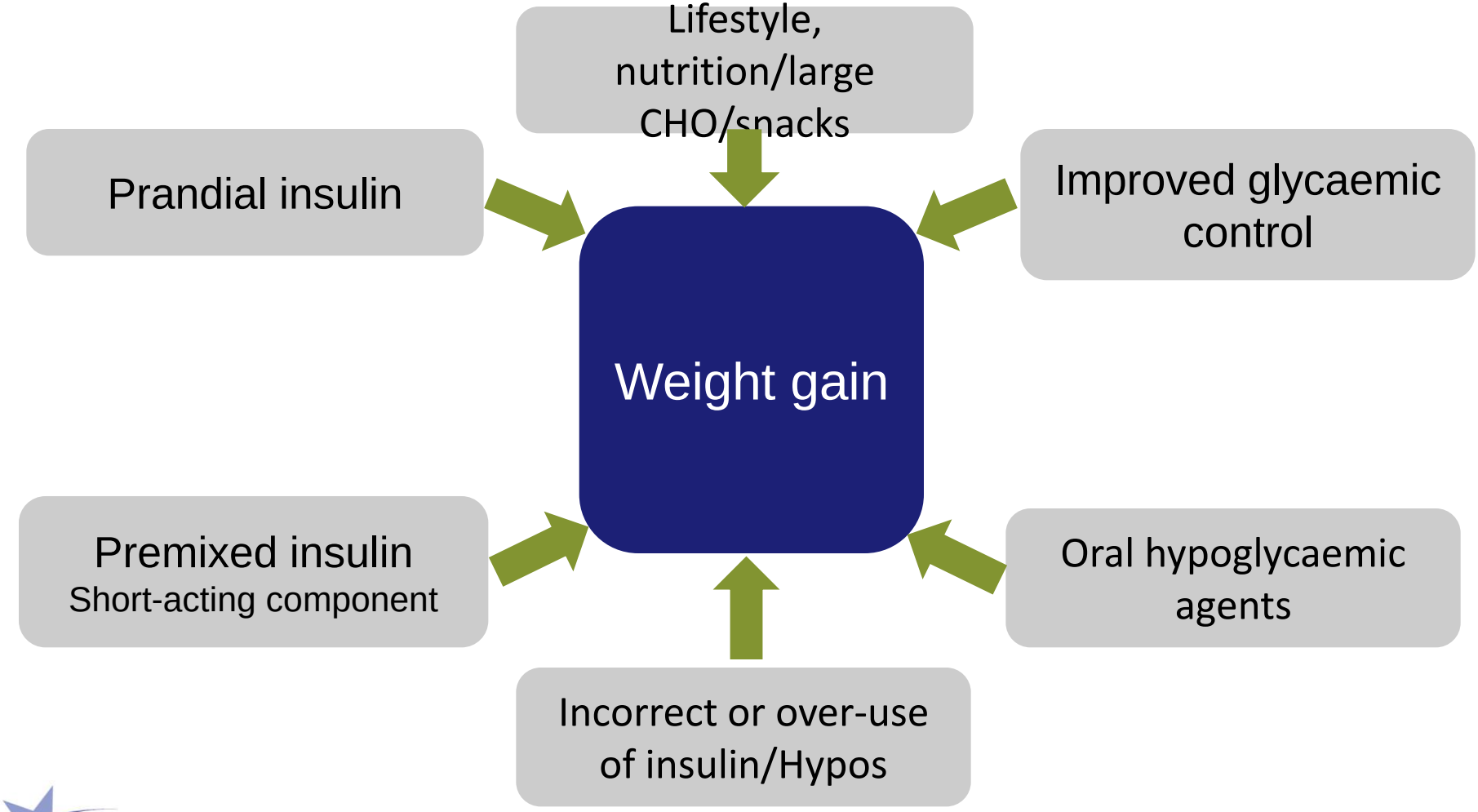
- Premixed insulin (30:70): 25 units twice daily
  - Increased from 12 units twice daily over past 12 months
- No oral hypoglycaemics
- Ramipril: 5 mg daily
- Hydrochlorothiazide: 12.5 mg daily
- Simvastatin: 40 mg daily

Examination/investigations

- BP: 145/90 mmHg
  - Was well controlled with ACE inhibitor until this visit
- BMI 30 kg/m^2 (Height 158 cm; weight 75 kg)
- Total cholesterol: 6.1 mmol/L
  - Triglycerides increased from 1.5 to 3.2 mmol/L since last measured 2 months ago
- HbA1c: 7.9%
- eGFR: 55 mL/min
- No other obvious causes of weight gain (e.g. hypothyroidism)

How does insulin contribute to weight gain?

Weight gain in T2D



1. Phillips P. KISS Part 2. Medicine Today 2007; 8(4): 43-52.

Which of these oral hypoglycaemic agents is associated with the least weight gain?

A. Rosiglitazone

B. Glipizide

C. Metformin

D. All about the same in terms of weight gain

How would you adjust Jackie's medication to address her weight?

A. Re-introduce metformin* to the twice daily premixed insulin schedule

B. Switch from twice daily premixed to basal/bolus

C. Switch from twice daily premixed to twice-daily long-acting basal insulin

D. Switch from twice daily premixed to once-daily long-acting basal insulin and re-introduce metformin*

E. None of the above

* if not contraindicated

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Switching insulins

- **Switch from premixed insulin (30:70) BD to once-daily long-acting basal insulin (at bedtime) and re-introduce metformin**
  - **Calculate the dose of long-acting basal insulin to be given at bedtime**

Consider a further 10% dose decrease if severe hypoglycaemia has occurred in the past[1]

1. Phillips P. KISS Part 4. Medicine Today 2007; 8(6): 43-52.

New, wider access to Lantus[1]

- No Special Authority **required**
  (replaced by a 'prescriber note')
  - **All Type 1 diabetes**
  - **Other condition-related diabetes (eg cystic fibrosis, diabetes in pregnancy, pancreatectomy patients)**
  - **Type 2 diabetes after there has been unacceptable hypoglycaemic events after a 3 month trial of an insulin regimen**
  - **Type 2 diabetes who require insulin therapy and who require assistance from a carer or healthcare professional to administer their insulin injections**

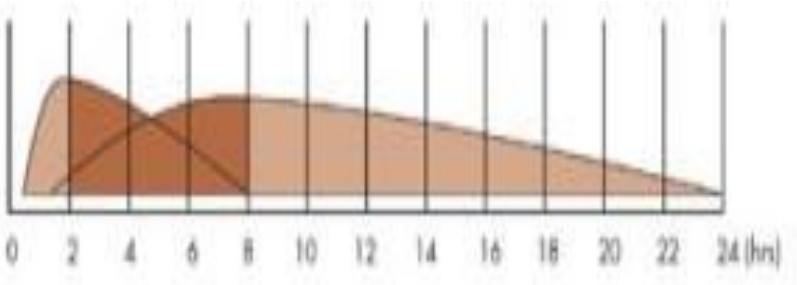
Premixed BD to long-acting basal

IF pts on Penmix 30/70 or Humilin 30/70

25 units premixed insulin

twice daily (50U)

(**30**: **70**)



30% of 50 units is **rapid-acting insulin**

15 units

70% of 50 units is **basal insulin**

35 units

Reduce dose by 20%

0.8 x 35 units

= **28 units/day long-acting basal**

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Switching T2DM patients from other insulin therapies to Lantus[4]

		Starting dose #
NPH	NPH Once Daily	Use 100% of daily dose once daily[4]
	NPH Twice Daily	Initially 80% of total dose once daily (at bedtime)[4]
Premix	Premixed Once Daily	Use 100% of total basal dose once daily*[4,14,16]
	Premixed Twice Daily	Use 70-80% of total basal dose once daily at bedtime*[4,14,16]

#Starting dose only, further titration may be required. *Fix the fasting blood glucose then review the need for prandial insulin

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LANTUS insulin glargine
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Managing other likely contributors to Jackie's weight gain

- ☆ **Monitor her eating, activity and insulin schedules closely and amend them to compensate for decreased glycosuria**
  - ☆ **Encourage her to 'eat less and walk more'**

- ☆ **Arrange a dietitian +/- exercise physiologist consult for Jackie**

What would you consider now to manage her triglyceride levels?

1. Optimise glycaemic control
2. Increase physical activity
3. Consider omega-3 fatty acid supplementation
4. Increase her statin dose
5. All of the above?

Hypertriglyceridaemia

- **Priority is to optimise glycaemic control[1]**
- **Dietary advice will help lipid profile and weight**
  - **Lower total fat intake[1]**
  - **Increase intake of omega 3 fats[1] with diet or supplementation (5 mg/day)**
  - **Increase dietary fibre[1]**
  - **Ask about alcohol intake**
- **Modify/add pharmacological agents only if required[1]**
  - **Could increase dose of statin**
  - **Add fenofibrate or gemfibrozil if hypertriglyceridaemia plus hypercholesterolaemia persists (care with myopathy)**

1. NHMRC T2D guidelines, lipid control, 2004.

How does alcohol affect glycaemic control?

1. Can cause ‘delayed’ hypoglycaemia
2. Can cause hyperglycaemia
3. Causes immediate weight loss
4. Can increase weight gain
5. 1, 2 and 4 above?

Effects of alcohol

In addition to its potential to affect glycaemic control, alcohol:

☆Is associated with increased HDL-cholesterol and triglycerides[1]

☆Can cause significant weight gain as high in calories[2] and may promote fat deposition[3,4]

1. NHMRC T2D guidelines, lipid control, 2004. 2.
2. Healthy eating and diabetes. Alcohol and diabetes. The Queen Elizabeth Hospital Diabetes Centre, 2007.
3. Australian guidelines. To reduce health risks from drinking alcohol. NHMRC, 2009.
4. DrugWatch newsletter, 34th issue, October 2007.Community Alcohol Action Network, an initiative of the Australian Drug Foundation.

12 weeks later....

- **Jackie returns for a follow-up appointment:**
  - **Glycaemic control remains reasonable (A1c 7.4%)**
  - **Lost 2 kg during the first 6 weeks but weight plateaued since then**

On questioning Jackie....

You find that she:

- **Hasn't been exercising**
  - **Intends to but never finds the time**
- **Is worried about hypoglycaemia with insulin**
- **Has been eating more carbohydrate in the day**
  - **Was told by a friend on insulin to have regular carbohydrate snacks as well as her three meals**
- **Feels better and may have been eating more because of this**

What would you suggest now?

Next steps for Jackie

- **Suggest Jackie:[1]**
  - **Adjusts hypoglycaemic medication to suit lifestyle – not vice versa**
  - **Increase physical activity**
- **As her GP, be content with an A1c of 7.4% – at least until weight is controlled[1]**

1. Phillips P. KISS Part 2. Medicine Today 2007; 8(4): 43-52.

Remember...

Increased physical activity and weight loss will also improve Jackie's hypertension:[1]

Intervention	Blood pressure reduction (mmHg)
Weight loss*	**15/8**
Aerobic exercise	**4/3**

*9 kg in 6 months.

This, in turn, will help improve the microvascular[2] and cardiovascular outcomes[1] of her diabetes

1. NHMRC T2D guidelines, BP control, 2004.
2. UKPDS 83. Lancet 1998; 352: 837-53.

What are your key learnings
in managing potential
weight gain
at insulin commencement?

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Practice points

1. **Rapid-acting insulin rarely needed at insulin commencement – common reason for:**
   - ☆ Increased appetite
   - ☆ Weight gain
   - ☆ Hypoglycaemia

2. **Don't stop metformin at insulin commencement**
   - ☆ Increases insulin sensitivity

Practice points

3. **Encourage ‘eat less, walk more’**

4. **Don’t adjust patient’s lifestyle to match the insulin…**
   …Adjust the hypoglycaemic treatment to match patient’s lifestyle

5. **Educate on alcohol**

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Practice points

6. **Metabolic control in type 2 diabetes always addresses:**

- ☆ **Blood glucose**
- ☆ **Blood pressure**
- ☆ **Blood lipids**

Steve

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Medical history

- ☆ 63-year-old retired engineer, lives with wife
- ☆ Diagnosed with diabetes 8 years ago
- ☆ Commenced on insulin 8 months ago
- ☆ Glycaemia reasonably well-controlled since starting insulin (A1c around 7.3% 8 weeks ago)
- ☆ Steve presents to you as his BG readings are now '*going up and down like a yoyo*'

Medical history cont'd

- Generally keeps himself fit and healthy
  - Plays veteran's tennis every Thursday and Saturday afternoons
  - Boasts that he hasn't been ill for at least 6 months
  - Drinks alcohol occasionally
- Normal BMI and waist circumference
  - Height:180 cm; weight:76 kg; waist: 84 cm

Medications

- ☆ Intermediate-acting, isophane insulin: 36 units at bedtime
- ☆ Metformin: 1 g twice daily
- ☆ Glipizide : 10 mg BD
- ☆ Atorvastatin 10 mg daily

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Steve's BG readings

	Fasting	Pre-lunch	Pre-dinner	Post-dinner
Wednesday	5.1	12.0	8.3	16.6
Thursday	4.0	6.5		12.2
Friday				
Saturday	14.4	5.8		13.2
Sunday	9.8	6.5	8.5	7.3
Monday	7.2			
Tuesday	7.1	12.5	13.1	13.2
Wednesday	4.7	5.6		8.6

What are the possible causes of BG ‘swings’?

10 minute small group discussion (workbooks)

5 minute feedback

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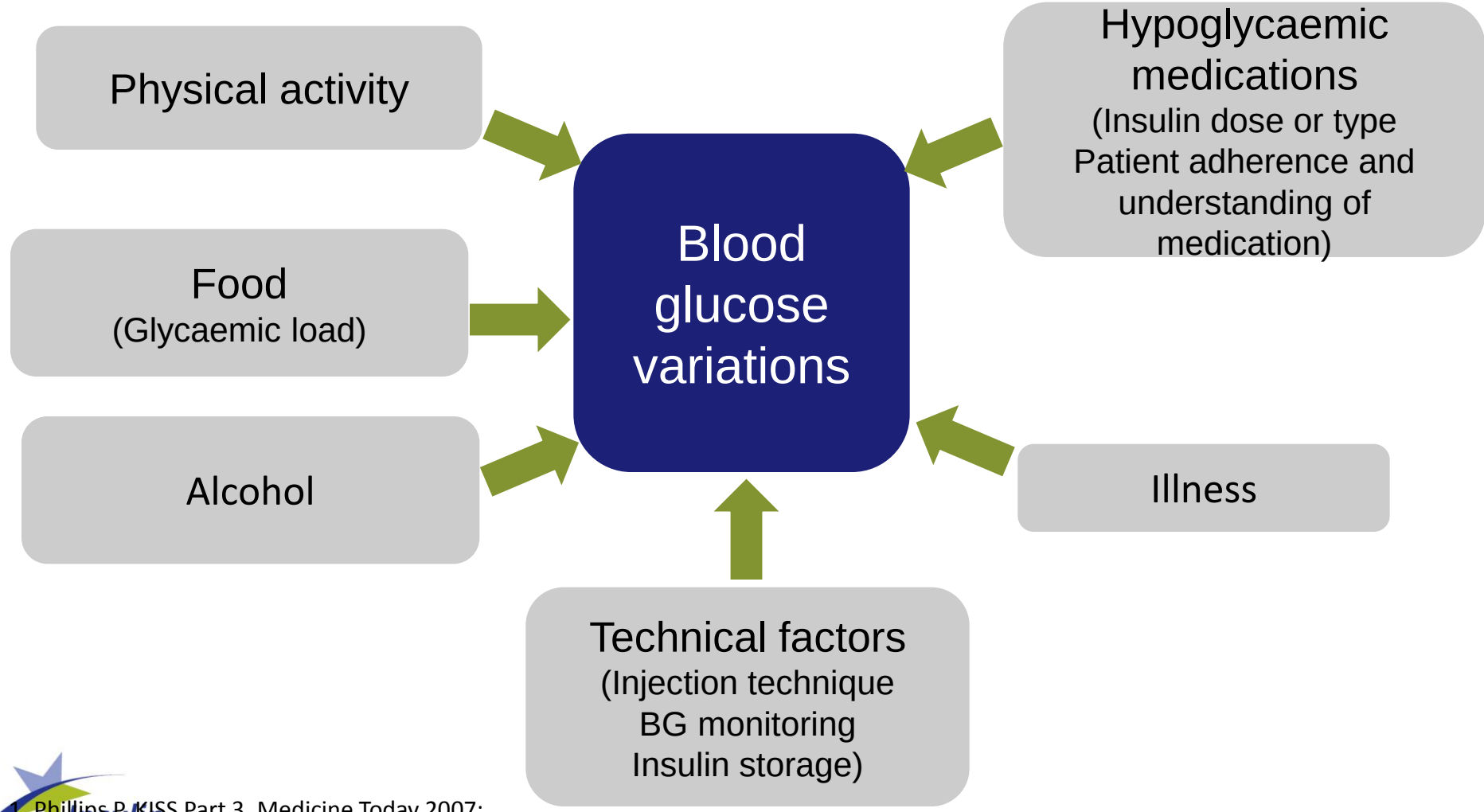
Contributors to BG 'swings'[1]



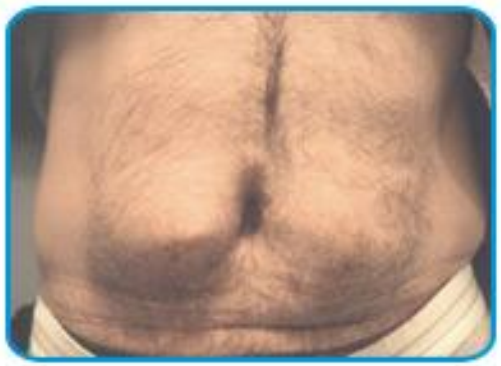
1. Phillips P. KISS Part 3. Medicine Today 2007; 8(5): 47-55.

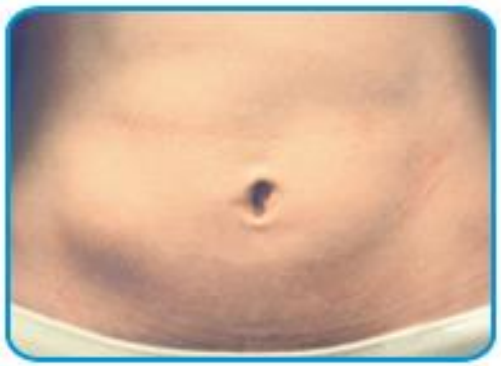
You discover

1. Steve sometimes injects into the same site (hurts less, habit)
2. Rest of injection technique is satisfactory
3. Often checks his BGL without washing and drying his hands first
4. Struggles sometimes to get enough blood onto the strip and takes ages from first drop of blood to obtaining result

Examination/investigations

- ☆ **Weight, BP, lipids unremarkable and mostly unchanged since last visit 12 weeks ago**
- ☆ **Induration and lumps at some injection sites (abdomen)**





Needle reuse and bending or breakage

Reuse can result in the microscopic bending of the tip, damage which is often not noticeable to the naked eye.

This initial tip damage originates from the multiple handling steps implicit in the reuse process such as deshielding and reshielding with

the needle cover or pen cap and/or repeated puncturing of the skin.

Reused needle at x370 magnification

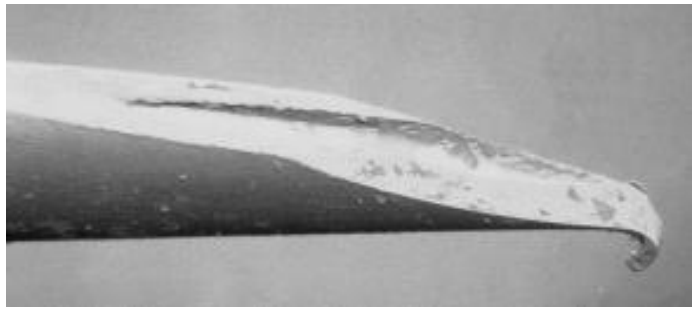
•Reused needle at x2000 magnification

** Photographs from Dieter Look and Kenneth Strauss study: "Nadeln mehrfach verwenden?" Diabetes Journal 1998, 10:S. 31-34*

Needle Reuse and injection pain

- ☆ **In order to significantly reduce the discomfort of the injection, thinner, shorter and sharper insulin needles have been developed. Repeated use however can impact the performance and safety of the needle by:**
- ☆ **➞ Removing the lubricant primarily responsible for painless or near painless injections**
- ☆ **➞ Damaging the needle tip, from mild bending to hook-like distortion of the entire tip**
- ☆ *Photographs showing the type of damage that can occur with needle reuse:**
- ☆ **Both loss of lubricant and tip damage will result in pain and discomfort during the**
- ☆ **injection.**
- ☆ **** Photographs from Dieter Look and Kenneth Strauss study: "Nadeln mehrfach verwenden?" Diabetes Journal 1998, 10:S. 31-34***

New needle at x370 magnification



Reused needle at x370 magnification

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Outcome

- Steve appears to manage his diabetes well in terms of balancing medications, carbohydrate intake and physical activity
- He is reassured that his BG readings should settle down if he corrects his diabetes techniques
  - Then fine tuning may be possible

Steve then says:

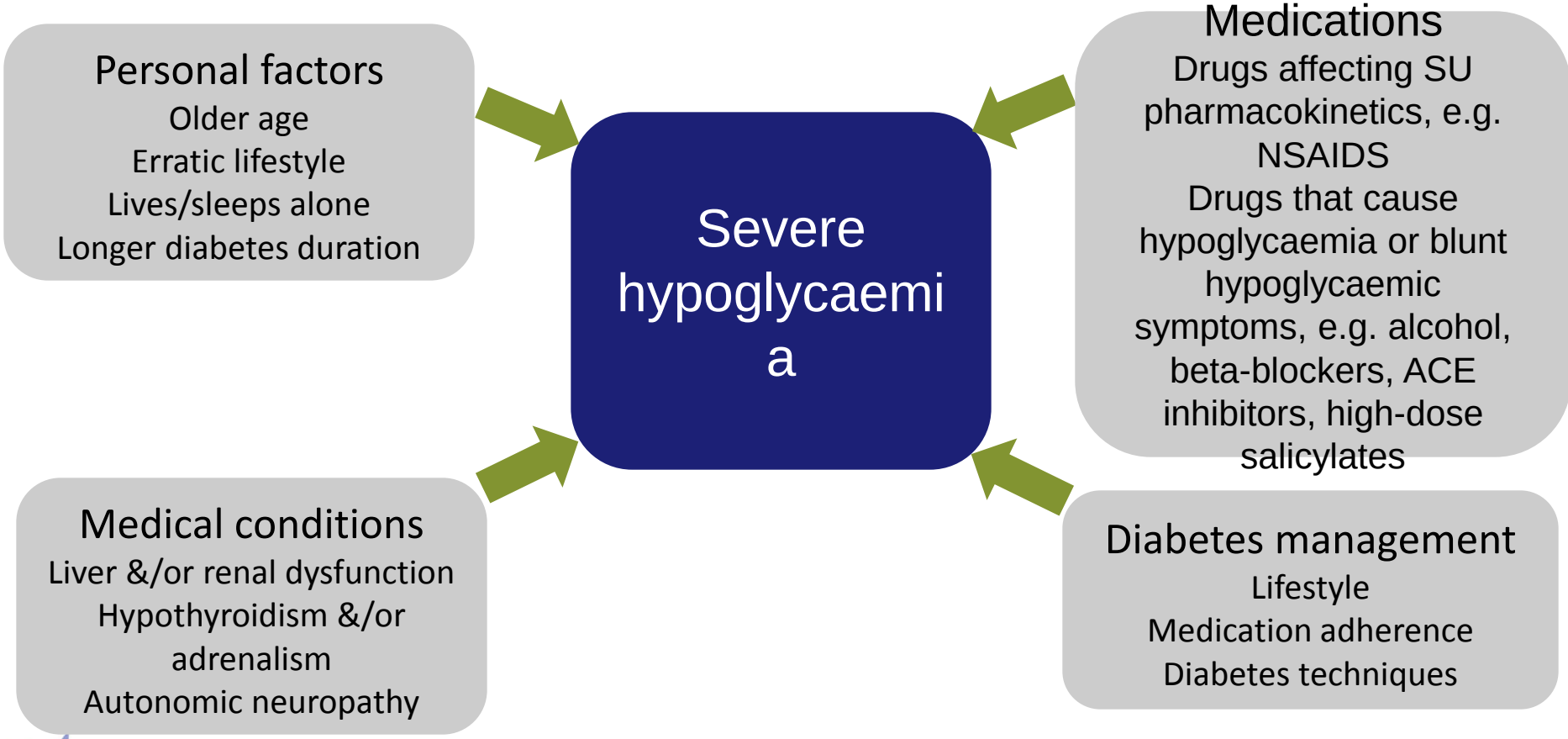
"Since I'm here doc, I might as well ask you. Does taking insulin at night increase my chances of having a hypoglycaemic attack?"

How likely is a severe hypoglycaemic event in Steve's case?

A. **Unlikely – the risk of a severe hypoglycaemic event is low in Steve's case**
B. **Possible – he has a number of risk factors that put him at moderate risk**
C. **Highly probable – he has a number of risk factors that put him at high risk**

What is the reasoning behind your answer?

Factors that increase hypoglycaemic risk[1]



1. Phillips P. Medicine Today 2009; 10: 27–34.

Practice points – BGL swings

1. **Use checklists to elucidate causes of BG swings**

2. **Continually review:**
   - ☆ Storage and use of hypoglycaemic medications
   - ☆ Injection technique
   - ☆ BG monitoring
   - ☆ Lifestyle factors (physical activity, carbohydrate consumption)

3. **Continually reeducate**

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Thank You