PGEA-ACCREDITED DISTANCE LEARNING PACKAGE FOR THE PRIMARY CARE TEAM

SUPPORTED BY AN EDUCATIONAL GRANT FROM AVENTIS

How to complete the learning module...

Marking & feedback guaranteed within 2 months

Each issue of* Diabetes and Primary Care *contains a continuing education module. Each module carries 2 hours PGEA accreditation for GPs; nurses can complete the supplement to use towards their PREP requirements. Participants should be able to complete the supplement within 2 hours. This can then be submitted to the address on the application form for assessment and feedback. Certificates will be awarded to all health professionals completing the supplement to the required standard. No payment is required.

Standards to be achieved

To receive a certificate, the answers provided must meet the following criteria:

1. All questions within the supplement must be answered.
2. The minimum number of answers to individual questions should be given where specified.
3. Factual knowledge around the subject area, plus the case studies, will be compared with specimen answers for accuracy.
4. Questions around your own practice will be assessed for an adequate level of completion. Brief answers are acceptable.

The feedback (GUARANTEED WITHIN 2 MONTHS) will indicate one of two things:

a) You have successfully completed the questions and will be awarded accreditation and a certificate.

b) Your answers have been inadequate, and comments will be provided.

You will also receive a set of specimen answers against which to compare your own work.

EACH MODULE FOLLOWS A STANDARD FORMAT, RELATING TO ONE AREA OF DIABETES CARE

Section 1: Seeks information about your factual knowledge around the subject area

Section 2: Provides factual information to enable you to revise and refresh your existing knowledge (this section will contain no questions for you to answer)

Section 3: Presents two or three case studies to provide you with an opportunity to apply your knowledge to different patient scenarios

Section 4: Invites you to answer questions about the treatment of a number of patients within your practice around the subject area

Section 5: Asks how completion of the supplement will influence your future practice

Diabetes and Primary Care reserves the right to hold back certificates where the above standards have not been met.

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PGEA-Accredited Distance Learning module
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Types Of Insulin

Readers can, if they choose, use this section to gain accreditation and feedback (marking guaranteed within 2 months).

Section 1. Name four different insulins that you know, and for each one indicate its action and how many times a day you would expect to take it.

NAME OF INSULIN	ACTION (HOW QUICK ACTING, HOW LONG IT LASTS, ETC)	HOW MANY TIMES A DAY WOULD YOU EXPECT TO TAKE IT?

Section 2. This section is provided for readers wishing to refresh their knowledge. Readers may choose to defer reading this section until completion of the rest of the module.

Types Of Insulin

There are many different preparations of insulin available, and the choice of which to use for someone with diabetes will depend on a number of factors. These include what type of diabetes they have, how regular or erratic their lifestyle is, their ability to give themselves injections, and whether there is a specific insulin delivery device that suits them more than another. This section provides information on the different types of insulin available, their actions, and when they would be likely to be used in adults with diabetes. Animal insulins are discussed separately.

Rapid-acting insulins

Rapid-acting insulins are insulin aspart (NovoRapid) and insulin lispro (Humalog), which are currently the fastest acting insulins available. They are clear solutions and start to act within 5–15 minutes of injecting. Most of the insulin will be used up within 2 h. They are insulin analogues, which means they are the new generation of shorter acting insulins. Rapid-acting insulins can be used either in combination with longer acting insulins (intermediate or long acting) or on their own as a continuous subcutaneous insulin infusion via an insulin pump.

Rapid-acting insulins are injected at mealtimes and possibly at other times if extra food is eaten. Also some people with type 1 diabetes are taught (through attending education sessions) to give additional injections to correct high blood glucose levels. If rapid-acting insulins are used in a mixture with longer acting insulin they are injected twice a day. In an insulin pump, these insulins are infused continuously and additional doses are programmed at meal times and to correct high blood glucose levels.

The biggest advantage of this type of insulin is that it can be injected immediately before a meal, during a meal, or immediately after. Also, because it wears off relatively quickly, it can mean that snacks are no longer needed between meals.

Short-acting insulins

Short-acting insulins are clear solutions, and include Humulin S, Actrapid, and Insuman Rapid. They start to act within 20–40 minutes of injecting, which means that they need to be taken this length of time before a meal, and their effect lasts for about 6 h.

Until rapid-acting insulin analogues became available in

DIABETES AND PRIMARY CARE

This series of PGEA modules will focus on different areas of diabetes managment and is supported by an educational grant from Aventis

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the 1990's, short-acting insulins were used to provide the short-acting part of any insulin regimen. In a twice-daily mixture with longer acting insulins snacks are needed mid-morning and before bed. If they are used as injections with each meal, and used in combination with a longer acting insulin once a day, snacking is not always necessary during the day as they are specifically targeted to provide enough insulin for the individual meal, although a bedtime snack would still be recommended.

Intermediate-acting insulins

Intermediate-acting insulins are isophane insulins, which are cloudy in appearance, and include Insulatard, Humulin I and Insuman Basal. They reach a peak of action after about 6 or 7 h and still provide some insulin for up to 16–18 h. They can be given once daily, ideally before bed, when used in combination with rapid or short-acting injections. They are also used in pre-mixed insulins which are given at mealtimes twice a day. Intermediate insulins can also be introduced once a day in combination with tablets in someone with type 2 diabetes.

Occasionally, intermediate insulin is used twice daily on its own in type 2 diabetes. Intermediate insulin ensures that there is always some insulin in the body; this is particularly important in type 1 diabetes where the rapid or short-acting insulins would not provide 24 h cover.

Long-acting peakless insulin

This is an insulin called glargine (Lantus) which only recently became available in the UK. It is a clear solution, and is designed to provide 24 h cover without having a peak of action, thereby reducing the potential for hypoglycaemia. It should be injected once daily, at any time, but at the same time each day. It can be used in combination with tablets in type 2 diabetes, or in combination with rapid or short-acting insulins at mealtimes, which is more common in type 1 diabetes. It is not available as a pre-mixed insulin.

Long-acting insulins

These are cloudy solutions, and include Monotard, Ultratard, Lente and Humulin ZN. They are used like intermediate-acting insulin but work for a longer period of time – their peak of action is around 10 h, and they can still work for 24 h or slightly longer. They are not available in pre-mixed insulins, and are injected once a day in combination with rapid or short-acting insulins at meal times. They are gradually being replaced by intermediate-acting insulins or long-acting peakless insulin, as they have greater potential for causing hypoglycaemia due to their long peak and duration of action.

Long-acting insulins would not be prescribed today if insulin was being started, but many people with diabetes still take them, and as with all insulins, changing to a different type of insulin should be considered in cases of suboptimal glycaemic control.

Pre-mixed insulins

Insulins are available pre-mixed, containing soluble and isophane insulin, in a range of strengths, for example: Mixtard 10, 20, 30, 40, 50 (the number denotes the % of soluble insulin); Humulin M2, M3, M5 (denoting 20%, 30% or 50% of soluble insulin); Insuman Comb 15, 25, 50 (the number denotes the % of soluble insulin).

They are also available as combinations of rapid-acting insulin and isophane insulin, such as NovoMix 30, Humalog Mix25 and Humalog Mix50, the numbers denoting the

Table 2. General principles of using different types of insulin

When either assessing glycaemic control of someone who is already on insulin, or prescribing insulin for the first time, there are a number of considerations which can help you choose the right insulin for them.

- If good glycaemic control is being achieved with insulin, many people prefer to stay on their usual insulin and should not be made to change because newer insulin versions appear to offer benefits over others.
- If someone on insulin has suboptimal control (HbA_{1c} greater than 7.5%), consider whether the dose of insulin is correct or whether the person would benefit from changing to a different regimen.
- If someone has type 1 diabetes, their insulin regimen should always include rapid or short-acting insulin in combination with intermediate or long-acting insulin, either as a pre-mixed insulin or as a basal bolus regimen (shorter acting at meal times, longer acting once a day)
- If someone has type 2 diabetes and is just starting insulin, once-daily peakless insulin can be added to tablets, or twice-daily mixed insulin can be used in those with regular lifestyles. Some people choose a basal bolus system at this point, and this option should be discussed
- If someone with type 2 diabetes is dependent on others to give their injections, a once-daily peakless insulin is the best choice, as it can be given at a time convenient to the carer and reduces the chances of hypoglycaemia.
- Insulin delivery devices have variable features, including large dial-up mechanisms, set-dose delivery, memory of date and time of last injection, and side plunger to deliver the insulin. If a particular device is used, the insulin prescribed must match the delivery device.

amount of rapid-acting insulin they contain. These insulins are injected at meal times twice a day, 20–40 minutes before the meal if they contain soluble insulin. Pre-mixed insulins aim to provide enough insulin to cover a 24 h period. However, snacks are needed mid-morning and before bed, although some people find they do not need a mid-morning snack with mixed insulins containing a rapid-acting analogue.

Animal insulins

Animal insulins (taken from the pancreas of a cow or pig) are still available, and include soluble (Hypurin Neutral), isophane (Hypurin Isophane), long acting insulin (Hypurin Protamine Zinc, Hypurin Lente) and also a fixed mixture of insulin (Hypurin 30/70 mix).

Animal insulins are used in the same way as human versions of soluble, isophane, long acting and mixed insulins. The newer insulin analogues (aspart, lispro and glargine) are not available in animal form. Animal insulin is generally not prescribed today for someone new to insulin, but some people have been taking animal insulin for years and feel that they have more predictable warning signs of hypoglycaemia than when taking human insulin. Animal insulins are available in vials for use with syringes, or in cartridges for use with pen devices.

Section 3. The answers to these case studies should include the broad aims of treatment, although specific goals may be added where appropriate.

Case study 1

Roger is a 28-year-old with type 1 diabetes who is taking Humulin S with his meals and Humulin I at night. He works as a sales representative and also runs marathons. His HbA_{1c} is 8.2% and he is finding it difficult to get his insulin dose right to deal with fairly sedentary days at work and for the times when he is running.

Questions about case study 1

a) Which insulin regimen might suit Roger better and why?

b) Roger is keen to stay on his existing insulins. What discussion would you have about this with him?

Case study 2

Marian is 48 years old, and has had type 2 diabetes for 10 years. She is taking maximum oral therapy, her HbA_{1c} has risen over the past 2 years to 9.5% and she has agreed it is time to start insulin.

Questions about case study 2

a) Which insulin regimens might you suggest for Marian and why (give different options)?

b) How would you and Marian decide which insulin regimen will be the one she tries?

Case study 3

Florence is a 74-year-old widow who has type 2 diabetes, and an HbA_{1c} of 9.8% despite maximal tablets. She needs to start insulin, but a cerebrovascular accident a year ago means that while she lives alone and can manage to wash and dress herself, she has meals on wheels and needs help with other tasks such as monitoring her blood glucose levels.

Questions about case study 3

a) Which insulin regimen would you choose for Florence and why?

b) How would you assess whether the insulin regimen is working for Florence?

Section 4. Think of three people in your practice who are having insulin injections for their diabetes, ideally a mix of people with type 1 and type 2 diabetes, and answer the questions below for each.

	Patient 1	Patient 2	Patient 3
a) What type of diabetes do they have?			
b) How long have they been taking insulin?			
c) What type(s) of insulin are they taking?			
d) Why are they on that particular insulin?			
e) Describe any problems that might mean changes need to be made to their insulin regimen.			
f) If problems were identified in (e), provide suggestions of what changes could be made.			

Section 5. After completing this supplement, identify two or three key points, stating how this will influence your future practice.

1.

2.

3.

EDUCATION SUPPLEMENT APPLICATION FORM

Please send the completed education supplement and application form (or a copy of it) to the address below if you wish it to be assessed. Feedback on your work, plus a set of specimen answers, will be sent to you within 2 months.

Name.....
Job title.....
Address.....
.....
..... Postcode.....
Telephone..... Fax.....
GMC or UKCC registration number.....

Has the programme been effective in meeting your needs? Yes ☐ No ☐
Comments.....
.....

Diabetes and Primary Care, SB Communications Group, 15 Mandeville Courtyard, 142 Battersea Park Road, LONDON SW11 4NB
Tel. 020-7627 1510 Fax. 020-7627 1570