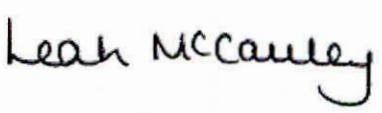
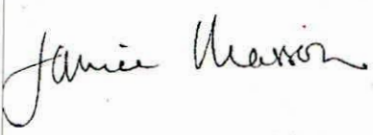



Guideline For The Adjustment Of Insulin Dose For Patients With Diabetes By Diabetes Specialist Dietitians, Cystic Fibrosis Dietitians and Specialist Weight Management Dietitians In NHS Grampian

Co-ordinators: Dietitian (Diabetes)	Consultation Group: Dietitians Diabetes Clinical Focus Group, NHS Grampian	Approver: Medicines Guidelines and Policies Group
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Signature: 	Signature: 	Signature: 
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Identifier: NHSG/Guide/InsDos/MGPG1230	Review Date: December 2024	Date Approved: December 2021
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Version 4

Executive Sign-Off

This document has been endorsed by the Director of Pharmacy and Medicines Management



Signature: _____

Title: Guideline For The Adjustment Of Insulin Dose For Patients With Diabetes By Diabetes Specialist Dietitians, Cystic Fibrosis Dietitians and Specialist Weight Management Dietitians In NHS Grampian

Identifier: NHSG/Guide/InsDos/MGPG1230

Replaces: NHSG/Pro/InsDos/MGPG937, Version 3

Across NHS Boards	Organisation Wide	Directorate	Clinical Service	Sub Department Area
	Yes			

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Lead Author/ Co-ordinator: Advanced Diabetes Dietitian and Advanced Cystic Fibrosis Dietitian

Subject Guidance

Key word(s): Guidance diabetes specialist dietitians dose adjustment insulin diet cystic fibrosis weight management

Document application: Diabetes Specialist Dietitians, Cystic Fibrosis Specialist Dietitians and Weight Management Specialist Dietitians (who have received training and are meeting the required competencies)

Purpose: To provide the above staff with a framework for the safe and effective adjustment of insulin dose in adults with diabetes in order to reduce variations in practice.

Responsibilities for implementation:

Organisational:
Departmental: Relevant NHS Grampian Dietetic Departments
Area: Grampian wide
Hospital/Interface services: Acute and Community
Operational Management Unit:

Policy statement: It is the responsibility of the line managers to ensure staff work to the most up to date and relevant policies, protocols and procedures. By doing so, the quality of the services offered will be maintained, and the chances of staff making erroneous decisions which may affect patient, staff or visitor safety and comfort will be reduced.

Review: This guidance will be reviewed at least every three years or sooner if current treatment recommendations change.

Responsible for review of this document: Diabetes Specialist Dietitians, NHS Grampian
Dietetic Prescribing Advisor

Responsible for ensuring registration of this document on the NHS Grampian Information/ Document Silo: Dietetic Prescribing Advisor

Physical location of the original of this document: Pharmacy and Medicines Directorate,
Westholme

Job/group title of those who have control over this document: Dietitians Diabetes Clinical Focus Group

Responsible for disseminating document as per distribution list: Grampian Dietetic Managers

Revision History:

Date of change	Approval date of procedure that is being superseded	Summary of Changes	Section heading
August 2021	April 2018	Changed of title to include specialist weight management dietitians.	
August 2021	April 2018	Key word(s): added weight management.	
August 2021	April 2018	Band 6 replaced with Band 5 and Weight Management Specialist Dieticians added as title.	
August 2021	April 2018	Removed DSD and Cystic Fibrosis Dietitians. The following text added: Specialist Dietitians (Dietitians who have completed appropriate training in diabetes management and meet the competencies for insulin dose adjustment).	1
August 2021	April 2018	<ul style="list-style-type: none"> Band 6 changed to Band 5 or above Change of text to: Minimum 6 months working in diabetes. Text added at the beginning of a sentence: In the absence of Specialist Dietitians for people with diabetes requiring insulin, Non Specialist Dietitians providing clinical cover are not authorised under this guidance and should not advise on dose adjustment of insulin. <ul style="list-style-type: none"> The following bullet point has been added: Be competent in the interpretation of downloads from glucose meters, flash glucose monitors, continuous glucose monitors and pumps. 	3.1
		Removed DSD or Cystic fibrosis dietitians and changed to Specialist Dietitians.	3.2

August 2021	April 2018	The following text has been added: Other factors that need to be considered are data from BG monitoring, physical activity, illness and current medication.	4
August 2021	April 2018	Previous exclusions for <ul style="list-style-type: none"> Newly Diagnosed Diabetes, pregnancy and Gestational Diabetes have been removed The following text has been added as an exclusion: Patients who are non-compliant with advised insulin doses 	5
August 2021	April 2018	DIANE changed to Structured Education for People with Diabetes.	6.1
August 2021	April 2018	Balance of good health changed to "Eat Well Guide".	6.2
August 2021	April 2018	DSD or Cystic Fibrosis Dietitians - changed to Specialist Dietitians.	8
August 2021	April 2018	Update to section 9 – Documenting changes.	9
August 2021	April 2018	Review hypo treatment. Check that the patient knows how to correct BG above their target and what correction factor they use. Ensure patients aware of what levels to check for ketones and aware of 'sick day rules' and how to apply them. Suggestions should be documented by the patient / dietitian for the patient to have as a reminder of the changes discussed.	10
August 2021	April 2018	Updated Title of Appendix 1 to include Specialist Weight Management Dietitians. Policies and guidelines of Appendix 1 updated to most recent versions.	Appendix 1
August 2021	April 2018	Clinical Aspects updated to add: Interpretation of glucose profiles from glucose meters, flash glucose monitors, continuous glucose monitors and pumps.	Appendix 1
August 2021	April 2018	Update to training courses.	Appendix 1, 1.1
August 2021	April 2018	Removed DIANE course and added information on STEP/structured education programme.	Appendix 1, 2.2
August 2021	April 2018	Removed DIANE course.	Appendix 1, 3
August 2021	April 2018	Maintaining Competencies: Added Reference to Appendix 2. Remove references listed at end of Appendix 1.	Appendix 1

Guideline For The Adjustment Of Insulin Dose For Patients With Diabetes By Diabetes Specialist Dietitians, Cystic Fibrosis Dietitians and Specialist Weight Management Dietitians In NHS Grampian

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Guideline For The Adjustment Of Insulin Dose For Patients With Diabetes By Diabetes Specialist Dietitians, Cystic Fibrosis Dietitians and Specialist Weight Management Dietitians In NHS Grampian

1. Introduction

Diabetes is a chronic condition in which therapy should be tailored to suit an individual, with self management being a key goal.

There is strong evidence that good glycaemic control in both Type 1 and Type 2 diabetes significantly reduces the risk of future complications^{1, 2}. Healthcare professionals working as part of the diabetes multidisciplinary team across a variety of healthcare settings are routinely required to advise individuals with diabetes on the commencement, titration or discontinuation of insulin. Dietitians have a highly specialist and detailed knowledge of the nutritional value of food and how this affects blood glucose levels and insulin requirements, which is unique amongst health care professionals. Their role in helping people to adjust their insulin in relation to their food intake is pivotal in those patients with diabetes, cystic fibrosis related diabetes and people with diabetes referred to the weight management service. The Specialist Dietitians provide advice and teaching on a range of areas including diet and lifestyle.

Factors to be considered include:

- The transfer to insulin from oral medication.
- Insulin initiation.
- Manipulating insulin doses in accordance to carbohydrate intake.
- Manipulating insulin doses in accordance to disease related infection (including Cystic Fibrosis related disease) and oral intake.
- Teaching carbohydrate counting skills.
- Weight management including bariatric surgery.
- Insulin pump therapy.

This guidance provides guidance to be used in NHS Grampian to ensure the safe and appropriate dose adjustment of insulin.

This guidance applies to the dose adjustment of insulin as listed in section 6 (3.1) of the British National Formulary by Specialist Dietitians (Dietitians who have completed appropriate training in diabetes management). It applies equally to all products unless otherwise stated. **Note:** It is not applicable to the initial supply of insulin.

2. Who Will Recommend Dose Adjustment?

This guidance is intended for use by Diabetes Specialist Dietitians (DSD), the Cystic Fibrosis Specialist Dietitians and Weight Management Specialist Dietitians in NHS Grampian.

The guidance is designed as a guide to the safe limits within which the dietitian can adjust insulin and the competencies required by them when recommending dose adjustment.

Before adjusting the insulin dose the dietitian must have read this guidance, be aware of the precautions needed to safely carry this out, and meet the competencies detailed in [Appendix 1](#).

3. Characteristics of Staff

3.1. Qualifications of the Specialist Dietitians authorised to adjust insulin dose

Staff must meet all the following criteria:

- Health and Care Professions Council (HCPC) Registered Dietitian.
- BSc Nutrition and Dietetics.
- Experienced Band 5 or above
- Minimum 3 years post-registration experience.
- Minimum 6 months working in diabetes.

In the absence of Specialist Dietitians for people with diabetes requiring insulin, Non Specialist Dietitians providing clinical cover are not authorised under this guidance and should not advise on dose adjustment of insulin.

In addition the following requirements are necessary. Staff must:

- Meet and maintain the competencies outlined in the competency framework for NHS Grampian DSD and Cystic Fibrosis Dietitians advising on the adjustment of insulin dose in NHS Grampian ([Appendix 1](#)).
- Hold a clinical caseload of patients with diabetes requiring insulin.
- Have British Dietetic Association (BDA) or other recognised professional indemnity cover.
- Agree to be professionally accountable for their work.
- Be aware of current treatment recommendations for diabetes, including the types of insulin, their modes of action, indications, contraindications and side effects.
- Be competent in the interpretation of downloads from glucose meters, flash glucose monitors, continuous glucose monitors and pumps.
- Maintain their skills and knowledge in this area according to their individual standards of conduct (BDA 2017), performance and ethics (HCPC January 2016, Dietitians) and standards of proficiency (HCPC March 2013, Dietitians).
- Undertake regular CPD in areas related to diabetes as per local and national guidance.
- Agree to work within the terms of this NHS Grampian Guidance.

3.2. Clinical managers will be responsible for:

- Ensuring staff are aware of and work in accordance with this guidance.
- Ensuring staff can provide evidence that they meet the competencies outlined in the NHS Grampian competency framework for NHS Grampian DSD advising on the adjustment of insulin dose ([Appendix 1](#)).
- Ensuring staff are provided with opportunities to undertake adequate training in all areas relevant to this guidance.
- Maintaining a current record of all Specialist Dietitians authorised to recommend dose adjustment of insulin under this guidance.

3.3. NHS Grampian liability

CNORIS (Clinical Negligence and Other Risks Scheme) have confirmed that in the event that liability attaches to a dietitian, arising from the execution of his/her duties for NHS Grampian whilst following this guidance and having met the competencies outlined in [Appendix 1](#), CNORIS would respond.

4. When Will Dose Adjustment Be Advised?

Insulin dose in relation to food intake is frequently the major factor influencing good diabetes control. The expertise of a Specialist Dietitian is required to undertake a full assessment of the patient's diet, lifestyle, insulin dose (including a time action profile) and goals and subsequent to this formulate a treatment plan based on the individual patient needs. The dietitian may be required to advise on dose adjustment of current insulin therapy to match reported carbohydrate intake. Other factors that need to be considered are data from BG monitoring, physical activity, illness and current medication.

Dose adjustment of insulin in relation to diet may be required in any adult patient with Type 1 diabetes, Type 2 diabetes or other types of diabetes treated with insulin with the exception of those who meet the exclusion criteria listed in [Section 5](#).

5. Exclusion Criteria

The dietitian will **not** advise on dose adjustment of insulin in the following patients/instances:

- Patients who are non-compliant with agreed self-monitoring, or do not produce necessary monitoring records.
- Patients who are non-compliant with advised insulin doses.

6. Principles of Diet Therapy

There are several different models of diet therapy currently used in NHS Grampian and nationwide. The choice of model is dependent upon the patient, the type of diabetes, their lifestyle and the aims of their care.

6.1. Structured Education for people with Diabetes

Structured education is an evidenced based approach for people with Type 1 diabetes on basal bolus insulin regimens, designed to promote autonomy and self-care of diabetes, the principles of which are to adjust insulin dose depending upon the chosen carbohydrate intake.

Diabetes educators (DSD and Diabetes Specialist Nurses) will complete peer reviewed learning and competencies with their co-educator.

Patients complete a structured education course and receive ongoing support from the diabetes team as required/requested.

Patients who have been through a diabetes structured education programme are taught a precise, evidence based system of establishing how much quick acting insulin to take based, in part, on their current blood glucose level and the quantity of carbohydrate they choose to eat. This is done using algorithms and ratios of quick acting insulin to carbohydrate. Consideration is also given to correcting blood glucose levels above/below target and how to plan for physical activity.

People who are newly diagnosed with Type 1 Diabetes attend the Scottish Type 1 Education Programme (STEP) programme to learn the principles of carbohydrate counting and insulin dose adjustment. Patients are taught a precise, evidence based system of establishing how much quick acting insulin to take based, in part, on their current blood glucose level and the quantity of carbohydrate they choose to eat. This is done using algorithms and ratios of quick acting insulin to carbohydrate.

BERTIE online is a virtual education programme for people with Type 1 diabetes on a basal bolus insulin regimen which provides another option to learn about carbohydrate counting and insulin dose adjustment. Understanding of these principles is assessed by a dietitian through the patients food diary, blood glucose monitoring and insulin dose records.

The My Diabetes My Way Carbohydrate counting e-learning module is another virtual education programme for people with diabetes (Type 1 or other types of diabetes) on a basal bolus insulin regimen. This does not cover all the topics in BERTIE online but provides another option to learn about carbohydrate counting and insulin dose adjustment. Understanding of these principles is assessed by a dietitian through the patients food diary, blood glucose monitoring and insulin dose records.

6.2. Healthy eating guidance for diabetes

Patients are taught the basic principles of healthy eating, with the emphasis on portion control and the Eat Well Guide. Specific attention may be given to the total amount of carbohydrate in the diet and insulin titrated accordingly.

When adjusting insulin dose, the type of diabetes, the dietary principles, aims of treatments and insulin regimen (type and dose) need to be considered.

6.3. Protein Sparing Modified Fast (PSMF)

Patients with a BMI >30kg/m² and Type 2 diabetes may choose to try a very low carbohydrate diet (PSMF) in order to achieve weight loss or before bariatric surgery. This regimen is carried out after thorough screening and under the guidance of a physician.

Insulin doses are often reduced by as much as 50% or discontinued altogether upon commencement of a PSMF regimen. Dietitians initiating PSMF would do so using the Clinical Focus Group guidelines for the use of PSMF⁶ and will have received training on the use of this regimen.

These are the most common dietary principles employed by dietitians, however individuals may present or request to follow other types of diet with little evidence base for their effectiveness. Dietitians will endeavour to support patients in their choices in an attempt to reduce any risks associated with these choices.

7. Adjustment of Insulin

Each dose of insulin should be adjusted based on a clinical decision which takes account of self-reported pre and post meal blood glucose records, HbA_{1c} results, other co-morbidities, desired lifestyle, dietary patterns, agreed changes, targets and the carbohydrate content of meals. Also consider recent oral diabetic medication changes

7.1. Increasing insulin

Each dose of insulin can be increased by a maximum of the 10% of current dose in poorly controlled diabetes (blood glucose regularly above 11mmol/L) or in accordance with carbohydrate intake and current blood glucose readings (e.g. increased dietary intake from carbohydrate containing foods).

7.2. Decreasing insulin

Each dose of insulin can be reduced by up to 10%.

In cases where dietary intake is significantly reduced (particularly from carbohydrate containing foods, e.g. PSMF), where there is increased activity, frequent hypoglycaemia (i.e. blood glucose <4mmol/L), or as part of a structured education course certain insulin doses may need to be reduced by up to 50% of current dose or discontinued altogether.

8. Follow Up

Dose adjustment will be advised and the patient provided with contact details (telephone or email) to contact a DSD or Cystic Fibrosis Dietitians if problems should arise. The dietitian may refer the patient to another member of the diabetes team for review if felt clinically appropriate (for example illness, diabetic ketoacidosis, recurrent or severe hypoglycaemia).

9. Documenting Changes

Adjustment to insulin should be recorded in the Scottish Care Information (SCI) - Diabetes (electronic records) which can be accessed by secondary care clinic staff and General Practitioners. Documentation for maternity patients should also be recorded in BadgerNet. Documentation should include clinical justification or reasoning for advising a change.

A record of completion of structured education will be recorded on SCI-Diabetes.

10. Advice to Patient/Carer

Advice should be given on what to expect and what to do for major and minor reactions.

- When insulin is increased, risk of **hypoglycaemia** is increased. Review hypo signs, symptoms and treatment.
- When insulin is decreased, risk of **hyperglycaemia** is increased. Check that the patient knows how to correct BG above their target and what correction factor they use. Ensure patients aware of what levels to check for ketones and aware of 'sick day rules' and how to apply them.

Verbal advice should be given to the patient/carer prior to any change in dosage. Suggestions should be documented by the patient/dietitian for the patient to have as a reminder of the changes discussed. Telephone/email contacts will be documented as described in [Section 9](#) above.

The dietitian must ensure that the patient/carer has contact numbers for their named diabetes health care professionals and should be encouraged to contact them for advice and support.

11. References

1. UKPDS Lancet 1998: 352; 837 – 853.
2. N Engl J Med. 1993 Sep 30; 329(14):977-86. The Diabetes Control and Complications Trial Research Group.
3. British Dietetic Association: Code of Professional Conduct. May 2017.
4. Standards of conduct, performance and ethics (HCPC January 2016, Dietitians).
5. Standards of proficiency (HCPC March 2013, Dietitians).
6. Guidelines for the use of a Protein Sparing Modified Fast as a Treatment for Type 2 diabetes. NHSG Diabetes Clinical Focus Group Nov 2010.

Competency framework for NHS Grampian Specialist Diabetes Dietitian, Cystic Fibrosis Dietitians and Specialist Weight Management Dietitians advising on the adjustment of insulin dose for people with diabetes NHS Grampian

This framework is intended for use by those staff named in the guidance for the adjustment of insulin dose for patients with diabetes by Diabetes Specialist Dietitians (including specialist Cystic Fibrosis and Weight Management Dietitians) in NHS Grampian.

The above staff are required to have a knowledge and understanding of:

Policies and guidelines

- NICE Guidelines (www.nice.org.uk)
- Type 2 Diabetes in Adults: Management NG28 (Dec 2020) (www.nice.org.uk/guidance/ng28)
- Type 1 Diabetes in Adults: Diagnosis and Management NG17 (Dec 2020) (www.nice.org.uk/guidance/ng17)
- Diabetes in pregnancy: management from pre-conception to the post-natal period NG3 (Dec 2020) (<https://www.sign.ac.uk/media/1090/sign154.pdf>)
- SIGN 154 - Pharmacological management of glycaemic control in people with type 2 diabetes (Nov 2017) (www.sign.ac.uk/assets/sign154.pdf)
- SIGN 116 Management of Diabetes (Nov 2017) (www.sign.ac.uk/assets/sign116.pdf)
- NHS Grampian Guidance Diabetes http://guidance.nhsg.grampian.scot.nhs.uk/sites/Grampian_Guidance/diabetes
- Management of Cystic Fibrosis Related Diabetes 2004 – currently being reviewed (Aug 2021) [Management of Cystic Fibrosis Related Diabetes Mellitus - June 2004](#)
- Diabetes Improvement Plan 2021 -2026 [Diabetes Care in Scotland](http://diabetesinscotland.org.uk) (diabetesinscotland.org.uk)
- Evidence based nutrition guidelines for the prevent and management of diabetes (March 2018) [Evidence-based nutrition guidelines for the prevention and management of diabetes | Diabetes UK](#)

Clinical aspects

- Diabetes, its causes and symptoms.
- The management of diabetes, including insulin profiles.
- Understanding of the legal status of the medication involved.
- Carbohydrate counting.
- The principles and application of working in partnership with patients and carers.
- Interpretation of glucose profiles from glucose meters, flash glucose monitors, continuous glucose monitors and pumps.

Staff must undertake at least 18 hours post-graduate education in diabetes per annum.

Staff must be able to demonstrate competent practice related to the adjustment of insulin in 6 patient contacts per year.

Meeting the competencies

Staff new to post or returning to work after a period of ≥ 1 year

1. Theoretical Learning

The above staff are required to attend one of the following courses:

1.1 Learning about diabetes

- Complete BERTIE online www.bertieonline.org.uk
- Learn about flash glucose monitoring – complete freestyle libre academy online modules FreeStyle [Progress - Abbott \(freestylediabetes.co.uk\)](http://Progress - Abbott (freestylediabetes.co.uk))

In addition staff are encouraged to complete the following e-learning modules:

- [The six steps to insulin safety - DiabetesontheNet](#)

1.2 Learning about diet

All staff are required to:

- Follow a patient through the STEP programme
- Complete My Diabetes My Way CHO counting module
- Complete BERTIE online
- Complete a food diary demonstrating an ability to count CHO accurately.

2. Practical Skills, Knowledge And Experience

2.1 Staff will follow patients through the system, observing patients who are referred on to the other members of the specialist diabetes multidisciplinary team such as Consultant/GP, Diabetic Specialist Nurse (DSN), DSD, podiatrist and psychologist where applicable.

2.2 Staff will observe and shadow a DSD or DSN practising dose adjustment on 5 occasions in at least 2 of the following applicable locations:

- Consultant led - Acute Clinic.
- Consultant led - Community Clinic.
- GP led – Diabetes Clinic.
- Consultation of patients with diabetes - hospital ward/clinic.
- DSN Led Community Clinic.
- STEP programme/Structured Education Programme

2.3 Staff will be mentored on 5 occasions adjusting insulin doses in one of the above settings, with the opportunity for support and discussion from a DSD or DSN.

Maintaining Competencies

New and existing staff will be required to provide and demonstrate evidence of continued competence to adjust insulin to enable them to continue to work within the NHS Grampian Guidance.

A competencies checklist is included in this document providing detail of the knowledge and skills required ([Appendix 2](#)).

Formats for achieving this:

(1) Practice supervision with peers, consultants or other diabetes specialist medical staff:

- This should be undertaken a minimum of 4 times/year.
- This can be in the form of 1:1 supervision or group supervision.

(2) Audit of notes

6 sets of dietary/medical notes to be audited annually for:

- Dose prescribed.
- Adverse drug reaction.
- Evaluation of treatment outcome and care.
- Clear documentation.

It is the responsibility of dietetic managers to ensure this is completed.

(3) Evidence of maintaining knowledge and skills in diabetes

Through attendance at relevant meetings, education seminars/conferences (national or local), critical appraisal of new evidence, annual and ongoing appraisal.

All learning for those new or returning to the post and for existing staff should be recorded as per professional CPD requirements.

All staff will be required to include the competencies related to dose adjustment in their Turas PDP.

In addition, an experienced Specialist Dietitian in each area (acute and primary care) will be identified to act as a source of advice, guidance and support for less experienced staff or those new to post.

A dietitian with 3 years of continued working in the field of diabetes is classed as experienced.

In addition the following requirements are necessary. Staff must:

- Agree to be professionally accountable for their work.
- Maintain their skills and knowledge in this area according to the individual Code of Professional Conduct (BDA 2017).
- Agree to work within the terms of the NHS Grampian guidance.

Clinical managers will be responsible for:

- Ensuring that all staff are aware of and work within the guidance for the adjustment of insulin dose for patients with diabetes by Specialist Dietitians in NHS Grampian.
- Ensuring that staff have received adequate training in all areas relevant to this guidance.
- Maintaining a current record of all Specialist Dietitians authorised to recommend dose adjustment of insulin under this protocol.

Knowledge And Skills Required By NHS Grampian Diabetes And Cystic Fibrosis Specialist Dietitians Advising On The Adjustment Of Insulin Dose

Competencies checklist

Knowledge	Achieved
An in-depth understanding of the causes of diabetes	
An in-depth understanding of the impact of nutrition and physical activity on diabetes	
An in-depth understanding of inter-relation of diet, medication and biochemistry	
An in-depth understanding of the carbohydrate content of food	
An in-depth understanding of significance of tests used in patient care	
An in-depth understanding of normal and abnormal blood glucose and HbA _{1c} values	
An in-depth understanding of how to interpret blood glucose and HbA _{1c} values	
A working understanding of the importance and effects of patient education and self-management	
An in-depth understanding of how to gather information from patients about their health	
An in-depth understanding of how to reduce risk of and manage hypoglycaemia	
An in-depth understanding of the medications used to manage diabetes	
A critical understanding of the effects of insulin on diabetes	
An in-depth understanding of the types of insulin	
An in-depth knowledge and understanding of current theories for calculating CHO: insulin ratios	
A working understanding of behavioural change/motivational interviewing to assist patients self-manage their diabetes	

Signatures

Supervisor: _____ Date: _____

Staff member: _____ Date: _____