Title	**Guideline for Insulin Adjustment by Diabetes Specialist Dietitians**
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Approved by	NHS Borders Diabetes Team NHS Borders Area, Drugs & Therapeutics Committee
Prepared by	Initial document Gillian Bremner (Lead Paediatric Dietitian)
Developed by	This policy has been adapted, with permission, from: NHS Lothian Guidelines for Insulin Adjustment by Diabetes Specialist Dietitians (September 2017) NHS Grampian Protocol for the Adjustment of Insulin Dose by Paediatric Diabetes Specialist Dietitians Working with Children within NHS Grampian (May 2019) Jill Little (Lead Diabetes Specialist Nurse) Nicky Berry (Director of Nursing) Alison Wilson (Director of Pharmacy) Gillian Bremner (Lead Paediatric Dietitian) Erica Reid (Associate Director for Nursing/AHP Services) Kenny Mitchell (General Manager in P&CS) Dr Graeme Eunson (Consultant Paediatrician) Dr Olive Herlihy (Consultant Physician) Dr Rachel Williamson (Consultant Physician)
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Equality and Diversity Impact Assessed	N/R

Contents: Page

1. Introduction

Diabetes is a chronic condition in which therapy should be tailored to the 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). Diabetes Specialist Nurses (DSN) and Diabetes Specialist Dietitians (DSD) working as part of the Diabetes multidisciplinary teams in both paediatrics and adults across a number of healthcare settings have a pivotal role to play in educating patients in the management of their therapy to optimise blood glucose control within the context of their individual lifestyles and circumstances.

It is widely recognised that the adjustment of insulin is an integral part of the DSN role but in recent years, DSDs too have been advising on insulin adjustment as a key part of their role, an example of this is the Dose Adjustment For Normal Eating (DAFNE) project. DAFNE with its solid evidence base has shown improved glycaemic control, better quality of life and psychological wellbeing (3,4). This project has also highlighted the benefits of both DSNs & DSDs advising and educating patients on insulin dose adjustment. Dietitians have a highly specialist and detailed knowledge of the nutritional value of food and how this affects blood glucose levels and insulin requirements. DSDs provide advice and teaching on a number of aspects of diabetes care including the following:

- Change in treatment e.g. change from oral medication to incretin mimetic therapy or to insulin +/- oral medication, change of insulin regimen
- Pregnancy
- New patient education at diagnosis
- Adjustment of insulin doses in relation to Carbohydrate (CHO) intake and Insulin Sensitivity Factor
- Adjustment of insulin doses with regards to disease related infection and oral intake
- Adjustment of insulin in relation to exercise and alcohol
- Adjustment of background insulin doses in relation to changes in basal requirements
- Teaching of carbohydrate (CHO) counting skills
- Weight management
- Insulin pump therapy

2. Purpose

To purpose of this policy is to authorise appropriately qualified and trained Diabetes Specialist Dietitians (DSDs) (see Essential criteria p4) to advise alterations to insulin doses to individuals without the requirement for a patient specific prescription written by a medical practitioner or non-medical prescriber. This policy is not applicable to the initial supply of insulin. This policy is designed as a guide to the safe limits within which DSDs can adjust insulin dose and the competencies required by them when recommending insulin dose adjustment and working within this policy.
As the Consultant is the person responsible for the patient care, anyone operating under this policy is accountable to the Medical Consultant, Dietetic Line Manager and own professional body.

'We strongly recommend that a local protocol (written by medical management committee in trust e.g. doctor, pharmacist, dietitian's, nurse etc) is in place for any members of staff adjusting insulin doses and that staff are acting within their scope of practice keeping up-to-date with training. We also strongly recommend that this is documented in the dietitian's job description'

Eleanor Johnstone PG Dip, BSc, RD
Policy Officer (Education & Professional Development)

3. Clinical condition or situation to which this policy applies:

Indication: Diabetes Mellitus

Inclusion criteria:

- Patients diagnosed with Diabetes Mellitus Type 1, Type 2, gestational, Maturity Onset Diabetes of the Young (MODY), Latent Autoimmune Diabetes of Adults (LADA) or secondary pathology Diabetes such as exocrine insufficiency, Cystic Fibrosis related Diabetes, drug/disease induced who attend NHS Borders for their inpatient and/or outpatient Diabetes care treated with insulin who would benefit from dose adjustment, with the exception of those who meet the exclusion criteria
- Patients for whom a registered medical practitioner has prescribed insulin and is under the care of a Consultant Diabetologist/DSN prescriber and only when insulin doses are given subcutaneously by syringe, insulin pen or insulin pump
- The DSDs will be authorised to titrate the dose of insulin when either a recent glucose profile or download (from a glucose meter, continuous glucose monitor, intermittently scanned continuous glucose monitoring technology or pump) is available for review

Exclusion criteria (the DSDs will **NOT** advise on dose adjustment in the following patients/instances)**:**

- Any child under 1 year of age
- Patients/Parents/Carers who do not wish to be advised about medication adjustment by a DSD
- If the presenting clinical condition is deemed to be out with area of expertise and knowledge of the DSD
- If the patient being treated is using a continuous subcutaneous insulin infusion and where staff member is untrained in this aspect of care
- Patients who have not been assessed by a Consultant and prescribed insulin by a registered medical practitioner

In the above circumstances the DSD will refer the case to a more experienced member of the Diabetes team e.g. Consultant.

4. Essential staff criteria for DSDs authorised to adjust insulin dose:

- Health and Care Professions Council (HCPC) registered Dietitians with a minimum of 3 years post-registration experience and 1 years experience working as a Diabetes Specialist Dietitian at Band 6 or above employed by NHS Borders
- Non-specialist Dietitians providing clinical cover for a DSD are **NOT** authorised under this policy and should not advise on dose adjustment of insulin. Out with scope of practice within a supervision framework within the Diabetes Dietetic Team
- British Dietetic Association (BDA) membership or other recognised professional indemnity cover
- Have a detailed understanding of the disease process of Diabetes Mellitus, Type 1 and Type 2 diabetes, gestational, MODY, LADA or secondary pathology Diabetes such as exocrine insufficiency, Cystic Fibrosis related Diabetes, drug/disease induced
- Have a detailed understanding and experience of the action, side effects and appropriate use of insulin in line with current treatment recommendations, keeping up to date with the NHS Borders formulary 'Drugs used in Diabetes'
- Be competent in the interpretation of downloads from glucose meters, continuous glucose monitors and pumps and competent to discuss issues concerning insulin with patients/parents/carers
- Hold a clinic caseload of at least 12 patients per year with Diabetes on insulin
- Supervision from a suitable mentor e.g. all Diabetes Consultants & DSNs who have completed a prescribing course. See Appendix 1 for supervision checklist
- Have completed at least 2 days learning specifically dedicated to Diabetes per year. Learning outcomes should be demonstrable in a professional portfolio and at annual TURAS appraisal
- Maintain their skills and knowledge in this area according to their individual Code of Professional Conduct (5) and HCPC and Standards of Conduct, Performance and Ethics and the Standards of Proficiency (6,7)
- Have permission and seek agreement from the Dietetic Line Manager to work under this policy
- Be aware of his/her own professional accountability when working in accordance with this policy
- Completed the Safe Use of Insulin module by the virtual college https://www.virtual-college.co.uk/courses/healthcare-courses/safe-use-of-insulin-administration

5. Maintaining competency:

New and existing DSDs will be required to provide and demonstrate evidence of continued competence to adjust insulin dose to enable them to continue to work within this policy. Examples;

- Hold a clinical caseload of at least 12 patients per year with diabetes on insulin therapy
- Have completed at least 2 days (pro rata) learning specifically dedicated to diabetes per year. Learning outcomes should be demonstrable in a professional portfolio and discussed at annual TURAS appraisal
- Provided advice to at least 4 patients per year receiving insulin injections with supervision from a mentor (supervision can include direct observation and/or retrospective discussion/reflection)
- Practice supervision with peers, Consultants or DSNs

- Audit of notes including audit of dose adjustment, adverse drug reaction, evaluation of treatment outcome and care and clear documentation
- Attendance at relevant meetings, education seminars/conferences, critical appraisal of new evidence, annual and ongoing appraisal

6. Essential criteria for DSD authorised to adjust insulin using insulin pump therapy:

- Completed a Diabetes and Insulin Pump Therapy course or provide equivalent evidence of pump competency
- Responsible for/contributes to at least 2 pump start/upgrade patients per year with supervision with an experienced member of staff in insulin pump therapy

7. Clinical Managers Responsibility:

- Ensuring staff are aware of and work in accordance with this policy
- Ensuring staff can provide evidence that they meet the competencies listed in Appendices 1 and 2
- Ensuring staff are provided with the opportunities to undertake adequate training in all areas relevant to this policy. This includes any updates to training that may be required
- Maintaining a current record of all DSDs authorised to recommend dose adjustment of insulin under this policy (record to be saved on shared drive)

8. Descriptions of insulins available under this policy

Please see NHS Borders Formulary 6.1 Drugs Used in Diabetes for agreed list of insulins used within NHS Borders; http://intranet/BordersFormulary/index.html
Current insulins on the NHS Borders formulary include:

- Soluble Insulin - Actrapid®, Humulin S®
- Insulin Aspart – Novorapid®, Fiasp®
- Insulin Lispro – Humalog®, Humalog U200 ®
- Insulin Glulisine – Apidra®
- Isophane Insulin – Insulatard®
- Biphasic Isophane Insulin – Humulin M3®
- Biphasic Insulin Lispro – Humalog Mix 25® & Humalog Mix 50®
- Biphasic Insulin Aspart – NovoMix 30®
- Isophane Insulin –Insulatard®, Humulin I®
- Insulin Determir –Levemir®
- Insulin Glargine –Lantus®, Abasaglar®
- Insulin Degludec – Tresiba®
- Insulin Glargine U300 –Toujeo®
- Insulin Degludec with Liraglutide –Xultophy®

9. Adjustment of Insulin

DSD's have a role in supporting patients with insulin adjustment to optimise glycaemic control. Each dose of insulin should be adjusted based on a clinical decision which takes account of self reported pre & post blood glucose measurements, blood ketone measurements, HbA1c results, other co-morbidities, desired lifestyle, dietary patterns, dietary carbohydrate intake, agreed changes and targets.

The Insulin doses of bolus and basal insulin should be considered. DSD's can adjust average total daily insulin dose by 10% (either an increase of 10% or decrease of 10%).

When insulin is increased the risk of hypoglycaemia is increased and when insulin is decreased the risk of hyperglycaemia is increased. Long standing hyperglycaemia can increase the risk of micro and macro vascular complications.

Bolus Insulin:
Insulin dose in relation to food intake is frequently the major factor influencing good diabetes control.

- Adjustment of Insulin to Carbohydrate Ratio (ICR) and/or Insulin Sensitivity Factor (ISF) may be required. ICR and ISF can be increased or decreased as required to control blood glucose levels.

Basal Insulin:
The basal insulin should give a steady level of insulin during the day and night, therefore if the dose is correct, the BG readings on waking and before meals should be within target. Basal insulin can be adjusted gradually by DSD working within adjustment limits.

- Adjustment of basal insulin should be considered and basal rate testing recommended where appropriate.

DSDs should ensure they are adhering to +/- 10% changes to insulin based on average total daily dose. DSDs should consider that possible changes to both bolus and basal insulin may exceed this adjustment and therefore should consider more gradual changes. For paediatric patients who have a small total daily insulin dose, a +/- 10% adjustment may not be possible due to insulin dose provision and it is therefore advised the smallest insulin change possible is made.

The effect of any insulin adjustment should be monitored over 3 days or more and glucose profile or download reviewed before further adjustments are made.

Should the DSD feel a greater increase/decrease is required and/or additional changes before 3 days they should seek advice from a more experienced member of the diabetes team e.g. Consultant, Registrar or DSN prescriber.

For paediatric diabetes management the following guidelines can be referred to when adjusting insulin:
DAFNE Handbook, version 3, April 2014
RHSC Diabetes Handbook, www.edinburghdiabetes.com

Note: It may be agreed within the Diabetes multidisciplinary team that a larger insulin dose adjustment parameter for DSD to work within e.g. >10% of average total daily dose adjustment may be beneficial for certain individual patients; this revised individual dose adjustment parameter should be Consultant approved and clearly documented in the patient's medical /SCI-Diabetes/EMIS record.

10. Follow-up

When insulin dose adjustment has been recommended the patient/carer/parent will be provided with the DSD or DSN contact details and advised who to contact if they have any queries, concerns or should any problem arise.

The patient/carer/parent should be advised what to do if they are unable to contact a member of the diabetes team for advice.

The patient/carer/parent should be made aware they can contact the Diabetes Team directly via the Diabetic Helpline during office hours (08.00-16.00).

Out of hours/weekends/public holidays;

- Paediatric patients can call Ward 15 at the Borders General Hospital, NHS 24 or attend the Emergency Department
- Adult patients can contact NHS 24 or attend Emergency Department

The DSD may refer the patient to another member of the diabetes team for review if felt clinically appropriate, e.g. illness, diabetic ketoacidosis (DKA), recurrent or severe hypoglycaemia.

11. Documentation

Adjustments to insulin dose should be recorded in Dietetic notes and medical/nursing notes (where appropriate) in paper or electronic form e.g. Scottish Care Information (SCI)-Diabetes and EMIS, in line with HCPC standards. Documentation should include clinical justification or reasoning for advising a change. Details of all changes to an insulin dose **must** be documented within SCI-Diabetes database which can be accessed by all secondary care clinic staff. Letters can be sent to G.Ps detailing advice provided where appropriate and in cases where the G.P does not access SCI-Diabetes.

All Dietitians authorised to adjust insulin dose under this policy will have this documented in personal files/electronic held staff records.

12. NHS Borders Liability

Similar guidelines/protocols/policies have been approved by the Central Legal Office (CLO) for use in NHS Scotland Health Boards and the CLO would respond in the event that a liability attaches to a Diabetes Specialist Dietitian, arising from the execution of his/her duties for NHS Borders whilst following this policy and having met the essential criteria for the DSD authorised to adjust insulin dose.

13. References

1. UKPDS **Lancet 1998: 352; 837-853**
2. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. **N Engl J Med. 1993 Sep 30; 329 (14): 977-86**
3. DAFNE study group. Training in flexible, intensive insulin management to enable dietary freedom in people with Type 1 diabetes: Dose Adjustment For Normal Eating (DAFNE) randomised control trial: **BMJ: 2002; 325:746**
4. ISPAD Clinical Practice Consensus Guidelines 2014. **Paediatric Diabetes 2014:15 (suppl.20): 1-290**
5. British Dietetic Association: Code of Professional Conduct. May 2017. https://www.bda.uk.com/professional/practice/professionalism/code_of_conduct
6. Standards of Conduct, Performance and Ethics (HCPC 2016). https://www.hcpc-uk.org/globalassets/resources/standards/standards-of-conduct-performance-and-ethics.pdf
7. Standards of Proficiency – Dietitians (HCPC 2013). https://www.hcpc-uk.org/globalassets/resources/standards/standards-of-proficiency---dietitians.pdf
8. NHS Lothian, Diabetes Service, Diabetes for Children and Adolescents. Day to day diabetes management, Insulin Pumps
9. NHS Greater Glasgow and Clyde, Diabetes Service, Teaching materials, Insulin adjustment. http://www.diabetes-scotland.org/documents/pdf_files/latest%20PHR%20material/insulin%20adjustment.pdf
10. NHS Greater Glasgow and Clyde, Diabetes Service, Teaching materials, Detailed insulin adjustment. http://www.diabetes-scotland.org/ggc/documents/pdf_files/latest%20PHR%20material/in-depth%20adjustment%20of%20insulin.pdf

14. Development Group

- Jill Little (Lead Diabetes Specialist Nurse)
- Nicky Berry (Director of Nursing)
- Alison Wilson (Director of Pharmacy)
- Erica Reid (Associate Director for Nursing/AHP Services)
- Kenny Mitchell (General Manager in P&CS)
- Dr Graeme Eunson (Consultant Paediatrician)
- Dr Olive Herlihy (Consultant Physician)
- Dr Rachel Williamson (Consultant Physician)
- Gillian Bremner (Lead Paediatric Dietitian)

Review Group

This policy will undergo initial review in 6months and then at least every two years or sooner if current treatment recommendations change.

- Jill Little (Lead Diabetes Specialist Nurse)
- Alison Wilson (Director of Pharmacy)
- Erica Reid (Associate Director for Nursing/AHP Services)
- Dr Graeme Eunson (Consultant Paediatrician)
- Dr Olive Herlihy (Consultant Physician)
- Dr Rachel Williamson (Consultant Physician)
- Allana Gillies (Specialist Paediatric Dietitian)
- Julie Frater (Specialist Diabetes Dietitian)
- Amy Simmonds (Specialist Diabetes Dietitian)

15. Roles & Responsibilities

Role	Responsibilities
Consultant Physicians/Paediatricians	To authorise/review this policy and provide mentorship to DSDs (completion of supervision checklist, Appendix 1)
Director of Pharmacy	To authorise/review this policy and responsible for ensuring the registration of this policy
Lead Diabetes Specialist Nurse	To read/review this policy and provide mentorship to DSDs (completion of supervision checklist, Appendix 1)
Dietetic Line Managers	Ensure all staff are aware of and work within the Policy for Insulin Adjustment by Diabetes Specialist Dietitians. Ensure staff have received adequate training in all areas relevant to the policy. Maintain a current record of all DSDs authorised to recommend dose adjustment of insulin under this policy. Annual completion of checklist (Appendix 2)
Specialist Diabetes Dietitian's	Before adjusting insulin doses the DSDs must have read this policy and understand the context in which insulin dose adjustment is allowed by DSDs within NHS Borders. DSDs must maintain agreed competencies and advise line manager if they have any concerns regarding this policy and scope of practice.
Associate Director for Nursing/AHP Services	Accountable for the Professional guidance of Dietitians as AHPs working within NHS Borders

APPENDIX 1 – Knowledge and Skills Required by NHS Borders Diabetes Specialist Dietitians Advising on the Adjustment of Insulin Dose

Supervision checklist for mentor use, with patient examples

Knowledge	**Achieved**
Appropriate understanding of the disease processes & possible complications of diabetes	
Appropriate understanding of the impact of physical activity on diabetes	
Appropriate understanding of the carbohydrate content of food	
Appropriate understanding of how to interpret blood glucose and HbA1c values	
A working understanding of the importance and effects of patient education and self management	
Appropriate understanding of how to gather relevant social & medical history from patients	
Appropriate understanding of how to reduce risk of and manage hypoglycaemia	
Appropriate understanding of how to reduce risk of and manage hyperglycaemia	
Appropriate understanding of the medications used to manage diabetes	
A critical understanding of the effects of insulin on diabetes	
Appropriate understanding of the types of insulin	
Appropriate knowledge and understanding of current theories for calculating carbohydrate : insulin ratios	
A working understanding of behavioural change/motivational interviewing to assist patients self manage their diabetes	

Name of Dietitian: _____

BDA membership number:_____

HCPC registration:_____

Signature: _____

Name of Supervisor: _____

Signature: _____

Date: ___/___/_____

APPENDIX 2 - **Competencies checklist for Clinical Manager's use**.

To be completed on an annual basis.

Competency	**Achieved**
Has clinical case load of at least 12 patients per year with diabetes on insulin therapy	
Provided advice to at least 4 patients per year receiving insulin therapy with supervision from a mentor	
Have completed at least 2 days pro rata per year learning specifically dedicated to diabetes	
FOR DSDS AUTHORISED FOR INSULIN PUMP THERAPY	
Completed a pump course or equivalent evidence of pump competency	
Responsible for/contributes to at least 2 pump start/upgrade patients per year with supervision with an experienced member of staff in insulin pump therapy	

Name of Dietitian: _____

Signature: _____

BDA membership number:_____

HCPC Registration:_____

Name of Supervisor: _____

Signature: _____

Date: ___/___/_____