**York Teaching Hospital**

**NHS Foundation Trust**

**Children and Young People’s diabetes team**

**Multi disciplinary team**

**Operational Policy**

Author Dr Dominic Smith

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**Introduction**

The Children and Young People’s Diabetes Multidisciplinary team provides an

integrated service for children and young people with diabetes from the time of

diagnosis through to transition to adult services. Trained paediatric diabetes staff

work with paediatric ward staff, school staff, primary care, families, colleagues in

adult diabetes and regional colleagues to provide services and improve the

quality of services for children and young people with diabetes.

The team is based in Child Health at York Hospital with an outreach clinic at Selby Hospital to provide services to York and North Yorkshire population of 500 000 with 80 000 children and young people.

The service currently provides care for 182 children up to age 18 from a large

urban and rural geographical area. The service is delivered as part of the

Yorkshire and Humber Children and Young People’s Diabetes Network.

**Multidisciplinary Team (MDT)**

**Purpose of MDT**

The service aims to provide best practice services for children and young people

with diabetes from the point of diagnosis to transition to adult services. A major

aim is to establish good practice to give optimal glycaemic control at the earliest

point of management of the condition to reduce risk of long term morbidity.

The approach is designed to support children and families with the psychological

issues relating to chronic illness to facilitate full inclusion in social and academic

activities.

**Specific aims**

1. To **deliver** excellent care through:

- providing full diabetes team support from diagnosis to follow up and

transition to adult diabetes services

- offering full range of intensive insulin regimen

- offering full follow-up health surveillance

- involvement in research and education to maintain good practice

1. To **improve** services through:

- accurate data collection and analysis

- implementing national recommendations

- participating in national audit and regional network

- involve patients and families in service evaluation and

improvement

**MDT Membership arrangements**

Names of core team members:

Ruth Kingsley paediatric diabetes specialist nurse

Keyworker childrens clinic

Schools policy

Patient experience feedback

Patient information

Sally Jennians paediatric diabetes specialist nurse

Keyworker transition clinic

Transition

Policies and patient information

Peer review

Service development

Dianne Mitchell paediatric diabetes specialist nurse,

Keyworker childrens clinic

Support group

Structured education

Patient information

Lipohypertrophy screening

Katie Holmes paediatric diabetes specialist nurse

Keyworker transition clinic

Transition

Audit

Ward staff education

Structured education

Sarah Jayes paediatric diabetes dietician

Dominic Smith consultant paediatrician childrens clinic, lead clinician

Jo Mannion consultant paediatrician young persons clinic

Liz Baker consultant paediatrican children’s Selby clinic

Emma Peakman consultant clinical psychologist

Kathryn Tompkins secretarial admin support

Kieran Stennett admin assistant

Extended team members:

Jonny Thow consultant adult diabetologist young persons clinic

Vicky Clancey diabetes specialist nurse transition young adult

Nicholas Sykes consultant child and adolescent psychiatrist

Sue Roughton lead nurse for safeguarding York Hospital

Anthea Downing lead play therapist for paediatric diabetes

Paul Burland named podiatrist

Anne Penrice biochemist, point of care testing lead

Andrew Hurran Database management, Information technology department

Katie Appleby Ward 17 link nurse

Sophie Fawcett Ward 17 link nurse

**Core responsibilities of lead clinician**

● Lead the clinical activity of the MDT working to NICE and ISPAD

guidelines ensuring a high quality service to meet national targets for diabetes

management

●` Attend and contribute to the Yorkshire and Humber CYPDN regional

meeting or agree a representative from the team

● Produce and update clinical guidelines

● Coordinate MDT meetings

● Establish an audit programme

● Produce an annual report and work plan for the MDT

● Ensure data submitted for National Diabetes Audit

● Take overall responsibility for MDT

● Keep up to date with paediatric diabetes practice. Complete postgraduate

training in paediatric diabetes including pump therapy programmes.

● Attend at least 1 educational training event every year agreed by the

CYPDN

These responsibilities are agreed with the clinical director of child health. Direct

clinical care and administrative time are included in the lead clinician’s job plan to

perform this role.

**Core responsibilities of diabetes specialist nurses**

contributing to the multidisciplinary discussion and patient assessment /

care planning decision of the team at the patients inpatient/outpatient

reviews

providing expert nursing advice and support to other health professionals

in the nurse's specialist area of practice;

involvement in clinical audit

leading on patient and carers' communication issues and co-ordination of

the patient pathway for patients referred to the team - acting as the key

worker or responsible for nominating the key worker for the patient's

dealings with the team

The named keyworker should be recorded in the patient notes and on the

database. Patients should have a contact phone number for their

keyworker.

providing expert advice to individual professionals who are involved in a

patients care who and are based in a community setting (e.g.

schools/colleges)

contributing to the management of the service

contributing towards research in the nurse's specialist area of practice..

Keep up to date with paediatric diabetes practice. Complete postgraduate

training in paediatric diabetes including pump therapy programmes with at

least 20 credits at degree level

Attend at least 1 educational training event every year agreed by the

CYPDN

**Core responsibilities of dietician**

● Contribute to the MDT discussion and planning decisions of the team

● Provide specialist paediatric diabetes dietetic advice to young people and

their families from diagnosis

● Provide paediatric diabetes dietetic advice to other health professionals

and education staff involved in managing children and young people with

diabetes

● Lead on the implementation of carbohydrate counting with children,

families and ward staff

● Involvement in clinical audit

● Attend clinic for dietetic review and more detailed annual review dietetic

opinion

● Keep up to date with paediatric diabetes dietetic practice. Complete

postgraduate training in paediatric diabetes including pump therapy programmes.

● Attend at least 1 educational training event every year agreed by the

CYPDN

**Core responsibilities of psychologist**

● contribute to the MDT discussion and planning decisions of the team

● provide specialist support to young people and their families to promote, restore,

sustain, and/or enhance positive functioning and a sense of wellbeing through

preventive, developmental and/or remedial services from diagnosis

● provide advice to other health professionals and education staff involved in

managing children and young people with diabetes

● involvement in clinical audit

● attend MDT monthly meetings

● Attend at least 1 educational training event every year agreed by the CYPDN

**Training of MDT members**

Diabetes specialist nurses must have completed RSCN training and have further

training in childhood diabetes through completion of Masters modules in children

and young people’s diabetes and pump therapy.

Consultants must have completed training in general paediatrics with special

interest in diabetes. Consultants must complete further postgraduate training in

childhood diabetes and pump therapy. Consultants appointed before 2012 do not

need to complete the RCPCH Special Interest Diabetes training but should have

at least 2 years clinical experience of work in paediatric diabetes with annual

appraisal and training needs reviewed through the previous system for

postgraduate training.

Dietician must have completed postgraduate training in paediatric diabetes

including pump therapy training.

Psychologist should be trained to doctoral level with experience in paediatric

psychology. Specific skills in paediatric diabetes are to be developed in the post

through working with psychology colleagues across the Yorkshire and Humber

region.

**MDT Cover arrangements**

Ward staff have access to protocol guidance and acute on call general

paediatrician advice out-of-hours. If there is a complex emergency issue (such as

diabetic ketoacidosis) then the general paediatrician can contact one of

the 3 paediatric consultants with special interest in diabetes at any time out of

hours. A formal rota for this cover is available in the child health section of the hospital computer system.

Consultants Dominic Smith, Jo Mannion, Liz Baker provide cross-cover for each

other to provide advice during office hours and out of hours emergency advice

24hours a day 7 days a week throughout the year.

Diabetes specialist nurses provide cover for each other if any absence for annual

leave, study leave or illness. There is always at least one member of the group

on duty for children and young people during office hours Monday- Friday 9-5.

Sarah Jayes, dietician is covered by 2 colleagues in paediatric dietetics

Psychologist Emma Peakman is covered by Dr Nick Sykes based at the Lime

Trees Unit

Admin support secretary Kathryn Tompkins is covered by child health directorate

secretarial colleagues.

**MDT management**

Paediatric diabetes is managed within the child health directorate reporting to

Directorate Manager and Clinical director who are responsible to the Foundation

Trust Chief Executive and Board for the performance of the directorate.

The lead clinician for the children’s diabetes team is Dr Dominic Smith,

consultant paediatrician with Dr Jo Mannion, consultant paediatrician as lead for

the young persons clinic transition. These leadership roles are agreed with the

clinical director child health through the directorate management group.

The lead clinician is responsible for the clinical management of patients and

service management to meet national standards.

There are 4 (3.8 WTE) diabetes specialist nurses who are managed by the Child

Health Directorate Matron.

There is 1 adult diabetes specialist nurse who has involvement with the older

transition patients who is managed within the diabetes service within the

medicine directorate.

The paediatric dietician and the dietician in the Young persons clinic

are managed by the head of dietetics for York Hospital.

The paediatric diabetes clinical psychologist is managed by the child health

directorate with clinical supervision under the child and adolescent mental health

service.

The Children and Young People’s diabetes service management group meets 3-4 monthly to provide co-ordination and development of care of children with diabetes. The team includes

* Lead consultant
* Lead nurse
* Lead consultant for transition
* Consultant for Selby service
* Adult diabetes consultant
* Directorate manager for child health
* Trust lead for point of care testing
* Lead for point of care testing

Performance of the service is reviewed in this meeting by report and discussion of the following measures:

HbA1c levels

Annual review check completion rates

DNA rate

Education review rates

Ward staff training rate

Team staffing and continuing diabetes education

Progress report on each active quality improvement project

In addition the meeting will record an update on regional network activity and patient experience and involvement.

Annual report

Patient numbers

Challenges for the coming year

Trust Wide Management Group

Report on the completeness of the group and the frequency/dates of the meetings and issues discussed as well as actions to be taken [these should be included in the work programme].

Paediatric Ward Staff Training

Report on the training that has taken place with dates. Show numbers of staff trained as percentages of overall staff.

Leadership and Core Membership

Report on any changes in core membership during the preceding year including leavers, new starters and any changes to WTE/PAs.

Ongoing Specialist Training

# 

Clinical Guidelines

Any new guidelines agreed and issued should be listed here as well as in the operational policy table.

Patient Pathways

Any new patient pathways agreed should be listed here as well as in the operational policy table.

Patient Choice of Insulin Pump Therapy

Percentage of patients on pump therapy to be added.

|  |  |  |
| --- | --- | --- |
| Year | No of patients meeting NICE guidance | Percentage on pumps |
|  |  |  |
|  |  |  |
|  |  |  |

Any ongoing challenges/successes with pump therapy should be described here.

Continuous Glucose Monitoring (CGM)

Percentage of patients on on-going, real-time CGM to be added. [Use table to show year on year changes as this may be useful for business planning purposes].

|  |  |  |
| --- | --- | --- |
| Year | No of patients meeting NICE guidance | Percentage receiving CGM |
|  |  |  |
|  |  |  |
|  |  |  |

Any ongoing challenges/successes with offering CGM should be described here.

Multidisciplinary Follow-Up Appointments

Insert latest NPDA annual report data to show current achievement and describe how team plans to address any shortfalls especially with adherence to the changes in the Best Practice Tariff wording requirements.

HbA1C Measurement

Insert latest NPDA annual report data for current achievement and show how team plans to address any shortfalls.

Dietetic Assessment

Insert latest NPDA annual report data for current achievement and show how team plans to address any shortfalls.

Psychological Assessment

Insert latest NPDA annual report data for current achievement and show how team plans to address any shortfalls.

Additional Contacts

Need to report on the percentage of patients achieving the additional contacts, the challenges for the team in meeting this and any plans to address.

Support for Children in Education

Describe successes and challenges in achieving the requirements.

Screening of Children and Young People with Diabetes

Use latest NPDA annual report for current achievement and show how team plans to address any shortfalls.

Transition and Transfer Policy

Describe number of patient currently in transition. Outline any capacity issues, future planning based on age profiling etc. Any challenges in engaging adult teams?

Patient Information and Support

Describe any new information produced or reviewed.

Individualised Objectives

Describe any challenges in ensuring all CYP achieve their objectives.

Diabetes Self-Management Education

Describe any challenges in delivering age and maturity related self-management education to each child and family.

Record of Care

Describe any challenges in ensuring all CYP receive records of care.

Patient Reported Experience Measures

Describe how the most recent PREM results have been presented and discussed at a CYPD MDT meeting.

What action plans for improvement have been agreed and implemented as appropriate including giving feedback on results to CYP and families?

Patient/Carer Experience of Transition and Transfer

Describe the exercise and whether results have been presented and discussed at a CYPD MDT meeting.

Have any action plans for improvement been agreed and implemented as appropriate?

National Paediatric Diabetes Audit (NPDA)

Show how the CYPD MDT has reviewed their individual unit report and annually submitted their NPDA results to the CYPDN for discussion and review of progress.

Has the MDT agreed a programme for improvement?

Review of Children and Young People's Admissions

Show details of hospital admissions for children and young people in the following categories.

|  |  |  |  |
| --- | --- | --- | --- |
|  | No of admissions | No of patients | LOS |
| Those with newly diagnosed diabetes. |  |  |  |
| CYP with DKA. |  |  |  |
| CYP with hypoglycaemia. |  |  |  |
| CYP for re-stabilisation. |  |  |  |

Describe how the reviews are held and outcomes recorded.

Did Not Attend / Was Not Brought Policy

Identify the DNA/WNB rates for the different clinics.

Have DNA/WNB rates been reviewed across all clinics?[include table of data]

Are DNA/WNB rates reviewed across different age bands?

Have DNA/WNB rates been discussed at the trust/health board management group [Date)

Have actions been taken to improve patient surveillance. [List]

Have the DNA/WNB rates been discussed at CYPDN? [Date]

Outline plans to address.

Extra-curricular activity delivered by the MDT

**MDT meetings**

Frequency

Weekly meeting / prior to clinic to discuss new patients, clinic patients and any

urgent issues

Policy for patients that require a treatment decision before next MDT :

Immediate discussion with responsible paediatric diabetes consultant on day of

admission or next working day

All decisions are recorded on patient assessment database

All new patients are discussed at MDT

MDT monthly meeting reviews all patients on clinic list with core team members to share information on current issues with particular focus on any patients experiencing difficulty with change in personal/ family circumstances, poor HbA1c, deteriorating HbA1c. Any actions agreed are entered on contact section of core patient database diabetes section.

**MDT working with Yorkshire and Humber Children and Young People’s Diabetes Network**

A member of the team will attend every CYPD network meeting to share

information and feedback to the group. This will be presented at the next 3 monthly

wider team MDT in York following the network meeting.

All members of the MDT will receive network newsletter information, meeting

agenda and minutes for every meeting.

The MDT will contribute to the development of network guidelines and service

improvement actions. Local guidelines will be consistent with network guidelines

on the management of patients with diabetes.

The network guidelines will include

- care of children and young people with newly diagnosed diabetes

- care of children and young people with diabetes undergoing surgery

- care of children and young people with diabetic ketoacidosis

- care of children and young people with hypoglycaemia

- optimising glycaemic control

- care of children and young people with high HbA1c

- sick day rules

**MDT member Lone worker policy**

Team members frequently work individually with patients and families in the community off site of the hospital centre. Staff should follow the **York Teaching Hospital NHS FT Lone Worker Policy (2012-)** which gives guidance on working safely in the community.

Staff should carry their contact mobile phone at all times. The team should be aware of the location of all staff at all times and the expected time of return to base hospital. Staff leaving to visit a patient or family in the community should leave details of the visit and their expected time of return with the team administrator.

**Referral patient pathway**

New patient presentation

GP referral to paediatric on-call staff

Emergency department referral to paediatric on-call staff

Paediatric on call team

Immediate assessment of whether admission via ambulance to resuscitation

room is needed – discussion with GP or Emergency Department staff

If resuscitation may be needed then urgent review by paediatric registrar and

consultant.

Decision on whether PICU admission is needed dependent on

severity of condition.

Referral to EMBRACE retrieval service if PICU care may be

needed.

Admission to Child assessment Unit York Hospital

Admission observations and patient details recorded by admitting ward nurse

Admission assessment by paediatric junior doctor to begin within 10 minutes of

arrival to include history, examination and investigations following the newly

presenting patient protocol. Venous blood gas, blood glucose, blood ketone level

and urea and electrolytes to be measured to guide immediate management.

Children and Young People’s Diabetes team to be informed of admission and

attend to meet patient, introduce the team and explain team’s involvement in the

immediate management on the ward through discharge

Start diabetic ketoacidosis medical protocol if necessary.

Move to High Dependency Room ward 17 and ensure 1:1 nursing observation with clear plan of action for medical review.

Step down level of dependency when metabolic control achieved on

subcutaneous insulin.

Aim to accommodate patient and family in cubicle so that

longer team discussions with family can take place in a private environment.

If not in ketoacidosis then start Newly Diagnosed Diabetic Child Type 1 Diabetes

protocol

Admitting staff to inform paediatric diabetes team (DSN and consultant) as

soon as diagnosis is made. Review by paediatric diabetes team (consultant,

DSN, dietician) on day of admission or following day if out-of –hours

admission.

Review medical management, observations, plan for therapy.

Discuss key points of diagnosis and early education.

Specific points that patients and families need to understand before discharge

- diagnosis of diabetes

- normal and abnormal blood glucose levels

- effects of insulin, diet and exercise on blood glucose levels

- healthy eating and carbohydrate counting

- how to check blood glucose using meter

- how to give insulin and which insulins to use

- how to treat hypoglycaemia

- support available from MDT team members

- contact numbers for emergency advice

- target pattern for good glycaemic control

When these points are discussed this should be documented in the patient notes

and the electronic assessment package.

Consider and make adaptation of education for any communication issues such as hearing impairment, difficulty in understanding spoken or written English. Use appropriate information and if necessary an interpreter

Written information should be given as part of the new patient pack. This gives

written information about the key diabetes management issues and also includes

emergency contact advice.

Patients should be admitted to ensure good metabolic control and good level of

understanding prior to discharge home. There are some patients where it may be

possible to achieve this without an overnight admission but most will be admitted

for at least one night.

Patients and carers should be able to manage their own blood glucose monitoring, insulin calculation , injection and understand hypoglycaemia management. This should be supervised by nursing staff with support where needed prior to discharge.

● Discharge checklist completed by DSN

● Email/ Fax letter to GP to give details of diagnosis and treatment. List equipment and medication to be included on repeat prescription. To be informed by end of second working day after diagnosis.

● Follow up support by DSN. Phone contact daily to check glucose control and

advise on any change in insulin plan with consultant.

● Home and school visit by DSN in first week following diagnosis. Each patient is allocated a specific named

nurse as Keyworker

● Full MDT discussion of case at MDT meeting

● Clinic review 1-2 weeks post discharge

Newly Diagnosed Type 1 Diabetes Check List

|  |  |  |
| --- | --- | --- |
|  | Date | Signature |
| What is diabetes?   * Immediate needs * Long term requirements * Brief overview of complications |  |  |
| Why do I need insulin |  |  |
| How does insulin work |  |  |
| Insulin injection technique/disposal of needles safely |  |  |
| When to give insulin injections |  |  |
| Practice injections |  |  |
| Normal blood glucose levels |  |  |
| Blood glucose testing |  |  |
| Practice blood glucose testing |  |  |
| Hypoglycaemia – causes – symptoms - treatments |  |  |
| Hyperglycaemia – causes – symptoms - treatment |  |  |
| Exercise and hypoglycaemia |  |  |
| Adjusting Insulin doses |  |  |
| Dietary advice   * Healthy eating * Carbohydrate counting |  |  |
| Prescriptions |  |  |
| Sick day rules |  |  |
| Ketoacidosis |  |  |
| Life style adjustments |  |  |
| Team members in the MDT   * Dominic Smith - Consultant * Jo Mannion- Consultant * Liz Baker - Consultant * Ruth Kingsley - PDN * Diane Mitchell - PDN * Katie Holmes - PDN * Sarah Jayes - Dietician * Emma Peakman - Psychologist |  |  |
| Treatment plan to be discussed with senior member of diabetes team within 24 hours of admission |  |  |
| Clinic review within 1-2 weeks |  |  |
| Patient to be discussed at diabetes MDT within 1 week of admission |  |  |

|  |  |  |
| --- | --- | --- |
| DSN to visit family/school/nursery Yes/No |  |  |

|  |
| --- |
|  |

**Network approved Escalation policy for the management of a child admitted with newly diagnosed Type 1 Diabetes**

Hospital admission

•Child admitted to hospital under on call Consultant General Paediatrician

•Follow current NICE, ISPAD or BSPED guidelines for management of DKA

• Follow protocol for insulin regimen

Within 24 hours

•Inform Children's Diabetes Team within 24 hours

•Ward staff to start diabetes teaching programme

•Advice given by the General Paediatric on call team regarding diagnosis and future management

If Advice required :

•Paediatric Diabetes Team should be informed within 24 hours and patient seen on the next working day.

•If urgent advice is required follow pathway as for serious condition.

**Network approved Escalation Policy for the management of a seriously ill child admitted with Type 1 Diabetes**

• Child admitted to hospital under on call Consultant General Paediatrician

• Follow current NICE, ISPAD or BSPED guidelines for management of DKA

• General Paediatric Consultant must be Informed

Problems identified

• Severe DKA (pH < 7.1, bicarbonate < 18 mmol/l), failure to respond to 20mls/kg 0.9% Saline, persistent acidosis and ketosis (Blood ketones > 3 mmol/l), complications such as falling Na.

• Consultant General Paediatrician to seek advice :

•Call local Children's Diabetes Consultant (name available on ward and with switchboard)

•Diabetes Consultant not available and **patient needing PICU**-phone Embrace (0845 147 2472).

•Diabetes Consultant not available but advice needed although patient **not** needing PICU -phone Leeds 0113 2432799/Sheffield 0114 2717000 and speak to **Consultant Paediatrician on call for Diabetes**.

PICU

•Embrace (0845 147 2472) will provide and record appropiate multi-party conference to discuss possible PICU transfer

•Regional PICUadmission arranged

•PICU contacts Consultant on call for Paediatric Diabetes to discuss a management plan

**Inpatient facilities**

The childrens ward area incorporates a 7 bed Child Assessment Unit for initial

assessment and management. There is a 25 bed children and young people’s

ward with designated teenage bay and lounge if inpatient admission is

necessary. The children and young peoples diabetes MDT have daily contact

with children with diabetes who are admitted for any reason.

Facilities for children include play room with play team staffing, school room,

sensory room. Parents are encouraged to stay with their children throughout their

admission. There are facilities for a parent to sleep in a bed next to their child

and parent bathroom and lounge areas.

The childrens ward includes 2 purpose-built high dependency rooms where a

high level of patient observation is facilitated including near patient blood gas and

blood ketone testing. As part of the development of these rooms a project nurse

has prepared detailed protocols and delivered nurse staff training for the

management of serious childhood illness including diabetic ketoacidosis. The

ward uses the Paediatric Advanced Warning Scoring observations system to

help identify patients who are showing physiological deterioration and need

medical intervention. There is an escalation policy to support nurses in arranging

an urgent medical review if there is any concern that a patient may be at risk of

deterioration.

Services include:

● emergency care including resuscitation of critically ill patients

● assessment and treatment of newly diagnosed patients

● inpatient diabetes MDT support to start self management

● emergency admission for hypoglycaemia

● emergency admission for ketoacidosis

● elective admission for stabilisation of poor glycaemic control

● diabetes management during emergency or elective general surgery,

orthopaedics, ENT, maxillofacial surgery, orthodontics, ophthalmology for

children above 10Kg in weight.

● joint working with other paediatric services for children with complex

medical needs such as diabetes and neurodevelopmental problems

The service is supported by an on-call anaesthetic service that has staffed

trained to provide airway, ventilation, vascular access, inotropic and

haemodialysis care. These staff will assist if there is a resuscitation situation.

Longer term intensive care is provided in a regional paediatric ICU with retrieval

of a patient provided by the EMBRACE team.

Radiology support includes 24hr access to MRI and CT imaging on site. Images

from these investigations can be shared with colleagues in tertiary care centres

through electronic transfer.

The acute service is supported by 8 consultant general paediatricans, 3 of whom

have specialist training in paediatric diabetes. There is a full tier of paediatric middle grade (resident second on call) and first oncall doctors in training.

Phone advice is available to those consultants who do not have specialist paediatric diabetes training. A formal rota for paediatric diabetes specialist advice is maintained and accessed via hospital switchboard or on the Child Health Directorate computer network on-call rota folder.

Phone advice is available to patients and families 24/7 either through contact to their keyworker specialist nurse during office hours or via contact to ward 17. Ward 17 staff have written guidance on common diabetes emergency questions such as sick day rules, hypoglycaemia, missed injection. Any questions that cannot be answered can be directed to the oncall consultant for paediatric diabetes out of hours. Patients and families are provided with keyworker contact phone number at diagnosis and it is included in every clinic letter that families receive.

**Outpatient services**

**Clinic format**

Multidisciplinary weekly clinic at York Hospital Child Development Centre

and a 6 weekly Selby Hospital clinic. Patients are seen by specialist

nurse, dietician and consultant at all appointments

All clinic templates have minimum 30 minute allocation for each patient

Young persons clinic takes place monthly in the Diabetes Centre during

after school hours Staffed by a larger team including consultant

diabetologist, young adult specialist nurse, specialty registrar. Clinic is

preceeded by an MDT review meeting to discuss patients listed to be

seen.

Point of Care Hba1c measurement is available in both York and Selby

clinics to provide immediate HbA1c result at time of every appointment. The External Quality assurance of the point of care testing is to meet UK WEQAS standards with 2 monthly QA testing of results for the point of care and laboratory glucose analysers. The point of care test device is an Afinion AS100.

Patients are seen in clinic within 2 weeks of discharge following initial

diagnosis. Patients are then seen at 4-6 weekly intervals until the MDT

agree that 3 monthly review is appropriate. Patients are then seen at least 4

times a year. More frequent review is used if there are particular issues

such as deterioration in glycaemic control or recent change in insulin

therapy. Patients will be contacted at least 8 times a year in addition to clinic

appointment and any admissions to review any issues.

**Download data**

Diasend system has been in use in the children’s clinic since beginning of

2010 to download meters and pumps from all patients for review during consultation.

Patients have password to access their personal results on Diasend.

**Core MDT members at clinic**

Specialist nurses, dietician, consultant

Clinic nursing staff carry out height, weight, blood pressure, urine testing

and HbA1c measurement at every clinic.

**Phone Advice**

Patients and families can access phone advice direct to the diabetes

specialist nurses Mon-Fri 9-5. All families are given contact details at

diagnosis. Specialist nurses carry department mobile phones to facilitate

urgent contacts. Drs Smith and Mannion are also available to answer

urgent questions and provide cover for the specialist nursing team phone

advice. Out of hours families are advised to contact ward 17 children’s

ward staff who have written protocols for common emergencies including

management of acute sickness, hypoglycaemia, ketoacidosis.

Consultant diabetes paediatrician advice is available through the oncall team if needed. If there is a complex issue (such as diabetic ketoacidosis management) then the general paediatrician on call can contact one of the 3 paediatricans with

subspecialist training in paediatric diabetes. A formal rota for this diabetes consultant advice cover out of hours is on the child health on call section of York Hospital IT system XDrive

**Data Collection**

Data submitted to CYPDN annual audit dataset via Core Patient Database

**Admissions information**

Recurrent audit of admissions

MDT discussion

**Patient and carer feedback**

York is participating in the Royal College of Paediatrics and Child Health

Patient and Carer’s feedback study (Patient Reported Experience

Measure) which is an ongoing and recurring audit of patient views of the

service.

**Arrangements for patients and carers to be offered permanent record of**

**consultations**

Every clinic review is followed up with a letter to every patient which is

copied to GP, school nurse, dietician, specialist nurse

**Detail of the type of information offered in patient letter**

Weight

Height

Blood pressure

HbA1c

Carbohydrate counting and glucose sensitivity ratios

Insulin type and dosage

Summary of clinic discussion and main action points

Time to next follow up review

Advice to contact team if any interim problem

Name and phone number of Keyworker

**Treatments offered**

Intensive insulin therapy (multiple daily injection or pump therapy) is

started from diagnosis with carbohydrate counting. NICE guidance CG015

Pump therapy is offered to patients according to the guideline NICE TA

151.

Patients and families are invited to a pump information evening and

then make a decision to proceed to pump start course. Pump starts are

coordinated with the first weekend of school half term holidays 3 times a

year. The aim is to get groups of 3-4 similar age young people at the same

start up session. Individual pump starts are also offered in some

circumstances for example very young child needing urgent stabilisation.

**Emotional factors in care**

Building positive supportive relationships with patients and families

A key aspect of diabetes care is to build a good relationship between patients and families and the MDT staff. This starts at diagnosis. Great care must be taken to explain all aspects of management fully and involve patients and families in decisions on treatment. The aim is to build self-confidence in managing diabetes and promote emotional wellbeing.

Patients may be anxious and unhappy to attend clinic. Nationally 85% of patients with diabetes are not achieving optimal control so many patients receive challenging information when they attend clinic or meet their health team.

Discussions can have negative impact for young people by :

* Discussing issues that are not comfortable for the patient
* Challenging
* Judging the patient (by family, by the team)
* Negative attention
* Ignoring the young person, not including them in discussion
* Not being enjoyable
* Too much detail
* Patients may have learning difficulties
* Patients may have cognitive impairment as a consequence of poor control
* There may be communication difficulties e.g English not first language
* Patients may have a sense that parents and team do not understand what they feel, what is important to them, how difficult it is to maintain an effective management plan.

Diabetes adds a burden of chronic disease to a child / young person’s lifestyle which causes differences to the majority of their peer group. Young people with diabetes are asked to manage their own condition with a high level of maturity and responsibility for their health. This is in contrast to the developmental stage for most children and young people as a period with few serious responsibilities, increasing freedom and independence.

It is common to see emotional problems such as anxiety, sense of failure to meet expectations, denial of the condition, eating disorder and other serious mental health issues associated with diabetes.

Family members are usually the closest support for children and young people. Parents should be encouraged to be involved in a positive way and communicate issues relating to diabetes in a supportive way.

Family support can be variable with many potential challenges. Family members may be experiencing difficulties with relationships, housing, financial, physical and mental health issues. There may be serious social care problems such as substance abuse, domestic violence, neglect or abuse of children.

It is helpful for children and young people with diabetes for their carers to communicate positive coping strategies to help manage the emotional difficulties of living with diabetes.

**Motivational interviewing**

If there are difficulties achieving optimal control that have emotional factors then young people and adults usually respond better to motivational interviewing approaches than to conventional direction. MDT team members should access training on motivational interviewing skills.

Conventional directive approaches – examples which are commonly used by families and staff but are less effective when tackling problems with control:

* Confrontation and challenge
* Direct instruction on what the patient should change
* Explaining the negative consequences of poor control

Motivational interviewing approach

Aim to build patient driven change to improve control when they are ready to change

Motivational interviewing techniques

Open questions

Affirm and praise positive behaviours

Normalise negative thoughts and difficulties

Patient considers What is important ?

Why this is difficult ?

What they could do differently ?

Reflect back what patient is understanding

Summarise and agree goals together

**Psychology support**

Patient and families emotional wellbeing should be considered by all MDT members at all patient contacts in addition to the technical aspects of issues relating to diabetes care.

Staff are supported in understanding psychological issues with regular meetings with the clinical psychology and psychiatry team members. Staff can be supported to manage many of the common emotional difficulties when working directly with patients themselves with a process of ongoing supervision from the clinical psychologist.

Psychology screening questionnaire is available to be used at annual review or at any other time when team members believe it would be helpful to review psychological difficulties with a patient. Referral to clinical psychology can be discussed at any time with patient and family’s consent.

Specialist psychology/ psychiatry interventions include

- discussion and support with emotional issues

- raise awareness of emotional wellbeing

- support with relationship difficulties and communication in families

- anxiety management strategies

- cognitive behavioural therapy

- assessment of cognitive performance skills

- psychiatry assessment and treatment including medication

**Responding to extreme psychological crisis**

MDT members may become aware thata child or young person is experiencing an acute crisis for example with thoughts of suicide, self-harm or harming other people. This should be discussed immediately with the responsible consultant or on-call consultant. Emergency referral will be arranged to the CAMHS service. This referral can be supported by discussion with the MDT clinical psychologist or psychiatrist but should not be delayed and can occur out of hours if necessary.**High HbA1c Policy**

Glycated haemoglobin (HbA1c) is a form of haemoglobin that is measured

primarily to identify the average plasma glucose concentration over prolonged

periods of time. In diabetes, this level can determine the control of blood glucose

levels over the last 8-12 weeks. In diabetes, a level of <7.5% (58mmols) is aimed

for to reduce the risks of diabetes related complications.

A higher HbA1c may indicate poorer control which can increase the risk of diabetes relates complications, such as cardiovascular disease, neuropathy, nephropathy and

retinopathy.

At each clinic the HbA1c is tested. For each patient this is at least 4 times per

year. These results are discussed at a post clinic multidisciplinary meeting, and

then recorded onto a database for future reference.

Optimal HbA1c is below 6.8% (48mmol/mol)

High HbA1c is above 7.5% (58mmol) and this should be reviewed in the

discussion with each patient to understand reasons for glycaemic control

problems and plan actions to improve HbA1c.

Very high HbA1c is above 9% (75mmols) and this significantly increases risk of

long term complications of diabetes.

In the first instance, the HbA1c is discussed with the Consultant at the clinic

appointment. It will then be followed up by the child/ young person’s key worker.

Any child/ young person with a HbA1c above 9% will be contacted in between

their clinic appointments. This may be in the form of a home visit, school visit,

phone call, text message or email. They are also offered more frequent clinic

appointments if deemed necessary. These would be in a nurse led clinic.

The key worker will work with the child/ young person and their family to establish

why the HbA1c is high, they will discuss the health implications of a high HbA1c,

offer assistance, support and work on strategies to stabilise blood glucose levels.

Further strategies to consider include

● more frequent specialist nurse review

● specialist nurse visit to home and/or school to meet young person

● weekly phone contact to jointly review blood glucose monitoring results

● review insulin regimen including carbohydrate counting accuracy, insulin

carbohydrate ratio, insulin sensitivity, basal insulin and bolus insulin

● discuss compliance. Missed insulin, missed testing, incorrect glucose

test result records, poor approach to carbohydrate counting are all

common

● review how the young person is emotionally supported and explore

whether any problems are occurring in the wider family or social group

● consider eating disorder or other psychological issues

● refer to CAMHS if significant emotional/ behavioural issues

● increase frequency of outpatient reviews to 1-2 monthly

**Do we understand the reason for high HbA1c?**

**Emotional wellbeing**

Consider general feelings about diabetes. Is there a significant problem with mood, depression, anxiety, peer or family relationships.

The HEADSSS screening questions can be a good prompt to consider areas that may be important: Ask open questions relating to:

* Home and Environment
* Education and Employment. Eating habits
* Activities
* Drugs
* Sexuality and sexual health issues
* Sleeping pattern
* Suicidal thoughts

Psychology screening questionnaire can be used to explore emotional wellbeing and the need for psychologist support.

**Family factors**

Consider any recent life events or major changes in the family. Difficulties with physical and mental health, relationships, financial problems, housing problems may all impact on support to the young person.

It is important that parents have warm engeaged relationships with the young people. Over engagement can be a diffilty at times of increasing independence.

Family factors make a big difference to young people’s resilience and confidence to manage their diabetes well and achieve good control.

**Technical knowledge issues**

These are often not the main reason for poor control but there are often gaps in knowledge of key points such as correct insulin bolus calculation or hypoglycaemia treatment that can be adversely affecting control. All key points need to be reviewed

**Practical task problems**

Consider the patient’s approach to injection technique, lipohypertrophy, pump set change, hypoglycaemia awareness and treatment

**Associated illness**

Occasionally a secondary illness can cause problems with glycaemic control.

These include:

* Coeliac disease
* Thyroid disease
* Addisons disease

**Points in understanding pattern of control – guidance to patients and families**

**Features of good control:**

Test x6 + every day

If testing x10 /day then control is similar to level achieved on CGMS as there are many opportunities to correct and monitor levels

Average blood glucose 7-9

( The HbA1c is approx Average Blood glucose – 1.5% if testing regularly )

Most tests in range

Pre-meal 4-7 mmol/l

Post meal 5-9 mmol/l

If HbA1c is excellent then 80% of post meal blood glucose tests will be <10 mmol/l

Very few blood glucose test levels >15mmol/l

(i.e 2-3 / week very high)

Standard deviation of blood glucose levels 2/3/4 mmol/l

Hypoglycaemia minor and treated correctly with follow up blood glucose check after 15 minutes

Bolus insulin for all meals and corrections

Use bolus calculator

Pump bolus x6-8+ every day

Carbohydrate counting and healthy eating

Pump set change every 2-3 days

( average blood glucose increase by 1 mmol/l for every extra day between pump set changes )

Rotate injection sites well, avoid any lipohypertrophy areas

Patient / family confident to make decisions to change insulin dose calculations or basal rates

Patient / family will make contact with their keyworker if experiencing difficulty

**Points in understanding pattern of control – guidance to patients and families**

**Features of poor control:**

Test <4 every day

HbA1c >10% typically no tests / day

>9% 1-2 tests/day

Average blood glucose >10

( The HbA1c is approx Average Blood glucose – 1.5% if testing regularly )

Most tests not in range

Episodes of hypoglycaemia causing problems and not treated correctly or checked with follow up blood glucose check after 15 minutes

Hypoglycaemia with stacking of multiple insulin doses

Most days blood glucose test levels >15mmol/l

(i.e 2-3 / day very high)

Standard deviation of blood glucose levels 5/6/7+ mmol/l

Missing some bolus insulin for meals and corrections

If HbA1c 12-14% then likely to be missing 5/7 basal days and ¾ bolus doses

If HbA1c 10-12% then likely to be missing 2/7 basal days and ½ bolus doses

Not Carbohydrate counting and healthy eating, snacking on high glycaemic index foods

Pump set change every 4-5+ days

( average blood glucose increase by 1 mmol/l for every extra day between pump set changes )

Repeatedly inject lipohypertrophy areas

Not making decisions to change insulin dose calculations or basal rates

Not making contact with their keyworker if experiencing difficulty.

Persistent pattern of high blood glucose has not prompted contact to team.

**Interpretation of meter download information**

The Diasend system is used to download glucose meter data from all patients for clinic review. Patients are reminded to bring all meters to clinic for this download.

The data can be viewed as a log table of numeric values or scatter plot / line graph

The time period reviewed is typically 2 weeks but can be extended or customised to a specific time interval e.g to review control over a holiday period.

Systematic interpretation:

1. number of tests / day
2. average blood glucose from all tests in period
3. proportion high, low, in range
4. standard variation gives assessment of consistency of control
5. Table for
   1. Hypoglycaemia frequency, severity, treatment, follow up – is the reason for hypoglycaemia understood?
   2. Trends
   3. Extremes (hypos, severe high levels)
6. Graph
   1. Rapid rise suggests carbohydrates without insulin or over-treated hypo
   2. Rapid rise and fall suggests post-meal bolus
   3. Rise and remains high suggests no bolus or insufficient bolus
   4. Rapid fall suggests exercise after insulin bolus
7. Interpretation points
   1. Basal overnight control
   2. Bolus for each meal consider
      1. Are frequent boluses given?
      2. insulin carb ratio (check by looking at a pre and post meal level when pre meal has been in target range)
      3. insulin glucose ratio (sensitivity factor) to correct high levels
   3. self-management behaviours
      1. response to hypos
      2. completing boluses
      3. exercise
      4. diet factors

**Interpretation of pump download information**

All patients using pumps will have a download of their pump at every clinic review.

The download will be available for discussion during the consultation and printed for patients to take away if they wish.

Systematic interpretation:

First page table

Number of test/ day

Number of boluses / day

Frequency of set changes ( Average blood glucose increases by 1mmol/day for each

day of set use)

Average blood glucose, standard deviation

Average total daily insulin

Proportion as basal and bolus

Children typical basal 30-40%, adults typical basal 40-50%

Typical basal approx 0.3units/Kg/day

Average carbs / day (usually 150-300 g/day – if <100 then it is likely that carbs are

not being entered)

2nd page scattergram

The target range of the scattergram may be set as 4-7.8

Look for hypoglycaemia – any “danger” times

Bolus should achieve steady patterns if lines change>45° suggests imbalance carbs/insulin/exercise

Review overnight control

Review pre and post meal pattern for mealtimes

4th page box graphs of daily control over 14 days

Shows compliance very well – number of tests and bolus doses / day

Boluses for carbs, boluses for corrections

Follow up testing if out of range

Testing to check set change

Hypoglycaemia patterns

Basal rates

DANGER patterns = untreated hypoglycaemia

Going to bed with high levels, possible set failure

5th page settings

Basal rate patterns

Carb ratios, ICR, Insulin sensitivity

Active insulin time (longer for bigger bolus doses)

**Pathway for decision on choice of insulin regimen**

**MDI / pump system**

All patients will start treatment on multiple daily injections with carbohydrate counting for individual insulin bolus dose calculation from diagnosis.

Total daily insulin will usually be 0.5 – 1 unit / Kg body weight. Higher doses are likely to be needed if the patient is older age group, higher weight or has presented in DKA which indicates less residual insulin.

Carbohydrate ratio is usually 1 unit insulin : 10-30g carbohydrate depending on size and age of patient.

Method to calculate carbohydrate ratio is the rule of 500

500/total daily dose e.g TDD = 40 units then carbohydrate ratio = 500/40 = 12.5g :1 unit insulin

Insulin sensitivity (glucose correction factor) can be calculated using

130/ total daily dose e.g TDD = 40 units then 130/40 = 3.5 mmol glucose reduction : 1 unit insulin

Consider switch to pump therapy if

* Failing to achieve optimal control on MDI despite full compliance with recommended regimen
* Practical difficulty with pen injection – particularly school lunch time injection

Pump patients should have a full understanding of essential competencies before starting pump education. These self-management skills need to be used in order to benefit from pump therapy (Kaufman competencies)

* Carbphydrate counting
* Understanding of glycaemic index
* Hypoglycaemia treatment
* Blood glucose monitoring at least x6 / day
* Understand target range for pre-meal and post-meal blood glucose
* Sick day rules and ketone testing
* How to get help in an emergency

The team need to assess whether pump patients will get sufficient support from family members to manage the more intensive monitoring and practical tasks that pump therapy requires

The team need to assess whether there are any psychological issues which will cause difficulty for successful training and long term management using the pump system

**Continuous glucose monitoring system (CGMS)**

CGMS is a method to provide a highly detailed and immediate marker of blood glucose level which can be used

* Long term in day-to day diabetes management either with pump or MDI pen injection regimen
* As a snapshot of control over a fixed period to give a more detailed study than intermittent finger-prick glucose checks. This can be particularly helpful to understand patterns of blood glucose overnight during sleep.
* Connected to pump insulin delivery system to suspend insulin delivery at times of hypoglycaemia (sensor augmented pump therapy)

NICE NG18 criteria to offer CGMS

* Severe hypoglycaemia with hypoglycaemia unawareness
* Significant and disruptive anxiety associated with hypoglycaemia
* An associated condition which makes diabetes more complicated to manage
* In young pre-school children

CGMS should be considered for patients in clinic where control is sub-optimal. Core self-management skills and knowledge should be assessed. Patients and families should be implementing full standard management and have validated understanding of all key self-management knowledge and skills.

Staff supporting CGMS use should have specific training in CGMS in order to advise patients on the utility of the technology, benefits and inform choice. Staff should have training to interpret CGMS data and deliver diabetes management advice to patients and families.

The York University Masters Module Advanced Technologies in Diabetes Care is a suitable training course to meet this requirement for CGMS management.

**Policy for annual review**

**Insulin Regimen review**

**Self-management knowledge points review**

**Lifestyle factors review**

**Screening tests:**

* **Thyroid function** – TSH and antibodies at diagnosis and then every 2nd year
* **Coeliac disease** – Diagnosis, then annually for first 5 years then every 2nd year.
  + More often if they have a first degree relative with celiac disease or clinical

condition dictates.

* **Retinal screening** – at 11yrs old with 2yrs diabetes duration

at 9yrs old with 5yrs diabetes duration over 13yrs after 2yrs duration

Frequency should be annually but can be more in high risk patients

* **Microalbumin screening** - at 12ys old for all diabetes duration

- at 9yrs old with 5yrs diabetes duration

Frequency – annually

Method – first morning urine albumin concentration

Urinary albumin/creatinine ratio (ARC) (moderately

increased if ratio 3-30mg/mol)

* **Fasting blood lipids** - to be performed soon after diagnosis (when diabetes stabilised) in all children with type 1 diabetes aged over 12yrs. If normal, repeat every year.

**Physical examination:**

**Annual:**

* **Growth** – monitoring of growth and puberty development to be

documented.

Body mass index should be calculated

* **Examination**- foot checks (soft tissue, pulses, sensation)

blood pressure

peripheral light touch, vibration and ankle reflexes

injection sites for lipohypertrophy

**Dietetic review**

Patients should be encouraged to bring a 14 day food diary to annual review in

addition to review of carbohydrate counting.

All patients are offered an additional appointment with the team dietician at annual review.

**Psychology review**

Need for psychology referral should be assessed at each annual review using

psychological wellbeing screening questionnaire. Referral is then arranged

through liaison meeting with diabetes psychology staff or more urgently

by phone discussion within one day if an emergency problem.

**Care planning**

Patients should agree main issues to address and what support is needed over

the coming year. This should be documented and communicated with patient,

family, GP, school nurse, diabetes specialist nurse and dietician.

The need for psychological support should be included in the discussion. Education needs should be agreed and documented at annual review.

**Individual Objectives**

Each child or young person should have agreed individualised objectives which

are reviewed at annual review and clinic reviews to include-

- lifestyle goals

- target blood glucose and how to achieve this

- therapeutic interventions plans

- self-care, self-management, moving through transition

- education

- health care plan for education

- how to manage problems of high and low blood glucose

- keyworker – how to contact and emergency advice

- review date

- information of patient support organisations and other internet resources

**Type 2 diabetes annual review checks**

Children and young people with Type 2 diabetes have lower risk of autoimmune associated conditions than type 1 patients but are at risk of long term complications and should have the following screening checks:

Height, weight, body mass index calculation

Blood pressure annually

Lipids annually

Retinopathy annually from 12 years

Microalbuminuria annually

**Diabetes Annual Review Record**

|  |  |
| --- | --- |
| **Name:**  **D.O.B:**  **Hospital Number:** | **Key Worker:** |

|  |  |
| --- | --- |
| **Bloods** | **Date** |
| HbA1c |  |
| Total Cholesterol |  |
| Kidney Function |  |
| TFT |  |
| Coeliac |  |
| Urine Microalbuminuria |  |

|  |  |
| --- | --- |
| **Physical Examination** | **Date** |
| Height |  |
| Weight |  |
| BMI |  |
| BP |  |
| Foot examination:   * Soft Tissue Problem * Sensation * Pulses |  |
| Injection Site |  |

|  |
| --- |
| **Treatment MDI/Pump** |
| Insulin: NovoRapid MDI doses if required to have pen injection: |
| Insulin: Levemir/Lantus Dose: |
| CHO Ratio: Breakfast: Lunch: Evening Meal: |
| Correction Dose: |
| Basal Rates:  Time: u/hr Time: u/hr Time: u/hr  Time: u/hr Time: u/hr Time: u/hr |

|  |  |
| --- | --- |
| **Retinal Screening** Yes/No | Date: |

|  |  |
| --- | --- |
| **Dietetic Review** – Food Diary Yes/No | Date: |

|  |  |  |
| --- | --- | --- |
| **Emotional Wellbeing** – Any issues of concern | | Date: |
| Area of concern identified? | Yes/No |  |
| Psychologist Consultation? | Yes/No |  |
| Referred to Psychologist? | Yes/No |  |
| Referred to CAMHS/ other services | Yes/No |  |
| Psychologist already involved | Yes/No |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Key Educational Points** | | **** |  |
| Glucose & HbA1c Targets | |  | MDI/Pump Education plan required – Yes/No | |
| Hypoglycaemia | |  | MDI/Pump Education plan required – Yes/No | |
| Hyperglycaemia | |  | Education plan required – Yes/No | |
| Injection Technique | |  | Education plan required – Yes/No | |
| Ketone Testing | |  | Education plan required – Yes/No | |
| Sick Day Rules | |  | Education plan required – Yes/No | |
| Carbohydrate Counting | |  | Education plan required – Yes/No | |
| Complications awareness | |  | Education plan required – Yes/No | |
| Glucagon training |  | | Yes/No | |

|  |
| --- |
| **School** |
| Name | |
| Change of School | |
| HCP in place Yes/No | |
| Staff Training Yes/No | |

|  |
| --- |
| **Lifestyle Issues** |
| Smoking | |
| Alcohol/Drug use | |
| Contraception/Sexual Health | |
| Driving | |
| Review Current Exercise | |

|  |
| --- |
| **Discuss aims for the next 12 months** Yes/No |
| 1. ------------------------------------------------------ 2. ------------------------------------------------------ 3. ------------------------------------------------------ 4. ------------------------------------------------------ |

**Structured education schedule**

**Diagnosis**

All new patients have education from the MDT on the principles of

* diabetes management
* explanation of the illness
* principles of glucose control
* Insulin
* Diet
* Exercise
* management of hypoglycaemia
* Blood glucose testing
* safe insulin administration
* The diabetes team and how to access support
* Sharps disposal

Dietician review at diagnosis 2 sessions on healthy eating and carb counting.

Completion of these education points should be documented on the database assessment package.

**First 4-6 weeks**

Further patient education to be covered through the process of specialist

nurse contacts and clinic visits at an appropriate stage when patients and

families are able to further develop their understanding (usually over the first 4-6 weeks following diagnosis) to include

* Sick day rules
* Medic alert bracelet information
* Blood ketone testing
* Eating away from home
* Disability living allowance
* Travel and holidays
* Diabetes in school
* Advice to have annual flu vaccine and check up to date for pneumococcal immunisation
* Advice to have regular dental checks and optician eye examination every 2 years
* Review exercise in more detail and consider whether specialist exercise in diabetes assessment is needed particularly if child or young person is regularly participating in a higher level sport activity
* Complications of diabetes
* Lifestyle and diabetes
  + Risks of substance misuse, alcohol, smoking
  + General advice not to smoke, or start smoking, offer referral to smoking cessation programme if smoker
* Driving rules
* Careers choice issues
* Sexual health and pregnancy
* Additional information and patient support organisations

Completion of these education points should be documented in the care

record and reviewed at annual review.

**Annual review**

To include clinic staff check that key education points are understood

Specific review knowledge of

Glucose & HbA1c targets

Hypoglycaemia

Hyperglycaemia

Injection technique

Ketone testing

Sick day rules

Carbohydrate counting

Complication awareness

Glucagon use

**Transition to secondary school**

Children and families at Year 6 (age 10-11) are offered a 1 day review meeting to discuss transition to secondary school

**Age 12-14**

Children at Year 8/9 (age12-14) are offered a 3 day education and peer support programme to refresh knowledge for the young people moving toward independent self-management.

**Pump start**

Pump patients should have a full understanding of essential competencies before starting pump education. These self-management skills need to be used in order to benefit from pump therapy (Kaufman competencies)

* Carbphydrate counting
* Understanding of glycaemic index
* Hypoglycaemia treatment
* Blood glucose monitoring at least x6 / day
* Understand target range for pre-meal and post-meal blood glucose
* Sick day rules and ketone testing
* How to get help in an emergency

New pump patients must have a knowledge refresher session with dietciaian to review carbohydrate counting before pump start process is started.

Pump start is set up after a 2 day education workshop with schedule of points and learning outcomes

Paediatric and Adolescent

Diabetes Transition Policy

Lead Contact: Jo Mannion

Designation of lead contact Consultant Paediatrician

Scope of document Trust wide

Date: 18/12/11

**Content**

Introduction

Purpose

Background to the service

Key elements for effective transition

Age ranges and Clinics

Philosophy of transition

Preparation for transition

Timings and age

Process of Transition

**SECTION 1: INTRODUCTION**

Diabetes Mellitus is a chronic disease which has a major impact on morbidity

and mortality. Caring for children and young people with diabetes is a

complex process which must be firmly focused on the child or young person

and their family and other carers supported by health care professionals who

have skills and expertise in all aspects of diabetes management. NICE

guidelines (2015) recommend that children and young people with Type 1

diabetes should be offered an ongoing integrated package of care by a multidisciplinary paediatric diabetes care team; this includes smooth transition from paediatric to adult services.

Evidence indicates that many young people are lost to follow up when

transferred to an adult system increasing the already significant risk of

premature morbidity and mortality (ref) The National Service Framework for

Diabetes (NSF 2001) Standard 6 and NSF for Children and Young People

“Growing into Adulthood” (2006) highlights transitional care as an integral

component of care for all young people and stresses the importance of

smooth effective transition organised in partnership with the young person.

A smooth transition is further supported by the intercollegiate report “Bridging

the Gaps: Health Care for Adolescents” [2003], guidelines from the Royal

College of Nursing [2004], “You’re Welcome” standards for adolescentfriendly

services [DoH 2005] and is in keeping with the objectives of “Every

Child Matters” [DfES 2004] and “Every Young Person with Diabetes Matters”

(DOH 2007)

**Definition of transition**

Transition is a “planned, purposeful movement of the young person from a

child centred to an adult orientated health care system”. It is a process which

evolves over a considerable period of time and should not be considered an

event. (Blum 1993)

Transitional care is a multi-dimensional, multi-disciplinary process that

addresses not only the medical needs of young people as they move from a

children’s service to a young persons services but also their psychosocial,

educational and vocational needs and the needs of their parents.

**The aims of transitional care are to:**

1. Provide high quality, co-ordinated, uninterrupted health-care that is

patient-centred, age and developmentally appropriate and culturally

competent, flexible, responsive and comprehensive with respect to all

persons involved;

2. Promote skills in communication, decision-making, assertiveness and selfcare,

self-determination and self-advocacy;

3. Enhance the young person’s sense of control and move towards

independence

4. Provide support for the parent(s)/guardian(s) of the young person during

this process

5. Maximise life long functioning and potential

**SECTION 2: PURPOSE**

This policy sets out the guidance to ensure that York Teaching Hospitals

NHS Trust is effective in making suitable arrangements for the transition of

young people with type 1 diabetes from a paediatric to adult /young persons

service.

The aim of this policy is also to ensure that children and families are fully

involved in the process of transition and that all staff are aware of the process.

All staff must ensure that all aspects of equality and diversity (E&D) are

considered in order to ensure the child and their family/carer receives

appropriate care and treatment and should include:

• interpreters (for non-English speakers or hearing impaired),

• access, aids and adaptations (for physical, sensory and learning

disabled people) and

• religious and cultural factors – for example, ensuring specific dietary

advice is provided.

These should be considered prior to any decision relating to transition.

Safeguarding children and young people

All those who come into contact with children, young people and their

families in their everyday work, including staff who do not have a

specific role in relation to safeguarding children, have a duty to

safeguard and promote the wellbeing of children.

All staff should be familiar with the trust policy and procedure for

safeguarding children and young people, ‘what to do if you are worried

a child is being abused’

All health professionals working directly with children should ensure

that safeguarding and promoting their welfare forms an integral part of

all stages of care.

All staff should be alert to the potential indicators of abuse and neglect

in children, know how to act on their concerns and fulfill their

responsibilities. A range of single and inter-agency training courses are

available. Individual staff members and their managers will need to

identify the correct level of training to enable the individual to fulfill their

roles and responsibilities.

All trust policies, procedures and advice on training is available on **Horizon -**

**the York Hospital Intranet**

**SECTION 3: BACKGROUND TO SERVICE**

**Young Persons Service**

The diabetes service for teenagers and young people is divided up into

First stage transition clinic

Held in children’s outpatient centre on Thursday afternoon once a month.

Jo Mannion consultant

Sally Jennians DSN

Katie Holmes DSN

Sarah Jayes dietician

Teenage/adolescent Clinic

Held in the Diabetes Centre on the 2nd Wednesday of every month, from 4-

6pm

Staff

Jo Mannion consultant paediatrician- young persons clinic

Jonny Thow consultant diabetologist- young persons clinic

Sally Jennians paediatric DSN

Katie Holmes paediatric DSN

Vicky Clancey young adult DSN

Sarah Jayes dietician

Emma Peakman clinical psychologist

The teenage/ adolescent clinic is staffed by both paediatric and adult team members. This enables planning and co-ordination and gives opportunities

for teenagers/adolescents to meet the young adult team and be seen

independently from their parents and carers.

Young Adult Clinic age 18-25

Staff

Vicki Clancey (DSN)

Jonny Thow -Consultant diabetologist

Dietician- Sally Bouttell

Venue- York Diabetes Centre

3 monthly follow up appointments with VC and annual review with JT

Same format as Teenage clinic for appointments, screening and annual

reviews

Teenagers/adolescents should not move to from the teenage to young

person’s clinic until they have the maturity to function effectively in an adult

service, including the ability to negotiate services independently.

**SECTION 4: Key elements for an effective transition programme**

1. A written policy

2. A preparation period and education programme with an individualised

approach, which addresses psychosocial and educational/vocational

needs, provides opportunities for adolescents to express opinions and

make informed decisions and gives them the option of being seen by

professionals without their parents.

3. A co-ordinated transfer process with a named co-ordinator and continuity

in health personnel when possible.

4. Administrative support

5. Primary health care and social care involvement.

**SECTION 5: Age ranges and clinics.**

There must be a flexible approach to transition which takes into account

developmental readiness and links to other social transitions such as leaving

school. However for the purpose of the document age ranges and movement

through the clinics have been defined as follow**:**

Paediatric up to 13 years old.

Teenage/ Adolescent 13-18 years old

Young adult 18-25 years old

Adult over 25 years old.

Whilst the diabetes team uses the term young people to apply to all age

ranges between 12-25 years and recognises that young people often do not

want to be referred to as adolescent, to avoid confusion and ensure clarity

young people attending the Teenage clinic i.e. between 12-16/18 years will be

referred to as teenagers/adolescents. Those attending the young adult clinic

will be identified as young people or young adults.

**SECTION 6: Philosophy of Transition**

**Aim of the service**

**York Teaching Hospital NHS Foundation Trust wishes to offer an**

**excellent service to all young people with diabetes without excluding**

**their parents and carers. We will do this by delivering good quality care**

**that delivers excellent clinical outcomes, that are provided by a multidisciplinary**

**team that empowers the patient and their parents and**

**carers.**

The transition programme is an essential part of quality care for

adolescents with diabetes and we recognise that transition in health care

is only one part of the wider transition from dependent child to independent

adult.

We recognise that transition services must also address the needs of the

parent/guardian(s) whose role is evolving at this time in their

son/daughter’s life and health-care.

Transition services are multidisciplinary and involve both paediatric and

young person’s diabetes teams and any other parties involved in the care

of the adolescent.

We recognise that transition services should also include education, social

services and voluntary agencies. Service development must be

undertaken in collaboration with the adolescent involved, enhancing their

sense of control and independence in their healthcare.

Coordination of transitional care is critical and a key worker from the

teenage clinic will be identified for each adolescent to oversee his or her

transition,. At York this key worker is also the person coordinating the

young adult service and so ensuring seamless transition*.*

Transition is an active *process* and not a single event like transfer.

Transition begins early, is planned and regularly reviewed and is age and

developmentally appropriate.

Transition services undergo continued evaluation.

**SECTION 7: Preparation for Transition**

***Principles***

Both the teenager/adolescent and their parent(s) need to be prepared for

transition and eventual transfer to the young persons service.

Adolescents should only be transferred to the young persons service when

they have completed growth and puberty and have the necessary skills to

function in a young persons service largely independent of parents and

staff e.g. decision-making, communication, self-care, assertiveness. When

this is not possible due to cognitive impairment and/or severe disability,

appropriate advocacy, preparation and developmentally appropriate care

in the young persons service should be ensured prior to transfer.

Transition planning begins well before the anticipated transfer time in early

adolescence. At this time a series of educational interventions during any

of the 4 clinic visits per year will discuss understandings of disease, the

rationale of therapy, source of symptoms, recognising deterioration and

taking appropriate action, and most importantly, how to seek help from

health professionals and how to operate within the medical system,

including primary and emergency care. This will be evidenced on the

diabetes record database.

Adolescents should be helped to take appropriate responsibility for their

diabetes from as early an age as possible. Furthermore, their parents

should be encouraged to help them to do so and so the concept of

independent visits introduced well in advance. A the initial appointment in

the teenage clinic at age 13 we prepare the adolescent and their

parents for this. “In the next couple of years you may feel able to start

seeing the doctor on your own….”

The aim should be to see the teenager/adolescent by themselves for some

time during clinic visits from approximately age 13-14 years. NB Parents

must remain involved and should be seen with the adolescent at some

time during the session

In preparation for adolescents to be seen independently, the teenage and

young persons clinic will provide **continuity** of professionals at each visit.

The adolescent and young person should also be given (where possible)

the option of seeing a professional of preferred gender if necessary. Team

members (including departmental visitors’ e.g. medical students) are be

kept to a minimum in these individual consultations i.e. a maximum of 1

extra.

A schedule of likely timings and events should be given in early

adolescence and they should be involved in developing detailed timings

for their own transition. Details should be documented in the notes to

ensure continuity especially if seen by different members of the multidisciplinary

team.

Ready Steady Go Leaflets and material about the adolescent clinic and transition are provided in clinic settings from early adolescence.

**SECTION 8. Timings and age**

Timing of transition MUST be flexible and not restricted to age criteria only. Timing of

transition and transfer depends on

chronological age,

maturity,

adherence,

independence,

adolescent readiness,

parental readiness.

Flexibility will also be required depending on the adolescent’s medical status.

Transfer should not take place during a crisis e.g. repeated admissions for

Diabetic Keto-Acidosis (DKA)

**1. Earliest discussion of transition to adult care**

This takes place at 11 years during or during their last year at primary school.

A transition plan for ALL teenagers/adolescents will be in place by the age of

13 years and reviewed at least annually thereafter.

**2. Beginning of active preparation for transfer to teenage clinic.**

The very first initial appointment at the teenage clinic will be a half- hour joint

appointment with JM and SB which will incorporate.

A review of knowledge and education needs, a psychosocial history

(HEADSS) and a screen for psychological problems and or problem eating .

The purpose of this initial appointment is to get to know the young person

and to direct care planning. We also explain the set up and ethos of the

teenage clinic and discuss parent roles.

This will be with the yp and parent. At future appointments the yp will be

encouraged to attend alone on occasions , to foster independence, whilst

keeping the family involved.

The information will highlight the process of transition for both the

teenager/adolescent and their parents over the next few years.

**3. Age of effective transfer to teenage clinic.**

Aged 13 years.

At the clinic the young person may see any member of the Teenage clinic

team (listed above). This is decided at the pre clinc MDT meeting. We

endeavour to ensure that the young person meets all the members of the

team at their first visit to the Diabetes centre

**4. Age of effective transfer to young adult service**

Aged 18 years.

VC is the key worker for all the 16+ teenagers and as such will be known to all

the yp as they move up to the adult service,. The staff (VC, JT and SB) and

venue are effectively the same.and the yp will have been continuously

prepped for this and as such it should be a seamless transition to adult

services

**5. Age of effective transfer to adult service.**

*Aged 25 years.*

**6. Exceptions to above timing**

However young people who have previously attended the children’s clinic at

Selby rather than at York may, if they prefer, may be transferred at an earlier

age (not before 16) to the adult diabetes clinic at Selby.

They will all still have the initial 30 min appointment with SB and JM and will

have a personal transition plan.

There may be exceptions to the transfer of young people aged 25 years old

into adult services if they are undergoing a crisis e.g. development of long

term complications which may impact on their clinic attendance. However this

must be discussed with the young person and the young persons team and

transfer take place as soon as possible after the age of 25 years.

**SECTION 9. Process of transition**

**Preparation for Transition**

**Initiation & co-ordination of transition**

The consultant, seeing children and young people in the children’s clinic is

responsible for ensuring discussion of transition in the last year of primary

school and making a referral up to the teenage clinic.

The teenage DSN will be present at this clinic and can explain the process.

Their first appointment will be a longer appointment with the teenage

diabetes consultant and teenage DSN where psychosocial assessment,

screening for problem eating and introduction , assessment of background

knowledge, structured education needs are assessed. .

Full documentation that this has taken place must be recorded on the

diabetes record database

**First discussion of transition**

Adolescents at around 14 y will be identified at pre clinic MDT meetings that

they will begin transition at the next appointment and a member of staff

named as the key worker for the patient. This will ensure transition is

discussed with every patient and identify the key worker responsible for the

process.The key worker will normally be VC

**Educational programme**

Introductory leaflet to the Teenage Clinic which includes meaning of

transition for the patient and parent at the initial discussion in the first

appointment clinic age 13 Gradual increasing emphasis on increasing self

advocacy for the adolescent in clinic. This includes involvement in decision

making, being seen alone and other issues which impact on their life.

The competency checklist that is used by the paediatric diabetes

department will transfer with the young person as they move into the adult

service.

**Assessment of readiness for transition**

This will involve Individual discussion with the adolescent and their parents

with the diabetes team and team discussion at post clinic meetings. The

ultimate decision to move to the young person service lies with the

adolescent.

**Transfer Process to Young Persons Service**

The process is mainly administrative as both staff and venue are the same.

However the transfer defines the move from a paediatric to an adult service

and accordingly correspondence and appointments will need to be sent to the

young person.

Issues of confidentiality must be considered e.g. how permission is sought

from young person to give information to their parents etc.

During this time young people will be encouraged to attend a self

management course “BITES” York Hospitals own version of DAFNE.

The “normal rules” for non attendance does not apply in the YP clinic and

appointments will continue to be offered to persistent non attenders

**Transfer Process to Adult Services**

Transfer to the adult service will be at 25 years. This service does not involve

a change of staff or venue

. For young people who have not attended BITES/ DAFNE further information

will be given before transfer.

**Involvement of GP in transfer process**

The GP is sent a copy of the transition plan.

.

**Finish documentation and file in patient notes when complete and patient transitions**

**Move onto ‘Go’ when at transition clinic using same process.**

**Aim to move onto ‘steady’ section at Young Teenage Clinic, work through using same process as above.**

**At every clinic consultation thereafter work through ready section, once completed give one copy to patient and then file in notes.**

**At end of clinic consultation work through ready section with patient to see check off areas that were covered.**

**At next appointment run through ‘ready’ section.**

**When patient reaches the age of 11, give initial leaflet and explain process file document into patients notes.**

**Policy for patients that do not attend (or are not brought) clinic**

In the first instance, if a patient has not attended clinic or cancelled their

appointment then a rescheduled appointment is made.

We telephone the young person or parent/ carer to

discuss the non attendance. At this point we would discuss the importance of

attending clinic. If they are having difficulty attending the clinic appointment we

will then work in collaboration with the child/ young person and their family to

ensure they are seen by a member of the diabetes team as soon as possible.

This could be in the form of a school or home visit.

Prior to their next appointment, a member of the diabetes team will telephone the

young person or parent/ carer the day before their scheduled appointment. If they

do not attend this appointment we refer to the safeguarding policy.

At all stages we will refer to the safeguarding policy if a child or young person is

experiencing harm through failure to attend clinic. This is a form of neglect of

their medical needs. Carers must ensure that appointments are kept. This

situation can be discussed with the lead nurse for child protection (Sue Roughton)

or the named doctor for safeguarding (Liz Baker).

There is a trust policy on safeguarding which gives detail of the approach to working with families and social services if a child is at risk of harm because of problems with their care. It

is good practice to inform carers that a referral to social services is being made if

that is necessary.

**Policy for newly diagnosed patient**

**Section 1: Introduction**

Type 1 diabetes is a chronic condition, which has a major impact on morbidity

and mortality. The management and care required for Children and Young

Persons with type 1 diabetes is a complex and ongoing process, requiring

support and guidance for the child and their family/carers.

Admissions and referrals are via the primary care team, our A&E department and

self referrals. The child or young person is seen on the Children’s Assessment

Unit or Ward 17. Depending on the condition and presentation of the child,

depends as to whether they are treated as DKA (Diabetic Ketoacidosis) or

non DKA newly diagnosed with type 1.

**Section 2: Initial Assessment and Management.**

**If the child is acutely ill, dehydrated or acutely acidotic refer to the Diabetic**

**Keto-Acidosis (DKA) protocol.**

1. Assess any need for resuscitation Airway Breathing Circulation

2. Perform weight, blood glucose and ketone test and dip stick urine test.

3. Assess hydration.

4. Initial Investigations:-

Bloods – Glucose

Ketones

Electrolytes

Liver function tests

HbA1c

TSH

Islet Cell Antibodies

GAD antibodies

Insulin antibodies

Insulin and CPeptide level if possible type 2

Coeliac Screen

Venous pH.

**Note – Diagnosis must be confirmed by Lab blood glucose > 11mmol**

**before insulin is prescribed.**

Early contact with the Paediatric Diabetes Team is essential

**Section 3: Insulin Treatment at Diagnosis.**

Children who are not in DKA will commence subcutaneous insulin. The child

and/or their parents/carers must be able to administer insulin via injection prior to

discharge from the children’s ward.

The majority of our patients are commenced on MDI injection regime, consisting

of, NovoRapid and Levemir or Lantus. The initial dose is calculated using 0.5 units/Kg/day. 50% of the dose is given as the basal slow-absorbed insulin

given at bedtime.

Novorapid is given premeal with an insulin: carbohydrate ratio of 1unit :10-20g

depending on the size/age of child. This should be discussed with the diabetes

team.

Carbohydrate ratio use “rule of 500”

1 unit insulin : 500 / weight in Kg

eg 50 Kg child 1unit:10g carbohydrate

Some very young children have unpredictable carbohydrate intake at mealtimes

so novorapid insulin may need to be given immediately afterwards when the

carbohydrate intake can be accurately assessed.

Insulin sensitivity is calculated as 100/total daily insulin. This gives a figure for the

amount of glucose reduction in mmol/l that will be expected with a 1 unit insulin

injection for this child. This is used to correct for hyperglycaemia at mealtimes in

addition to the bolus insulin for carbohydrate. The target blood glucose is 6mmol/l. Correction is given for premeal glucose levels>10

**Key training of insulin injection for the child/parent/carers:**

Selection of pen devices – usually NovoPen 4 or Junior and SoloStar

(prefilled pen).

Demonstration of the pen from setting up to giving.

Where to inject

How to inject

Sharp disposal.

**Section 4: Measurement of Blood Glucose.**

We use a variety of blood glucose meters, but give the child or parent the choice.

A demonstration is given, and then the child/parent/carer is encouraged to be

independent with use of blood glucose monitoring.

**Key training for blood glucose monitoring for the child/parent/carer:**

Hand washing.

Use of the lancing device.

Setting up the blood glucose monitor.

The importance of recording the results.

Action to take on the result.

Blood glucose monitoring is essential in the management of diabetes control,

insulin adjustment and the prevention of hypoglycaemia/hyperglycaemia.

The target range value is 4 – 10 mmols/L. We advice our children to monitor their

blood glucose levels pre prandial and 2 hours post prandial to assess and

establish the correct insulin dose.

**Key training for Hypoglycaemia:**

A hypoglycaemia is blood glucose levels less than 4 mmols/L

Mild hypo: Means the patient feels symptoms and is able to react and treat

themselves.

Moderate hypo: Means patient is still conscious and able to swallow but

unable to self-administer. Glucogel is generally used in this situation.

Severe hypo: This is characterised by an unconscious patient, although a

conscious patient may need IM glucagon and medical assistance.

Causes - a miss-match of insulin dose, timing of meals, insufficient food

intake and erratic or unplanned activity

**Signs and symptoms, most commonly reported in children are:-**

General feeling of not very well.

Feeling wobbly and dizzy.

Feeling very hot or very cold.

Change of character and behaviour.

Numbness and tingling around the mouth.

Pale.

Irritability.

Headache

**Treatment:**

Confirm by a blood test if possible.

1. Take a fast acting sugar ideally dextrose/lucozade tablets (15g) (3-4),

glucose drinks such as original lucozade approximately 60mls, 90mls

cola/lemonade, 150mls lucozade sport, 100mls fruit juice. (DO NOT USE

ANYTHING SAYING REDUCED SUGAR OR LIGHT). The measurement of

the above fluids are a starting point, each child is different and may require

more than the approximate amount. IT IS IMPORTANT THAT THE CHILDS

BLOOD GLUCOSE IS RECORDED 15 MINUTES AFTER TREATING THE

HYPO. If necessary the above steps to be repeated.

2. If the child is unable/unwilling to swallow sugar supplements then

glucogel can be massaged into the inside of the cheek or gums.

3. If the child is unconscious or fitting, the Glucagon injection can be given.

If the parent is unhappy about giving this, then advise them to call an

ambulance. The injection can make patients nausea’s or vomit quite

violently.

A carbohydrate snack may be required depending on the time of the

hypoglycaemia, e.g. a few hours before the next meal, before bed and if

exercise is going to be performed. Ideally the blood glucose level should be

5.6mmols.

Should a carbohydrate be necessary then the following may be an option:-

1-2 slices of bread (toast/sandwich)

400mls milk

3-4 rich tea biscuits

1-2 digestive biscuits

1 piece of fruit

35g bag of crisps.

(The carbohydrate snack will help maintain the blood glucose level, although

caution given not to over treat the hypo)

**Key training for Hyperglycaemia:**

Blood glucose levels 11mmols/L and above is classed as hyperglycaemia

and

needs to be monitored closely along with ketone levels. If levels continue to

read high then contact health care professionals for advice.

Some reasons why hyperglycaemias happens:

Missing an insulin dose or taking too little insulin.

Eating more sugary or starchy food than usual.

Over treating hypo’s.

Being unwell with infection.

Symptoms include increased thirst and urination, headaches, lethargy,

abdominal pain and nausea and vomiting.

Encourage the child to drink plenty of water and give extra insulin.

**Key training for Sick day rule:**

**NEVER** stop taking insulin even if the child is not eating. Encourage to take

plenty of

water. If blood glucose levels low encourage to sip sugary drinks. Monitor blood

glucose every 1 – 2 hourly. Again, consult health care professionals for advice

(Sick day booklet given on discharge).

**Section 5: Dietetics and Food.**

Generally the child/family/carer will be seen by the paediatric dietician prior to

discharge from hospital. The majority of our children are commenced on

Carbohydrate Counting regime, and will be booked in on a session by the

dietician. General advice regarding diet will be given prior to discharge.

**Key training and basic information for children/parents/carers.**

Regular meals.

Carbohydrate counting at each meal and snacks e.g. bread, cereal, pasta,

potatoes or rice.

Low sugar choices where applicable i.e. diet drinks, avoid adding sugar

and use sweetener alternatives.

Use of snacks and supper if on Novomix 30.

Avoid “diabetic” foods. (These products usually have a high fat content,

laxatives and are quite expensive).

**Section 5a: Communication with the Family.**

It is important that the child/parent/carer is supported and is able to obtain advice

24/7. On discharge from hospital the following contact numbers are given:-

Diabetes Team Office 01904 721317

Diabetes Nurses Mobile

07957591236 Ruth Kinsley

07534674869 Sally Jennians

07951342001 Diane Mitchell

01904 725779 Vicky Clancy

Doctor Smith Sec 01904 726447 Kathryn Tompkins

Doctor Mannion Sec 01904 725519 Gail Woodward

Ward 18 (CAU) 01904 726018

Ward 17 01904 726017

Dietician 01904 725266 Sarah Jayes

Diabetes Centre 01904 726510

As well as having telephone contact with the diabetes team, the family and the

child is seen in clinic every three months or less if they are having difficulties. We

also provide home visits for support and guidance.

We have a good rapport with schools within the York area, and work closely with

teachers and the family

All communications with the family and the patient is documented on our

diabetes package. This allows all members of the multi-disciplinary team to have

an input, and our kept up to date of the current events of their care.

**Section 5b: Communication with Schools.**

The team generally makes contact with the school prior to the patient’s been

discharged from hospital. A visit is arranged to see a group of teachers, teaching

assistants and dinner assistants who have regular contact with the child.

The visit would include discussing and highlighting what diabetes is,

hypoglycaemia and how to treat, hyperglycaemia and what to do if this occurs. A

demonstration of a blood glucose monitor is given, allowing the teachers to

practice on each other. Should the child require lunch time insulin and are too

young to administer it themselves, the team will provide support and guidance

and will teach individual staff members how to give the insulin injection.

A booklet is also provided called, Children with Diabetes at School – what all staff

need to know (From Diabetes UK).

Health Care Plans are completed by the diabetes team, and are sent to the

school nurses who in turn send them to the parents and the school to sign once

they are satisfied with the contents.

**Section 5c: Communication with the Primary Care Team.**

The Retinal Screening Services are informed on diagnosis. The child’s details

are kept until such a time that their screening is to commence. This is dependant

on the duration of diagnosis or age of the child.

The child’s GP is informed by fax of all the extra supplies required. This allows

parents to see the GP and order supplies in advance.

We have a support group, which we give the parent the option of joining. It allows

parents to get together and discuss any issues they may have; it also allows the

children to” buddy” up. The group organises fun events for the children and their

families.

**Section 6: Discharge Planning.**

**Provide the child and the family/carer information regarding:-**

Daily routine.

How to give insulin injections.

How to perform a blood glucose test.

Blood glucose range.

What to do if the child has a hypoglycaemic episode.

What to do if the child has a hyperglycaemic episode.

Food and diabetes.

Contact information for the diabetes team and emergency contact.

Clinic/CAU appointment. (To be seen within 1 - 2 weeks of discharge)

Contact social services if applicable.

Provide the sick day rules leaflet.

**Prescription:-**

**The medical staff will provide a prescription for:-**

The prescribed insulin.

Glucogel.

Glucagon injection.

**The diabetes Nurses provide email or faxed prescription to the GP for:-**

NovoPen device.

Appropriate sized needles.

Blood glucose test strips.

Lancets.

Blood ketone test strips.

Sharps bin.

All blood glucose monitors can be obtained from the diabetes team. A supply of

the above is given on discharge.

**The diabetes nurses will arrange a home visit within a couple of days of**

**discharge to:-**

Assess how the child and family are managing.

Discuss the Leeds Register.

Provide the family with the support group leaflets.

Explain and demonstrate ketone testing.

Glycagon injection.

Help with the DLA form if required.

Discuss any issues or problems.

**Diabetes Team and School on Discharge:-**

Visit school and provide education to the staff involved with the child.

Inform the school nurse of new diagnosis.

Provide the school nurse with a Health Care Plan specific to the individual

child’s needs.

**Paediatric diabetes management during surgery**

The aim of management is to avoid hypo- or hyperglycaemia

and ketoacidosis

The paediatric diabetes team should be contacted prior to admission for elective

surgery or at admission for emergency surgery to manage the child’s diabetes.

Blood glucose control should be optimised in the weeks leading up to surgery.

Staff should consider postponing surgery if there is recent difficult to control

diabetes.

Surgery should be performed first on the morning list if possible.

If the extent of surgery is uncertain then the **major surgery** protocol should be

followed.

**Management of diabetes during minor surgery (the child is expected to eat**

**and drink within 4 hours of surgery) in the morning**

The patient can be admitted the night before surgery or early on the morning of

surgery. Do not eat breakfast. Do not give usual morning insulin

Start maintenance fluid 5%Dextrose 0.45% Saline

Blood glucose BM should be checked hourly pre-op in theatre and post-op.

The rate of intravenous fluid increased if BM is falling (the dextrose can be

increased to 10% if BM falling)

If child is awake and hungry then a light lunch should be given then the

intravenous fluid stopped. Otherwise intravenous fluid is continued until the child

tolerates light diet.

Extra fast acting insulin (Actrapid/ Novorapid) can be given subcutaneously at

lunchtime if BM>15. Give 0.1 units/kg eg 30 Kg child receives 3 units

If the child is eating then the usual evening insulin dose can be given as the

normal subcutaneous injection. The patient can be discharged home after

evening meal.

If the blood glucose rises or the patient starts vomiting then the management

should be reviewed to consider changing to major surgery guideline i.e

intravenous insulin and dextrose until eating to avoid ketoacidosis.

**Management of diabetes during major surgery in the morning**

The patient should be admitted the day before surgery

The usual morning dose of insulin and breakfast **should not be given**

Blood glucose U&E and urine dipstick for ketones should be performed pre-op

Before 0800 an intravenous infusion of 5% Dextrose 0.45% Saline with KCl 20

mmol/l (10mmol / 500ml ) should be started at maintenance rate

Insulin infusion should be started via syringe pump. **Aim for BM 6-12**

50 unit short acting insulin Actrapid in 50 ml normal saline rate according to

sliding scale

BM <7 Insulin infusion 0.01 units/kg/hr

7-11 0.04

11.1-17 0.06

17-22 0.08

>22 0.1

If BM <7 increase dextrose infusion rate/concentration. Do not stop insulin infusion.

Blood glucose BM should be monitored hourly pre-op, half-hourly during surgery

and then hourly until eating and infusions stopped.

Urea and electrolytes should be checked postoperatively and then daily whilst

intravenous fluids continue

Once the patient is tolerating food their normal subcutaneous insulin can be

started pre-meal then infusions stopped (30 minutes after meal) once the patient

has eaten and has not vomited.

**Diabetic Ketoacidosis protocol**



Paediatric Diabetic Ketoacidosis

Guideline

1. Introduction

Guideline intended to give advice on common practical assessment and management aspects of a specific clinical problem. The guideline is for quick reference. Clinical decisions may need extra information from further literature search and discussion with senior paediatric medical staff. If in doubt ask for senior advice.

1. Scope of the Guideline

Guideline is aimed for use by medical and nursing staff in York Hospital, both within child health department and wider trust. Legal definition of a child is an individual under the age of 18. Occasionally older patients may also receive care from paediatric staff. Care must be taken to use age appropriate guidelines. Record in medical notes reasons for using paediatric guidelines if patient is over age 18.

1. Guideline Details

These guidelines for the management of Diabetic Ketoacidosis are from the following:

* British Society of Peadiatric Endocrinology and Diabetes (BSPED) Recommended Guideline for the Management of Children and Young People under the age of 18 years with Diabetic Ketoacidosis 2015
* National Institute of Clinical Excellence (NICE) NG18. Diabetes in children and young people. August 2015

1. Other related issues

See also guideline for paediatric newly presenting diabetic child

1. Accountability

Paediatric guidelines are the responsibility of paediatric consultants in child health directorate. Named consultant for each guideline responsible for review.

1. Implementation

Published on Horizon intranet access. All new clinical staff to be informed at induction of use of guidelines.

1. Monitoring and Audit

Guidelines will be audited and reviewed at least 3 yearly through child health clinical governance programme.

1. Consultation

Produced by consensus of paediatric consultants in child health directorate. Each guideline has a named consultant responsible for preparation.

1. Review Arrangements

Clinical guidelines will be reviewed by medical consultants at department governance meeting.

Review 3 yearly.

1. Supportive Evidence

* British Society of Peadiatric Endocrinology and Diabetes (BSPED) Recommended Guideline for the Management of Children and Young People under the age of 18 years with Diabetic Ketoacidosis 2015

<http://www.bsped.org.uk/clinical/docs/DKAguideline.pdf>

* National Institute of Clinical Excellence (NICE) NG18. Diabetes in children and young people. August 2015

<https://www.nice.org.uk/guidance/ng18/resources/diabetes-type-1-and-type-2-in-children-and-young-people-diagnosis-and-management-1837278149317>

11. Appendices

**Guidelines for the Management of Diabetic Ketoacidosis**

**A. GENERAL:**

* **Always accept any referral and admit children in suspected DKA.**
* **Always consult with a more senior doctor on call** as soon as you suspect DKA even if you feel confident of your management.

**A1. Remember: children can die from DKA**.

They can die from –

* **Cerebral oedema** – this is unpredictable, occurs more frequently in younger children and newly diagnosed diabetes and has a mortality of around 25%. The causes are not known, but this protocol aims to minimise the risk by producing a slow correction of the metabolic abnormalities. The management of cerebral oedema is covered on page 18.
* **Hypokalaemia** - this is preventable with careful monitoring and management.
* **Aspiration pneumonia** - use a nasogastric (NG) tube in semi-conscious or unconscious children.

***These are general guidelines for management. Treatment may need modification to suit the individual patient and these guidelines do not remove the need for frequent detailed reassessments of the individual child's requirements.***

**A2. DKA Diagnosis**

These guidelines are intended for the management of **children & young people** who have the following biochemical features:

* Acidosis – blood pH < 7.3 **OR** plasma bicarbonate < 18 mmol/l

**AND**

* Ketonaemia – blood beta-hydroxybutyrate > 3.0mmol/l

**OR**

* Ketonuria (2+) – used only if ketonaemia cannot be assessed
* Hyperglycaemia (BG > 11mmol/l) - some children with diabetes may develop DKA with normal blood glucose levels

**The severity of DKA is dependent on the degree of acidosis:**

**Mild-moderate DKA = pH > 7.1**

**Severe DKA = pH < 7.1**

They may also have the following clinical features:

* Clinical dehydration (>5%)
* Nausea and/or vomiting
* Drowsy
* Clinically acidotic
* Acidotic respiration (Kussmaul breathing)
* Abdominal pain
* Confusion & progressive reduction in consciousness

1. Children who are alert, not clinically dehydrated, not nauseated or vomiting, do not always require IV fluids, even if their ketone levels are high. They usually tolerate oral rehydration and subcutaneous insulin but do require careful monitoring to ensure that they are improving and their ketones are falling.
2. If a child is hyperosmolar with very high BG levels (> 30mmol/l), with little or no acidosis or ketones, this is Hyperosmolar Hyperglycaemic State and requires ***DIFFERENT*** treatment.

**Discuss both groups or children and young people with the senior doctor on call.**

**B. EMERGENCY MANAGEMENT IN ED**:

**B1. General Resuscitation: A, B, C.**

Airway Ensure that the airway is patent and if the child is comatose, insert an oropharygeal or nasopharyngeal airway.

If consciousness is reduced or recurrent vomiting, insert NG tube, aspirate and leave on open drainage.

***Seek urgent anaesthetic review and paediatric critical care advice if the child or young person has a reduced level of consciousness and is unable to protect their airway.***

Breathing Give 100% oxygen by face-mask.

Circulation Insert 2 IV cannula and take blood samples (see below)

Cardiac monitor for T waves (peaked in hyperkalaemia)

Monitor BP and heart rate

***Discuss the use of inotropes with a paediatric critical care specialist if a child or young person with DKA is in hypotensive shock.***

**B2. Confirm the Diagnosis:**

* History: Polydipsia, polyuria, weight loss

Precipitating factors (illness, pump failure, insulin omission)

* Clinical: Acidotic respiration

Dehydration

Drowsiness

Abdominal pain/nausea/vomiting

* Biochemical : Acidosis

Ketonaemia/Ketonuria

Hyperglycaemia

**B3. Initial Fluid Bolus: CAUTION**

**Do not give an IV fluid bolus for mild to moderate DKA (blood pH >7.1)**

**Do not routinely give an IV fluid bolus for severe DKA (blood pH < 7.1)**

**Discuss with senior**

* Only if **shocked** (**poor peripheral pulses**, poor capillary filling with tachycardia, and/or **hypotension**) give 10 ml/kg 0.9% sodium chloride as a slow bolus (over 30-60 minutes). There is no evidence to support the use of colloids or other volume expanders in preference to crystalloids.
* **Do not give more than one IV fluid bolus** of 10ml/kg 0.9% saline to a child or young person with severe DKA **without discussion with the responsible senior paediatrician.**

**B3. Initial Investigations:**

* Blood glucose
* Urea and electrolytes – electrolytes on blood gas machine give a guide until accurate results available
* Blood gases – capillary or venous
* Near patient blood ketones (betahydroxybutyrate) if available (superior to urine ketones)
* Plasma HCO3
* If newly diagnosed type 1 diabetes then please take additional samples based on newly diagnosed diabetes guideline

+/- Other investigations only if indicated e.g. PCV and FBC (leucocytosis is common in DKA and does not necessarily indicate sepsis), CXR, throat swab, blood culture, urinalysis, culture and sensitivity etc.

***NB.*** *DKA may rarely be precipitated by sepsis, and fever is not part of DKA. Suspect sepsis if there is fever or hypothermia, hypotension, refractory acidosis or lactic acidosis.*

**C. FULL CLINICAL ASSESSMENT**

Assess and record in the notes the following to allow direct comparison:

**C1. Degree of Dehydration**

Moderate (5%) dry mucous membranes, reduced skin turgor, prolonged capillary refill time

Severe (10%) severely ill with poor perfusion, difficult to feel pulses, oliguria, reduced level of consciousness, **(reduced blood pressure is not likely and is a very late sign)**

**C2. Conscious Level**

Institute hourly neurological observations including Glasgow Coma Scale (Appendix 1) whether or not drowsy on admission.

If **reduced conscious level on admission**, or there is any subsequent deterioration:

* Seek urgent anaesthetic review if airway cannot be protected
* Discuss with responsible senior paediatrician
* Discuss with paediatric critical care specialist regarding transfer to PICU
* Conscious level is directly related to degree of acidosis but signs of raised ICP suggest cerebral oedema
* If cerebral oedema suspected go to page 18 for details on management

**C3. Full Examination**

Looking particularly for evidence of:

* Cerebral oedema – headache, irritability, slowing pulse, rising blood pressure, reducing conscious level. **N.B. Examine fundi but papilloedema is a late sign.**
* Infection
* Ileus

**C4. Weigh the child**

If this is not possible because of the clinical condition, use the most recent clinic weight

or an estimated weight from centile charts or APLS formula.

**C5. Does the child need to be on PICU?**

**Consider** if:

 severe acidosis pH<7.1 with marked hyperventilation

severe dehydration with shock (see below)

depressed sensorium with risk of aspiration from vomiting

very young (under 2 years)

 staffing levels on the wards are insufficient to allow adequate monitoring.

All children with DKA require a high level of nursing care, even on general paediatric wards. Care ideally should be provided in a HDU setting.

**D. MANAGEMENT:**

The goals of DKA treatment are:

* Correct dehydration
* Correct acidosis and reverse ketosis
* Restore blood glucose to near normal
* Monitor for complications of DKA and its treatment
* Identify and treat any precipitating factor

**D1. Fluids:**

**N.B.** It is essential that all fluids given are documented carefully, particularly the fluid which is given in ED and on the way to the ward.

**a)** **Volume of fluid**

By this stage, the circulating volume should have been restored and the child is no longer in shock after a maximum of one bolus of 10ml/kg 0.9% sodium chloride. **If not discuss with a Consultant whether a second bolus should be given.**

Otherwise, once circulating blood volume has been restored, calculate fluid requirements as follows:

**Fluid Requirement = 48 hours Maintenance + Deficit**

**Deficit**

It is not possible to accurately clinically assess the degree of dehydration to calculate the deficit therefore:

* Mild or moderate DKA (blood pH > 7.1) = 5% deficit
* Severe DKA (blood pH < 7.1) = 10% deficit
* Deficit (litres) = % dehydration x body weight (kg) – *ensure the result is then converted into ml*
* **Never use more than 10% dehydration in the calculations**

**Maintenance**

Calculate the maintenance fluid requirement using the following ‘reduced volume’ rules:

* **Weight < 10kg = 2ml/kg/hour**
* **Weight 10-40kg = 1ml/kg/hour**
* **Weight > 40kg = fixed volume of 40ml/hour**

These volumes are lower than standard maintenance fluid volumes as larger fluid volumes are associated with increased risk of cerebral oedema. Do not use other methods of calculating maintenance fluids (e.g. APLS) as these over-estimate requirements.

***NB.*** *Neonatal DKA is a special consideration and larger volumes than those quoted above will usually be required, usually 100-150ml/kg/day.*

**Resuscitation Fluid**

If > 20ml/kg 0.9% sodium chloride has been given as boluses, subtract any additional bolus volumes from the total fluid calculation for the 48-hour period i.e. if 30ml/kg has been given subtract 10ml/kg from the calculations.

**Fluid Calculation**

1. Calculate the fluid deficit (either 5% or 10% depending on severity of acidosis) and divide over 48 hours.
2. Add to the hourly rate of maintenance deficit, giving the total volume evenly over the next 48 hours

**Hourly rate = (deficit/48 hours) + maintenance per hour**

***Examples:***

1. A 20 kg 6-year old boy with a pH of 7.15, who did not have a sodium chloride bolus will require:

* Deficit 5% x 20kg =1000ml
* Divide by 48 hours = 21ml/hr
* Plus maintenance 1ml/kg/hr = 20ml/hr
* **Total = 41ml/hr**

#### A 60kg 16-year old with a pH of 6.9 was given 30ml/kg 0.9% sodium chloride for circulatory collapse will require:

* Deficit 10% x 60kg = 6000ml
* Minus 10ml/kg resuscitation fluid (600ml) = 5400ml
* Divide (deficit – resuscitation fluid) by 48 = 113ml/hr
* Add maintenance fixed rate = 40ml/hr
* **Total = 153ml/hr**

#### Do not give additional IV fluids to replace urinary losses. Urinary catheterisation should be avoided but may be useful in the child with impaired consciousness.

**b) Type of fluid**

* Use 0.9% sodium chloride with 20mmol potassium chloride in 500ml (40mmol/litre) until blood glucose levels are < 14mmol/l.
* Use 0.9% sodium chloride with 10% dextrose and 20mmol potassium chloride in 500ml when blood glucose <14mmol/l if ketones remain > 3.0mmol/l
* Use 0.9% sodium chloride with 5% dextrose and 20mmol potassium chloride in 500ml when blood glucose <14mmol/l if ketones < 3.0mmol/l.

See Appendix 3 for instruction how to make up 10% dextrose & 0.9% saline with 20mmol KCl

**c) Corrected sodium**

There is often a dilutional hyponatraemia secondary to high glucose in the extracellular space causing osmotic movement of water into the serum. As the blood glucose corrects the water moves back. Corrected sodium is a useful guide to fluid management as it is the expected sodium concentration in the absence of hyperglycaemia. **Corrected sodium should be stable or slowly rise as blood glucose falls in DKA management**. Failure of this to happen suggests too much fluid is being administered, which is a risk for cerebral oedema.

**Corrected sodium = 0.4x(Glucose - 5.6) + measured sodium**

**Please ensure you use the lab sodium and glucose levels to calculate corrected sodium.**

***Example:***

Lab Glucose = 21, Lab Sodium =133

Corrected sodium = 0.4x(21-5.6) +133

=138.5

**Interpreting Corrected Sodium**

If corrected sodium level rises more than 5 mmol/l over 4-8 hours during treatment this indicates insufficient fluid. Discuss with the Consultant on call as total fluid infusion rate may need to increase by 20%.

If corrected sodium level falls more than 5 mmol/l over 4-8 hours then total infusion rate may need to be reduced by 20%. Check that infused fluid contains 0.9% sodium chloride.

**d) Oral fluids**

* Do not give oral fluids to a child or young person who is receiving IV fluids for DKA until ketosis is resolving and there is no nausea or vomiting
* A NG tube may be necessary in the case of gastric paresis
* If oral fluids are given before the 48-hour rehydration period is completed, the IV infusion needs to be reduced to take account of the oral intake.

**e) Fluid Losses**

If a massive diuresis continues for several hours, fluid input may need to be increased. If large volumes of gastric aspirate continue, these will need to be replaced with 0.45% sodium chloride and 10mmol potassium chloride.

**D2. POTASSIUM:**

Ensure all fluids (except any initial bolus) contain 40mmol/l potassium chloride, unless there is evidence of renal failure. Potassium is mainly an intracellular ion and there will always be total body depletion of potassium regardless of initial plasma levels. Levels will fall once insulin is commenced. Therefore **ensure that every** 500ml bag of fluid contains 20mmol/l potassium chloride (40mmol per litre).

If the child or young person with DKA develops hypokalaemia (potassium < 3.0mmol/l):

* Consider oral potassium (SandoK) if conscious level normal and not vomiting
* Think about temporarily suspending the insulin infusion
* Discuss urgently with critical care specialist as a central venous catheter is needed for potassium concentrations > 40mmol/l.

***Very rarely, dangerously high potassium levels develop if there has been renal failure secondary to hypoperfusion with shock in diabetic ketoacidosis. This situation must be discussed with regional PICU and EMBRACE critical care team to plan management.***

**D3. INSULIN:**

Once rehydration fluids and potassium are running, blood glucose will already be falling. However, insulin is essential to switch off ketogenesis and reverse the acidosis. There is some evidence that cerebral oedema is more likely if insulin is started early.

**Continuous low-dose intravenous infusion** is the preferred method. There is no need for an initial bolus.

**Insulin infusion should be started 1 hour after commencing IV fluid therapy**

* Make up a solution of 1 unit per ml. of human soluble insulin (e.g. Actrapid) by adding 50 units (0.5 ml) insulin to 50 ml 0.9% saline in a syringe pump. Attach this using a Y-connector to the IV fluids already running. Do **not** add insulin directly to the fluid bags.
* The solution should then run at **0.05-0.1 units/kg/hour (0.05-0.1ml/kg/hour)**
* Other insulin management:
  + For children and young people on continuous subcutaneous insulin infusion (CSII) pump therapy, stop the pump when starting IV insulin.
  + For children who are already on long acting insulin (especially glargine), you may wish to continue this at the usual dose and time throughout DKA treatment, in addition to the IV infusion, in order to shorten the length of stay after recovery from DKA.

**D4. BICARBONATE:**

Do not give IV sodium bicarbonate to children and young people with DKA.

**D5. PHOSPHATE:**

There is always depletion of phosphate, another predominantly intracellular ion. Plasma levels may be very low. There is no evidence in adults or children that replacement has any clinical benefit and phosphate administration may lead to hypocalcaemia.

**D6: RISK OF VENOUS THROMBOSIS**

Be aware that there is a significant risk of femoral venous thrombosis in those requiring femoral lines.

E. MONITORING (see appendix 2)

**E1. Nursing Observations**

Ensure full instructions are given to the **senior** nursing staff emphasising the need for:

* Strict fluid balance including oral fluids and urine output
* Hourly **capillary blood glucose** measurement (these may be inaccurate with severe acidosis/dehydration but useful in documenting trends). Do not rely on any sudden changes and check with a venous laboratory glucose.
* **Capillary blood ketone** levels every 1-2 hours
* Urine testing for ketones (only if blood ketone testing not available)
* Hourly BP and basic observation (or more frequently if indicated)
* Hourly level of consciousness initially, using modified Glasgow Coma Scale (GCS) (Appendix 1)
* **Half-hourly** neurological observations, including level of consciousness (using modified GCS) and heart rate, in children under the age of 2, or in children and young people with a pH of < 7.1, because they are increased risk of cerebral oedema
* Report **immediately** to medical staff, even at night, symptoms of **headache**, **slowing of heart rate, or any change in either conscious level or behaviour**
* Report any changes in the ECG trace, especially signs of hypokalaemia, including S-T segment depression and prominent U-waves
* Twice daily weight; can be helpful in assessing fluid balance

**E2. Medical Reviews**

At 2 hours after starting treatment, and then at least every 4 hours, carry out and record the results of the following blood tests:

* Glucose (laboratory measurement)
* Blood gas
* Plasma sodium, potassium & urea
* Blood ketones

Electrolytes on blood gas machine can be helpful for trends whilst awaiting laboratory results. A 2nd IV access can be used to facilitate blood sampling.

A doctor should carry out a face-to-face review at the start of treatment and then at least every 4 hours, and more frequently if:

* Child < 2 years
* Severe DKA (pH < 7.1)
* There are any other reasons for special concern

At each face-to-face assess the following:

* Clinical status, including vital signs and neurological status
* Results of investigations
* ECG trace
* Fluid balance

It is important to update the child or young person with DKA and their family members or carers (as appropriate) regularly about the treatment plan and their progress.

F. CONTINUING MANAGEMENT

* Continue with 0.9% sodium chloride containing 20mmol/litre potassium chloride until blood glucose levels have fallen to 14mmol/l.
* If the blood glucose rises out of control, or the pH level is not improving after 4-6 hours consult senior medical staff and re-evaluate (possible sepsis, insulin errors or other conditions), and consider starting the whole protocol again.
* If blood ketones are not falling within 6-8 hours, think about increasing the insulin dosage to 0.1units/kg/hr or greater.

**F1. Blood Glucose ≤ 14mmol/l**

Once blood glucose has fallen to 14 mmol/l add glucose to the fluid and think about the insulin infusion rate as follows:

**If ketones levels are < 3 mmol/l**

* Change the fluid to contain 5% dextrose (ie. 0.9% sodium chloride & 5% dextrose with 20mmol/l potassium chloride per 500ml)
* Reduce to or maintain an insulin infusion rate of 0.05units/kg/hour

**If blood ketones are > 3mmol/l**

* Increase or maintain the insulin infusion rate at 0.1units/kg/hour to switch off ketogenesis
* Change the fluid to contain 10% dextrose rather than 5% dextrose to avoid hypoglycaemia when the higher dose of insulin is continued (ie. 0.9% sodium chloride & 10% dextrose with 20mmol potassium chloride per 500ml)

*Appendix 3 – how to make fluids up*

**DO NOT stop the insulin infusion while glucose is being infused, as insulin is required to switch off ketone production.**

**F2. Blood Glucose < 6mmol/l**

* Increase the glucose concentration of the IV infusion fluid **AND**
* If there is persisting ketosis, continue to give insulin at a dosage of at least 0.05 units/kg/hour

**F3. If blood glucose falls below 4 mmol/l:**

* Give a bolus of 2ml/kg 10% dextrose **OR** dextrose tablets/glucogel if conscious and no nausea or vomiting
* Increase the glucose concentration of the IV infusion fluid
* Insulin can be temporarily reduced for 1 hour

Once the pH is > 7.3 and blood ketones are < 3mmol/l, the blood glucose is down to 14 mmol/l and a glucose containing fluid has been started, reduce the insulin infusion rate to 0.05units/kg/hour if not already done so.

**F4. Failure of Acidosis to Correct**

Consider:

* Insufficient insulin to switch off ketones
* Inadequate resuscitation
* Sepsis (fever or hypothermia, hypotension, refractory acidosis or lactic acidosis)
* Hyperchloraemic acidosis
* Salicylate or other prescription or recreational drugs

Use near-patient ketone testing to confirm that ketone levels are falling adequately. If blood ketones are not falling:

* Check infusion lines
* Check the calculation and dose of insulin & consider giving more insulin
* If sufficient insulin is being given, consider sepsis, inadequate fluid input and other causes

Once all these causes of acidosis have been excluded, and if ketones are gradually falling, the residual acidosis is likely to be due to hyperchloraemia, which can be left to resolve on it’s own.

**G. INSULIN MANAGEMENT ONCE KETOSIS RESOLVED**

* Think about stopping IV fluid therapy when ketosis is resolving and oral fluids are tolerated without nausea and vomiting.
* Do not change from IV insulin to subcutaneous insulin until ketosis is resolving (e.g. blood ketones < 1.0mmol/l) and the child or young person with DKA is alert and tolerating fluids without nausea and vomiting.
* Start subcutaneous insulin at least 30 minutes before stopping IV insulin. The most convenient time to change to subcutaneous insulin is pre-mealtime.
* For a child or young person with DKA who is using insulin pump therapy, restart the pump at least 60 minutes before stopping IV insulin. Change the insulin cartridge, infusion set and insert the cannula into a new subcutaneous site.

Subcutaneous insulin should be started according to local protocol for the child with newly diagnosed diabetes, or the child should be started back onto their usual insulin regimen at an appropriate time (discuss with senior staff).

**H. CEREBRAL OEDEMA:**

Clinically significant cerebral oedema usually develops within first 12 hours after treatment has started. **If suspected inform senior staff immediately**.

Immediately assess a child or young person with DKA for suspected cerebral oedema if they have any of these early manifestations or signs:

* Headache
* Agitation or irritability
* Unexpected fall in heart rate
* Increased BP
* Abnormalities in breathing pattern (e.g. pauses)
* Deterioration in level of consciousness
* Oculomotor palsies
* Abnormal posturing
* Pupillary inequality or dilatation

**TREAT IMMEDIATELY WITH:**

* **Mannitol (20% 0.5-1g/kg = 2.5-5ml/kg over 10-15 minutes) OR**
* **Hypertonic saline (2.7% or 3% 2.5-5ml/kg over 10-15 minutes)**

**In addition, fluids should be restricted to half maintenance rates.**

**NB. More dramatic changes such as convulsions, papilloedema, respiratory arrest are late signs associated with extremely poor prognosis.**

After starting treatment for cerebral oedema with mannitol or hypertonic saline immediately seek further advice on further management, including the most appropriate care setting. This is usually PICU.

* Do not intubate and ventilate until an experienced doctor is available. Intubation should be avoided if possible as sudden rise in pCO2 causes CSF pH to reduce and contributes to worsening cerebral oedema.
* Once the child is stable, exclude other diagnoses by CT scan – other intracerebral events may occur (thrombosis, haemorrhage or infarction) and present similarly
* A repeated dose of mannitol may be required after 2 hours if no response
* Document all events (with dates and times) very carefully in medical records
* Exclude hypoglycaemia as a possible cause of any behaviour change

**I. OTHER COMPLICATIONS:**

* **Hypoglycaemia and hypokalaemia** - avoid by careful monitoring and adjustment of infusion rates. Consideration should be given to adding more glucose if BG falling quickly even if still > 4 mmol/l
* **Systemic infections** - Antibiotics are not given as a routine unless a severe bacterial infection is suspected
* **Aspiration pneumonia** – avoid by NG tube in vomiting child with impaired consciousness

**Other associations** with DKA require specific management:

* Continuing abdominal pain is common and may be due to liver swelling, gastritis, bladder retention or ileus. However, beware of appendicitis and ask for a surgical opinion once DKA is stable. A raised amylase is common in DKA.
* Other problems to consider include:
  + Pneumothorax ± pneumo-mediastinum
  + Interstitial pulmonary oedema
  + Unusual infections (e.g. TB, fungal infections
  + Hyperosmolar hyperglycaemic non–ketotic coma in type 2 diabetes.

Discuss these with the consultant on-call

**J. EDUCATION AND FOLLOW-UP**

After a child or young person with known diabetes has recovered from an episode of DKA, discuss with them and their family members or carers (as appropriate) the factors that may have led to the episod

**APPENDIX 1: Glasgow Coma Scale**

**Best Motor Response**

1 = none

2 = extensor response to pain

3 = abnormal flexion to pain

4 = withdraws from pain

5 = localises pain

6 = responds to commands

**Eye Opening**

1 = none

2 = to pain

3 = to speech

4 = spontaneous

**Best Verbal Response**

1 = none

2 = incomprehensible sounds

3 = inappropriate words

4 = appropriate words but confused

5 = fully orientated

Maximum score 15, minimum score 3

**Modification of verbal response score for younger children:**

2-5 years < 2 years

1 = none 1 = none

2 = grunts 2 = grunts

3 = cries or screams 3 = inappropriate crying/unstimulated screaming

4 = monosyllables 4 = cries only

5 = words of any sort 5 = appropriate non-verbal responses

(coos, smiles, cries)

**APPENDIX 2: Observation & Results Flow Chart**

Use together with fluid balance chart and neurological observations charts

Continue 1-2hourly (longer interval when condition stable)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Monitoring Parameters** | **Time Since Treatment Started (Hours)** | | | | | | | | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Glasgow Coma Scale (GCS) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Capillary Glucose |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Blood Ketones |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Blood Gas** |  | | | | | | | | | | | | | |  |
| pH |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bicarbonate |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Base excess |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sodium |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Potassium |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Corrected Sodium (Na) |  | | | | | | | | | | | | | | |
| Lab glucose |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lab sodium |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Corrected Na = 0.4x(glucose - 5.6) + Na |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fluids (Cumulative) |  | | | | | | | | | | | | | | |
| Fluid input |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fluid output |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fluid balance |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Est. Fluid deficit (initial deficit + balance) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**APPENDIX 3: How to make up special intravenous fluids**

The following is generally available from Pharmacy:

500ml bag of 0.9% sodium chloride/5% glucose containing 20 mmol potassium chloride (Baxter: FKB 2486)

But may not be available on every ward. If you need to make it up, please do so as below, rather than waiting for pharmacy.

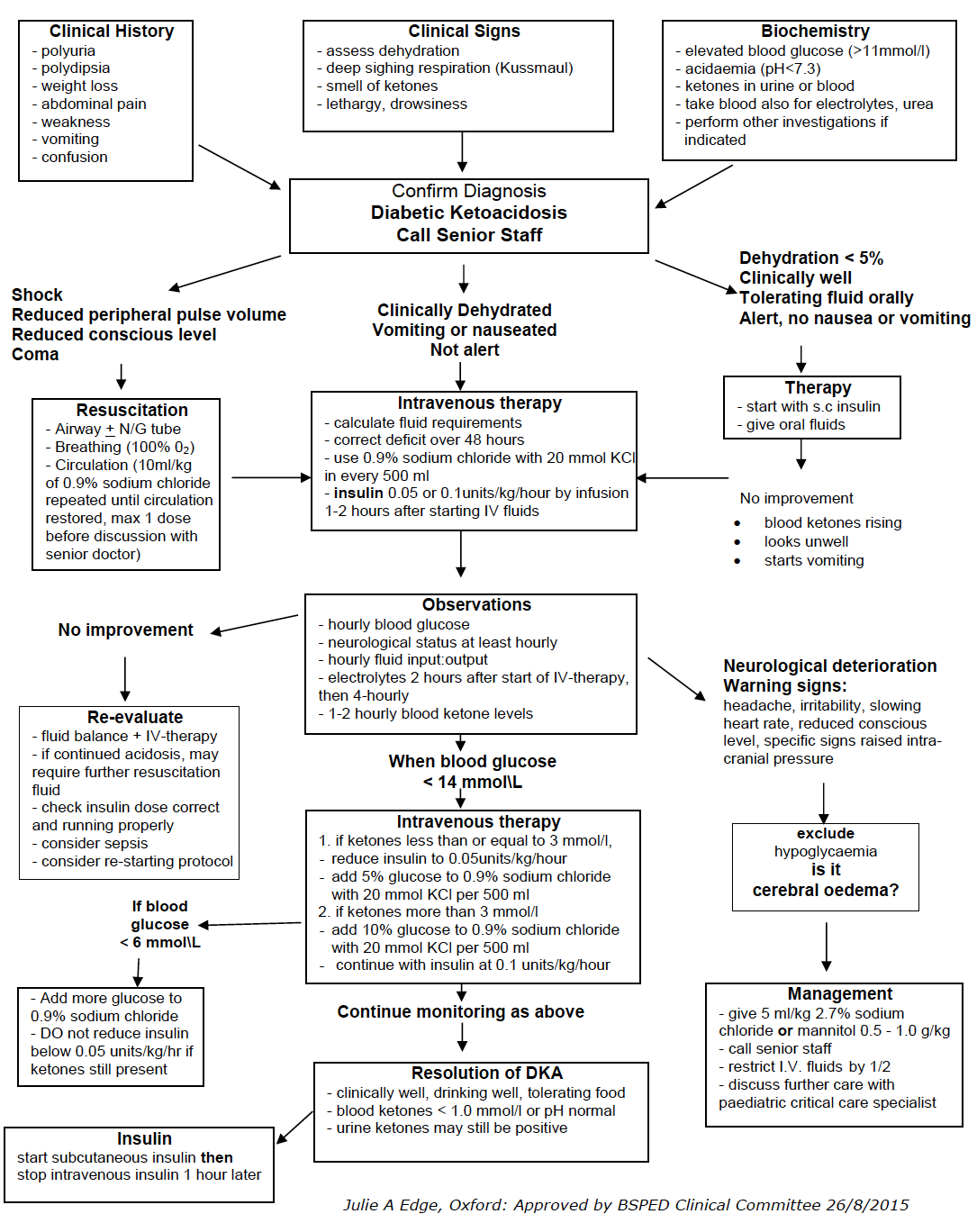
**Glucose 5% & Sodium Chloride 0.9% with 20mmol KCl in 500ml** (if unavailable in clinical area)

* Remove 50ml from a bag of Sodium Chloride 0.9% with 20mmol KCl in 500ml
* Draw up 50ml of Glucose 50% using a syringe and add to the above bag which will make the glucose concentration 5%
* Mix well before administration

**Glucose 10% & Sodium Chloride 0.9% with 20mmol KCl in 500ml** (this fluid is not available and MUST be made up if required)

* Remove 50ml from a bag of Glucose 5% & Sodium Chloride 0.9% with KCl in 500ml (FKB2486)
* Draw up 50ml of Glucose 50% using a syringe and add to the above bag which will increase the glucose concentration to 10%
* Mix well before administration

**APPENDIX 4: Algorithm for Management of DKA**



**Sick day rules for children with diabetes on basal bolus insulin regime**

**BLOOD KETONES**

**MORE THAN 1.5**

**BETWEEN 0.6 – 1.5**

**LESS THAN 0.6**

**NOT EATING**

**EATING**

**NOT EATING**

**EATING**

**NOT EATING**

**EATING**

**Correction dose for blood glucose level if high + usual insulin carbohydrate ratio for meal**

**Extra 20% Total Daily Dose. Give insulin now (see table below) + usual insulin carbohydrate ratio for meal.**

**Extra 20% Total Daily Dose (see table below)**

**10% extra insulin now (see table below)**

**10% extra insulin now (see table) + usual insulin carbohydrate ratio for meal**

**Correction dose for blood glucose level if high.**

**BLOOD GLUCOSE LESS THAN 6**

**BLOOD GLUCOSE MORE THAN 6**

**FREQUENT SMALL SUGARY DRINKS**

**FREQUENT SUGAR FREE DRINKS**



**CHECK BLOOD KETONES AND GLUCOSE EVERY TWO HOURS.**

**REPEAT PROCESS AGAIN**

**CONTACT TEAM IF:**

* **Increasingly unwell**
* **Rescue dose x3 has failed to correct**
* **Ketones more than 3/ Vomiting persists**
* **Unable to maintain blood glucose above 4.**
* **Worried for any reason or unsure as what to do.**

**Maximum NovoRapid dose 10 units. Repeat after 2 hours if ketones still present.**

When you are ill your body needs more energy to fight the infection.

Glucose is released from your body stores to do this, so the blood glucose tends to go up even if you are not eating.

This means that you need more insulin than usual when you are ill.

If you do not give enough insulin then your body cannot use the extra glucose so it will start to break down fat for energy.

When fat is broken down, this produces ketones.

**KETONES ARE VERY DANGEROUS!**

Ketones are acids which can make you feel very unwell and can make you vomit. They can make you feel breathless. If you do not get rid of ketones, you can become extremely unwell and would need urgent hospital treatment (Diabetic Ketoacidosis – DKA)

**KETONES CAN STILL BE PRODUCED WHEN YOU ARE ILL EVEN WHEN YOUR BLOOD GLUCOSE IS LOW.**

**THEREFORE:**

**NEVER STOP YOUR INSULIN EVEN IF YOU ARE NOT EATING.**

**ALWAYS CHECK FOR KETONES & BLOODGLUCOSE IF YOU ARE UNWELL REGARDLESS OF YOUR BLOODGLUCOSE LEVEL.**

**Structured education material**

**Annual course for 12-14 year old patients**

1. **Housekeeping**

**Before the course:**

Plan early and make families aware the course is part of the service

Book facilities

Get names of people that want to attend

Get email addresses and phone numbers

Consent forms for activities

Instructions on where to go, what to bring

Emergency contact details for parents

Insurance

Arrange programme and speakers to cover all sessions

Plan food and breaks

Request sponsorship

Plan sessions with Educational objectives, teaching plan

Plan activities

Plan Group Challenges to encourage participation and maintain interest through the session

Prepare certificates and prizes

Equipment list

* Pens
* Post its
* Whiteboard pens
* Games
* Cooking ingredients
* Textbooks for reference (carbs and cals, Hanas)

Internet log in with school IT service

**On arrival:**

Orientation classrooms, toilets

Fire safety

Breaks and snacks

Rules about confidentiality / respect for other people – allow everyone to say what they think

Rules about mobile phones

**YOU CAN TEST YOUR BLOOD SUGAR WHENEVER YOU NEED TO**

**Plan for the course:**

The aim of the group is to

1. Allow an opportunity to meet other young people with diabetes to share experience and gain support from the ideas and experience of other people managing similar difficulties
2. Have some time (away from school, clinic and home) dedicated to making progress on self-management
3. Learn (or revise) the key points of knowledge needed for self-management
4. Incorporate some practical physical exercise and diet experience

The method of learning is different to school lessons – it is more like a university student group and involves more self-learning, discussion and trying things out. This is about the group sharing experience and knowledge. Staff are here to join in the discussion and learning, make sure we get everything covered and everyone gets what they need from the sessions.

Pre-course evaluation

Post course evaluation

Content

1. Back to basics
2. Food and diet
3. Sport and exercise
4. Hypos
5. High blood sugars ketones and sick day rules
6. Looking after diabetes for a healthy life
7. Transition, independence, taking control, getting support
8. Living with diabetes – thoughts feelings and talking about diabetes
9. **Back to basics**

Everyone in the group knows a huge amount about diabetes.

Sometimes if people have lived with diabetes for a long time some of the essential early information about the condition was discussed with parents and isn’t easy to remember or explain.

The aim of this session is to refresh knowledge of all the key facts about diabetes.

**Experience from the group:**

Can you remember when you were first diagnosed?

What were the signs of diabetes?

What happened ?

What did you need to know?

Can you remember a time when you needed to explain to someone – what is diabetes?

Why were they asking?

What did they need to know?

What did you say?

Were there parts that were difficult to explain?

Are there things people often don’t understand or get wrong about diabetes?

**Questions to work through:**

What do the words Diabetes and Mellitus mean?

What is insulin?

How and where is insulin made?

What is glucose? Dextrose? Sugar? Carbohydrates?

What is diabetes?

How many people have diabetes?

Why do some people develop diabetes?

Can you catch diabetes form someone?

List the features of type 1 and type 2 diabetes

*(age, prevalence, mechanism autoimmunity, cause, treatment approach, complications)*

What are the physical effects of diabetes at diagnosis?

*(feeling tired, passing lots of urine, feeling thirsty, losing weight, vomiting, abdo pain, breathlessness, infection, drowsiness)*

What is found in the urine when there is not enough insulin? *(Glucose, Ketones)*

What is found in the blood? *(Glucose, Ketones)*

Questions about insulin

* How does insulin work
* How quickly does it act
* What are the different types – why do they work in different ways
* Can you draw a profile of action of different insulins
* How do you store insulin
* How quickly does it stop working if kept at room temperature

Questions about injections

* Where do you inject *(draw a map)*
* What sort of needle do you use
* Describe method of injection *(check correct insulin, dose calculation, air shot, site, angle , depth, inject , count to 10)*
* What can go wrong with injections

Questions about insulin doses

* What do you think about when deciding how much insulin to have?
* What does bolus insulin and basal insulin mean?
* How often do you change mealtime bolus dose?
* How often do you change once daily or basal rates?
* What does insulin:carbohydrate ratio mean
* What does insulin:glucose correction mean
* What blood tests tell you about which injection/basal/bolus dose

What do you do if you give the wrong insulin?

What do you do if you forget a dose?

Questions about blood tests

* Why do you do blood tests
* What are the target numbers for blood sugar?
* When do you do a test
* Does keeping a record of results help you
* How should tests be done

What does HbA1c mean?

What is the target HbA1c?

What are blood sugars like if in target for Hba1c – if HbA1c is high?

What are the key things to understand to get started with treating diabetes?

What are the more advanced things to understand?

1. **Food and drink**

In this session we think about food and how it affects blood sugars. This means understanding what different foods are and how insulin needs to change to match what we eat.

**Experience from the group:**

Can you think of different ways that food is important?

What are your favourite foods?

Can you think of times when your diabetes made it difficult to eat what you want?

**Questions on food:**

What food groups make up our diet?

What is the job of each of the food types?

Can you name 4 foods that belong to each group?

What natural foods contains both high sugar and high fat content?

**Counting Carbohydrates**

How do we count carbohydrates?

Exercise – count carbs

* from packet labels *(note value per 100g, note total carbs of which sugars)*
* from plates
* from recipe
* from menu

What does carbohydrate ratio mean?

How accurate does carbohydrate counting need to be?

What is the size of a carbohydrate snack which needs an insulin bolus?

How long before meals should you have insulin if you have a snack? And when do you wait and add the snack carbs to your next meal and give insulin altogether?

**Glycaemic index questions**

What is the difference between fast carbs and slow carbs?

Why is this important ?

What effect does fat and protein have on glycaemic index?

Exercise – Can you spot the high and low glycaemic index foods – which are the fast carbs and slow carbs?

What type of carbohydrate should be eaten

* to treat a hypo
* before bed
* before exercise

What books and Apps can help?

**Scenarios:**

You test your blood sugar at 0800 it is 7.0. You do not feel hungry so you skip breakfast. You normally have lunch at 1200. At breaktime 1030 you have a bacon sandwich

* what insulin should you have ?

Your friend comes home from school with you and you stop at a shop on the way home at 430 and have a chunky KitKat and a few crisps. Your evening meal is at 530 and you will have a medium size jacket potato with beans (1/3rd can) cheese and salad.

* How much insulin will you have & when will you have it?

1. **Sport and exercise**

The aim of the session is to understand how to manage blood sugars with exercise. There are lots of different approaches to this so we will review the current best advice which can help you exercise better.

**Experience from the group:**

Has anyone had difficulty with hypos and exercise?

Do you think high blood sugars have an effect on your exercise performance?

What are the best sports and what are the hardest to get right?

**Questions:**

What is good about exercise?

*(fitness, strength, mood, social, competition, physique, weight control)*

Plus for diabetes

*(improves absorption of insulin)*

*(makes muscle cells store glucose without more insulin)*

*(improves sensitivity to insulin)*

How much energy does exercise use?

Resting weight Kg x 40 (30 female) = rest calories /day

e.g 50 Kg male = 2000 kcal/day

Activity

Moderately active – add 50%

Very active – add 80%

Swimming weight x 3.5 /hr e.g 50Kg swim 30 mins =88

Running weight x 4.2/hr e.g 50Kg jog 30 mins = 105

Football / Netball weight x3.7/hr e.g 50Kg football for 1 h = 185

Walking to school weightx 3.5/hr e.g 50kg walk 30mins = 88

Cleaning ! weightx 1.7/hr e.g 50Kg mop 30mins =42

What exercise is NOT school sport?

*(trampolining, mountain biking, juggling, dancing, table tennis, frisbee, gym sessions, swim, triathlon, sailing, canoeing, trekking, skateboard, paintball, climbing, Wii fit, Xbox Kinect)*

How do you prevent hypos with exercise?

Before exercise

* *Check blood sugar*
* *If <4 mmol/l treat hypo*
* *Consider when last dose of rapid insulin was given – will level be rising?*
* *Consider when last food – will sugar be rising?*
* *Consider type and duration of exercise planned*

During exercise

* *Always carry hypo treatment carbs*
* *If exercising over time check blood sugar during*
* *Make sure someone knows you have diabetes*

After exercise

* *Test blood sugar*
* *Be aware hypos more likely up to 24 hours after exercise*
* *Extra carbs snacks / meal portions may be needed*
* *Check blood sugar before bed*
* *The next insulin dose may need to be reduced*

Why can exercise sometimes cause blood sugar to rise?

*If insulin levels are low at the time of exercise there will be insufficient insulin to allow glucose in blood to move in to muscles. The body may release extra glucose as exercise starts from stores. Adrenalin can also raise blood sugar.*

What should you do if blood sugar high >14mmol/l before exercise?

*Think about why has this happened*

*If very high may need to check ketones, consider sick day rules*

*Consider a correction dose or rescue dose*

**Exercise scenarios**

Short gentle exercise

e.g walk to shops ,20minutes

*Action : test blood sugar, carry carbs*

20-40 minutes moderate exercise

e.g bike ride, swim, dance

*Action: test blood sugar, eat extra 10-20g fast carbs*

Intense or long >60 minutes

e.g Game of football, aerobic class

*Action: test blood sugar*

*Reduce rapid insulin by 30-50% for meal before exercise if within 3hrs*

*Eat extra 10-20g fast carbs*

*Eat fast carbs +/- reduce next insulin dose after exercise*

Prolonged exercise 3-4 hrs +

e.g Hiking, football tournament

*Action: reduce basal insulin beforehand by 20%*

*Reduce rapid bolus insulin by 50% meal before*

*Test blood sugar before and during*

*Extra fast carbs 10-20g before and during*

*Reduce insulin rapid bolus by 50% next dose after*

*Reduce basal insulin by 20% overnight following*

**Websites for exercise**

Runsweet.com

excarbs

1. **Hypos**

Everyone here will know lots about hypos. You are all experts in your own hypo symptoms. The aim of this session is to get all the detail you need to understand hypos, treat them correctly and consider how to reduce the number of hypos if they happen a lot.

**Experiences from the group:**

Can everyone write down how they usually feel when they have a hypo?

Has anyone had a difficult hypo needing extra help like glucagon treatment or hospital admission?

Has anyone been in a situation when a hypo has been extra difficult or embarrassing?

How do you treat your hypos?

**Questions on hypos:**

What things influence blood sugar levels?

High with- *food, adrenalin, growth hormone, cortisol, menstrual periods, lipohypertrophy, too little insulin, pump failure, illness*

Low with *insulin, exercise, missing food, warmer weather (insulin absorbed quicker, illness*

What does Glucagon do?

*Extra sugar is stored in the liver and muscles. If sugar is needed quickly the pancreas releases glucagon which releases sugar from stores into the blood.*

*Glucagon can be given as an injection*

What are the commonest causes of hypos?

Too much insulin

Unplanned exercise / activity

Alcohol

Incorrect dose calculations

What are the signs of hypos?

Mild *pale , shaky, sweaty, dizzy, hungry, headache*

Moderate *+ confused, moody, concentration problems, blurred vision*

Severe *+ more extreme behaviour change, seizure, unconscious*

How low is blood sugar when you start to feel hypo?

**How do you treat hypos?**

*Test*

*If <4.0 mmol/l have fast carbs*

*Fastest carbs = sugary drink, fast = dextrose tablets*

*Take 10-20g*

*If still unwell repeat in 5 minutes*

*If feel OK retest in 15 minutes*

Should you have slow carbs too?

*Yes if >1hr before meal e.g 10g toast*

*Yes if>2hrs before meal e.g 20g toast*

Think – *why did the hypo happen?*

*Do I need to change dose calculations, carb counting, exercise plan?*

What happens in a severe hypo?

*Feel very unwell, seizure, unconscious, can’t correct it yourself*

*May need emergency hospital admission*

*Instructions for helpers*

*Don’t give food or drink if unconscious*

*Make sure you are safe (traffic, water, heights)*

*Recovery position*

*Glucagel can be tried*

*Glucagon injection*

*Call an ambulance and emergency contact*

When conscious *have 20-40g fast carbs*

*40 g slow carbs*

*Reduce next rapid insulin bolus by 50%*

*Reduce overnight basal by 20%*

*Discuss with team*

*Frequent testing over following days weeks*

What do you need in your hypo kit?

*Test equipment*

*Fast carbs*

*ID card / bracelet*

*Contact number*

1. **High blood sugars, ketones and sick day rules**

We talk a lot about managing hypos but we also need to take action if levels are high. This session will build confidence in treating high blood sugars, consider changes to insulin calculations and help understand ketones and sick day rules.

**Experiences from the group:**

How many people do a correction dose for a high blood sugar

At what level would you give a correction?

Would you feel happy to change your insulin :carbohydrate ratio?

Have you ever had difficulty managing when you have been ill – would you know what to do?

**Questions about high blood sugars:**

How often should you check a blood sugar?

What do the tests tell you when you test

Before breakfast

Before lunch

Late afternoon

Before tea

Before bed

In the night

What are the numbers like if control is good?

What are ketones and when do you see them?

*(starvation/sickness/ lack insulin)*

When should you test for ketones?

*(if unwell or blood glucose > 14 mmol/l)*

What should you do if blood glucose high, ketones low, feel OK?

*( correction dose, recheck, repeat)*

What should you do if blood glucose high, ketones high, feel OK?

*(rescue dose, recheck, repeat)*

What happens during illness?

*Your body needs more energy. Sugar stored in liver and muscles is releases. More insulin is needed. If there is not enough insulin your body gets energy from fat stores which makes ketone acids. This can develop into diabetic ketoacidosis DKA.*

**DKA**

What are the signs of DKA?

*Thirst, passing urine*

*Vomiting*

*Abdo pain*

*Kussmaul breathing*

*ketone breath*

*unconscious*

What are the risks with DKA?

How often does this happen?

**Illness**

Blood sugars are sometimes low during illness – how do you manage this?

*Should have had normal basal insulin*

*Test frequently*

*Have fast carbs often if you don’t feel like eating*

*If sugar < 5 have carbs but no bolus rapid insulin*

*If sugar > 5 have carbs with bolus rapid insulin*

*Test every 1-2 hours*

*Reduce next basal insulin by 50 % if you struggle to keep blood sugars >5*

*Phone your team if you need help –may need to come in to hospital*

**Sick day rules**

High blood sugar (>14mmol/l) and low/medium ketones (< 1.0)

Rescue bolus rapid insulin 10% total daily or Weight in kilo

e.g 50 Kg then give 5 units novorapid

Check blood glucose and ketones every 1-2 hours

If blood glucose drops< 14 mmol/l but you still have ketones then give an extra rapid rescue bolus and also 20g fast carbs

Repeat extra insulin every 2 hrs until ketones < 0.3

Continue normal insulin plan with next meal

High blood sugar (>14 mmol/l) and high ketones (>1.0 ) or very high (>3.0)

Rescue bolus rapid insulin at 20% of total daily dose or 20% body weight in kilos

e.g 50Kg then give 10 units novorapid

Check blood glucose and ketones every 1-2 hrs

If blood glucose drops< 14 mmol/l and you still have ketones >3.0 reoeat high dose rescue 20% total daily dose. Have 20g fast carbs

If ketones high 1.0-3.0 give rescue at 10% and have 20g carbs

Repeat extra dose every 2 hours until ketones low

Contact hospital team if

rescue dose x3 has failed to correct

vomiting

looking ill

unsure what to do

1. **Looking after diabetes for a healthy life**

Everyone needs to take care of themselves to stay healthy. There are lots of ways this is important. People with diabetes need to take special care to stay healthy long term as there are extra things they need to take care of. In this session we think about being healthy and the long term effects of diabetes.

**Experiences from the group:**

This is a very general question – what does health mean?

*Not being ill*

*Preventing illness*

*Feeling well*

*Able to do everything and join in*

*Physically strong*

*Living a long time*

*Being happy*

*Living life to the full*

Do you feel healthy?

**Questions:**

What can everyone (with or without diabetes) do to stay healthy?

*Physically active*

*Healthy eating*

*Not smoking*

*Not drinking too much alcohol or using drugs*

*Avoid danger and accidents*

*See the dentist, optician*

*Get immunisations*

*Good mental health*

*Sexual health*

What things about adolescence make this difficult ?

*Peer group*

*Finding independence*

*Normal to experiment*

*Excitement and spontaneity are important*

*Emotions and relationships are changing*

*Taking responsibility is hard*

What are the long term challenges and health complications linked with diabetes?

Complications

* Kidney disease
* Circulation problems - Heart disease and Stroke, skin damage
* Damage to nerves (pins and needles, reduced sensation, skin damage, gastroparesis)
* Damage to the retina in the eyes
* Impotence
* Skin changes
* Joints

Extra care in Pregnancy (pre-conception control, folic acid, pregnancy care)

Driving and employment

Associations

* Coeliac disease
* Thyroid disease
* Addisons disease

What can you do to reduce the risk of complications?

* Good general health
* Follow a good routine every day with testing, remembering doses, correcting
* Achieve good control
* Low HbA1c
* Attend clinic and annual review
* Have good knowledge about diabetes

What is happening in research and diabetes care to make things better?

Timeline of diabetes research

* 1500 BC Ancient Egypt description of diabetes
* 150 BC Ancient Greece description of diabetes
* 1000 Arabian doctor describes sugar in urine in diabetes
* 1921 discovery of insulin

start of treatment for diabetes

* 1930s-1960s Purification of animal insulin

Combination with chemicals to change absorption pattern

Urine glucose and ketone tests

* 1970s Home blood glucose test
* 1980s Human insulin

Multiple daily injections

Carb counting DAFNE

* 1990s Analogue insulins – rapid, slow
* 2000s pumps

Blood Ketone testing

Smart meters

CGMS

* 2010s pump technology

Linked CGMS – pump

Artificial pancreas

Stem cell transplant

More information

JDRF

Diabetes UK

1. **Transition, independence, taking control, getting support**

In this session we will think about what needs to happen for diabetes to be well controlled. This is about understanding what the common problems are and who can make decisions or help with decisions.

**Experience from the group:**

Can you think of decisions that are made by you? your parents ? your clinic team?

As you have got older what aspects of diabetes have you taken charge of ?

What more is there left for you to be doing?

**Questions:**

Who helps look after you?

Who do you ask in an emergency?

What other ways do you get information or support?

Internet

Social media

Books, written info

Parents

Diabetes speciaiist nurse

friends

teacher

Doctor

Other staff at school

Dietician

Psychologist

School nurse

CAMHS

Hospital ward

Youth services

Social worker

GP

What happens at clinic?

At every review

Height weight

BP

HbA1c

General health and wellbeing

Blood sugar control questions

Hypos

Long term control

Injection sites

Insulin doses

Any gaps in knowledge

Any immediate needs

– school health care plan

* + - * Travel
      * Dose adjustment
      * Download CGMS
      * Dietician
      * psychologist

Does this feel OK or does this feel like criticism?

Is the clinic helping you or judging you?

At annual review

Physical checks – Height weight BMI BP Injection sites Feet, Sensation

Urine microalbumin

Psychology

Diet

Diabetes Education level

Targets for next year

Bloods – U&E LFT Coeliac TFT Cholesterol

Retinopathy screen

How does transition work? – what to expect as you get older and leave school

1. **Living with diabetes – thoughts feelings and talking about diabetes**

We talk a lot about the technical side of diabetes – insulin, carb counting, pumps and meters.

There is another very important side to managing diabetes which is the impact diabetes has on emotions, thoughts and relationships with other people. It isn’t easy to discuss this but it has a huge effect on how people feel every day and how well the condition is managed.

You can know everything there is to know about the science of diabetes but if you feel sad or anxious lots of the time it is very hard to get things working well.

The aim of this session is to think about emotional wellbeing – how emotions affect what we do.

**Experience from group:**

How do emotions affect diabetes ?

How does diabetes affect emotions ?

People grow in height through childhood, learn academic skills and knowledge

What emotional development happens as children become adults?

What does independence feel like? Are there good and bad things about this?

Challenging communication scenarios

Parent asks what blood sugar is

Level is high

What do you say

What are you thinking, parent thinking

What happens next ?

How can you talk about this in a way which is OK for you, your parent?

Young person wants to go out with friends. They aren’t sure what they are doing but

will meet at friend’s house Saturday afternoon then decide. Might go in to town, might see a film or find something to eat.

Young person lets parent know this is happening

At lunchtime at school you need to do a test and inject. Someone you don’t know very well starts staring at you and asking what you are doing.

You come to clinic and download meter and pump info

There are not many tests, missed some bolus doses, not carb counting well

HbA1c is 9.2% (80mmol)

What is everyone thinking ? what happens?

Some patterns of thinking can cause strong feelings

What are harmful thoughts and behaviours?

Patterns of negative thinking

How do you beat stress?

Recognise when you are feeling low or anxious

Think or discuss – is this the right response?

Have strategies to manage stress

**Psychology screening questionnaire for younger children**



CHILDREN AND YOUNG PEOPLE’S DIABETES TEAM

Ward 18 - Children’s Assessment Unit

Team Office 01904 721317

**Emotional Well-Being Check up for younger children**

As part of your diabetes care we consider it important to think with you about your and your family’s emotional well-being and how you / your family feel you are coping with your diabetes. Once a year we will ask you to go through these questions and you will have a chance to talk about any worries you have.

If you mention anything in here that might be a big worry for you or your family you can talk to your nurse, Paediatrician or dietician about this. Your nurse can also put you in touch with our team Psychologist who you might want to talk to about any concerns you have about your emotional well-being. The information you provide here will be kept confidential within the Children’s and Young People’s Diabetes Team.

**If you consent for yourself and/or your child to complete the following questionnaires please complete the name and date details below.**

However, if you do not feel happy being involved in this for any reason that is absolutely fine. It will not affect your care in any way. Any concerns you might have about your own / your child’s emotional well-being can be discussed with your nurse or you can contact the team Psychologist, Emma Peakman, on 01904 721317 or at emma.peakman@nhs.net.

|  |  |
| --- | --- |
| **Your Name** | **Your date of birth** |
|  |  |
| **Date today** | **Parent or Guardian** |
|  |  |

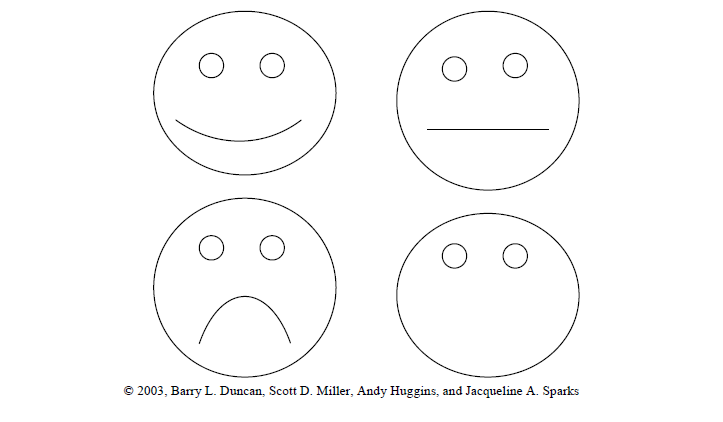
***I do not wish to take part in the emotional well-being check-up this time.***

*Please tick.*

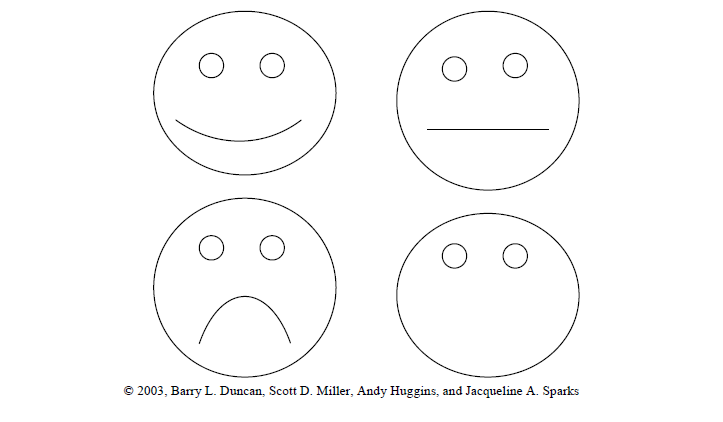
**Version 2 (<11)**

**How are you doing?**

Choose one of the faces that shows how things are going for you. Or you can draw one below that is just right for you.

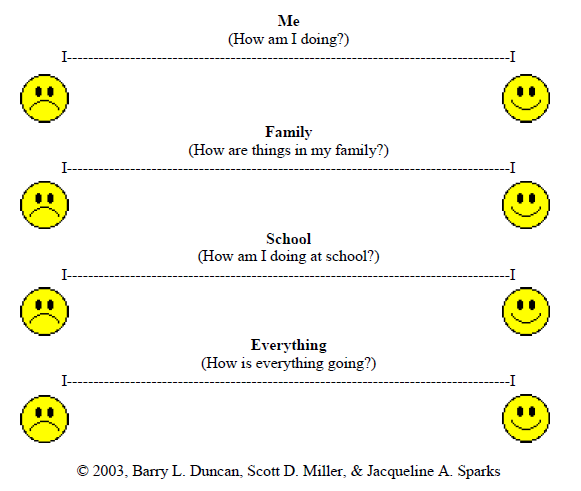


**Then, choose a face for what you think about your diabetes:**



***Young Child Outcome Rating Scale (YCORS)***

How are things in your life as a whole? Please mark on the scale to let us know. The closer to the smiley face the better things are. The closer to the frowny face, things are not so good. *If you are a caregiver/parent filling out this form, please fill out according to how you think your child is doing.*



**How I feel about my diabetes**

I---------------------------------------------------------------------------------I

**In the last month…**

|  |  |  |  |
| --- | --- | --- | --- |
| **There have been changes in my eating or how hungry I am**  [Image result for kids eating and food](http://www.google.co.uk/imgres?imgurl=http://foodwallpaper.info/wp-content/uploads/2014/11/kids-eating-healthy-food.jpg&imgrefurl=http://foodwallpaper.info/kids-eating-healthy-food/&h=413&w=634&tbnid=SMZpAuN-LDnvgM:&zoom=1&docid=JS6US0reFT_vhM&ei=LBJSVabfI-iz7gblp4HICQ&tbm=isch) | **Yes** | **no** | **Not sure** |
| **I have been feeling more sad and unhappy** | **Yes** | **no** | **Not sure** |
| **I have been worrying more** | **Yes** | **no** | **Not sure** |
| **I have found things at home more difficult**  [Image result for home kids drawing](http://www.google.co.uk/imgres?imgurl=http://www.cattco.org/files/pictures/happy_home_family.png&imgrefurl=http://homes-kid.com/home-drawing-pictures-for-kids.html&h=191&w=250&tbnid=Uo6dhkK1BvmKRM:&zoom=1&docid=asRVZ8a7_kYGXM&ei=lBFSVfaKD7GO7AbAw4GYCQ&tbm=isch) | **Yes** | **no** | **Not sure** |
| **I have found school work more difficult**  [Image result for school work](http://www.google.co.uk/imgres?imgurl=http://ineedmoretime.com/images/j0232149%5b1%5d.gif&imgrefurl=http://ineedmoretime.com/playroom.htm&h=238&w=223&tbnid=c0di3vsLMyjYuM:&zoom=1&docid=vo9lrITncdEvFM&ei=DBNSVf-hBsOu7AbXzoGIBQ&tbm=isch) | **Yes** | **no** | **Not sure** |
| **I have found things with friends more difficult**  [Image result for friendships](http://www.google.co.uk/imgres?imgurl=http://www.centergrove.k12.in.us/cms/lib4/IN01000850/Centricity/Domain/974/friends2.JPG&imgrefurl=http://www.centergrove.k12.in.us/Page/5442&h=225&w=300&tbnid=Ekng84uqPU9FXM:&zoom=1&docid=jra2x7NBOvywzM&ei=WBNSVdS9COWt7gaL34GQCg&tbm=isch) | **Yes** | **no** | **Not sure** |
| **Looking after my diabetes has been more difficult**  [Image result for diabetes  children](http://www.google.co.uk/imgres?imgurl=http://www.nashvilleparent.com/wp-content/uploads/2010/11/prick-460x280.jpg&imgrefurl=http://www.nashvilleparent.com/special-needs/diabetes-and-your-child&h=280&w=460&tbnid=JXOcJWviQbGSBM:&zoom=1&docid=qPfycLg3OJLbIM&ei=5hNSVbmDB6eS7Abg84DQDg&tbm=isch&) | **Yes** | **no** | **Not sure** |
| **I am worried about how my family is coping**  [Image result for family](http://www.google.co.uk/imgres?imgurl=http://www.site-fusion.co.uk/files/writeable/uploads/webfusion70266/image/families.jpg&imgrefurl=http://www.leicesterpsychotherapyandcounselling.co.uk/family-life&h=1200&w=1800&tbnid=b0PqLZKY_fbrAM:&zoom=1&docid=8DBtPiZoJkucLM&ei=ixRSVY3OE4fc7Aa_lIDwCQ&tbm=isch) | **Yes** | **no** | **Not sure** |

***Adapted from the Wellbeing in Diabetes Questionnaire – Yorkshire and the Humber Paediatric Diabetes Network***

|  |  |
| --- | --- |
| **What feels hard for you?** | |
| **Pricking my finger** |  |
| **Injections** |  |
| **Changing sets for my pump** |  |
| **Putting information into my pump** |  |
| **Carbohydrate counting** |  |
| **Deciding what to eat or drink** |  |
| **Knowing what to do about hypos** |  |
| **Controlling high blood sugars** |  |
| **Remembering to have all my diabetes stuff with me** |  |
| **Controlling diabetes when I exercise** |  |
| **Doing diabetes stuff in front of people** |  |
| **Nothing** |  |
| **Something else…** |  |

**Is there anything that could be better about your diabetes** 

*Child Outcome Rating Scale (CORS)*

*Child Outcome Rating Scale (CORS)*

*Child Outcome Rating Scale (CORS)*

**The three things I would like to be different are:**

**Would you like some help to make these things different?**



**Who would I like to help me?**

My parents

My nurse / doctor / dietician

A psychologist in the team

**BLANK PAGE**

**For Parent or Caregiver to complete**

|  |  |  |  |
| --- | --- | --- | --- |
| **Child’s name** |  | **Child’s date of birth** |  |
| **Parent/caregiver name** |  | **Today’s date** |  |
| **Please circle: completed by mother /father /carer** | | | |

These next questions are about how your child might have been feeling or acting recently. For each question, please tick how s/he has been feeling or acting in the ***past two weeks.***

If a sentence was not true about your child, tick NOT TRUE.

If a sentence was only sometimes true, tick SOMETIMES.

If a sentence was true about your child most of the time, tick TRUE.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NOT TRUE** | **SOMETIMES** | **TRUE** |
| 1. **S/he felt miserable or unhappy.** |  |  |  |
| 1. **S/he didn’t enjoy anything at all.** |  |  |  |
| 1. **S/he felt so tired that s/he just sat around and did nothing.** |  |  |  |
| 1. **S/he was very restless.** |  |  |  |
| 1. **S/he felt s/he was no good anymore.** |  |  |  |
| 1. **S/he cried a lot.** |  |  |  |
| 1. **S/he found it hard to think properly or concentrate.** |  |  |  |
| 1. **S/he hated him/herself.** |  |  |  |
| 1. **S/he felt s/he was a bad person.** |  |  |  |
| 1. **S/he felt lonely.** |  |  |  |
| 1. **S/he thought nobody really loved him/her.** |  |  |  |
| 1. **S/he thought s/he could never be as good as other kids.** |  |  |  |
| 1. **S/he felt s/he did everything wrong.** |  |  |  |

***Moods and Feelings Questionnaire – Short Form – Parent report on child***

**How is diabetes affecting your life?**

Parenting a child with a chronic condition like diabetes can present many challenges which can change over time. These questions ask you about ***your feelings and thoughts*** during the ***LAST MONTH*** in relation to your child’s health.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Not a problem** | **A slight problem** | **A reasonable problem** | **A considerable problem** | **A serious problem** |
| **1** | **Feeling discouraged**  **about the way in which my child is being treated** |  |  |  |  |  |
| **2** | **Not having clear and**  **concrete treatment goals**  **for my child’s diabetes**  **treatment** |  |  |  |  |  |
| **3** | **Feeling scared when I**  **think about my child**  **living with diabetes** |  |  |  |  |  |
| **4** | **Having problems with**  **school staff** |  |  |  |  |  |
| **5** | **Feeling that my child is**  **deprived of food and**  **meals** |  |  |  |  |  |
| **6** | **Feeling that my child is**  **excluded from activities**  **due to his/her diabetes** |  |  |  |  |  |
| **7** | **Not knowing if my child’s**  **mood or feelings are**  **related to his/her blood**  **sugar level** |  |  |  |  | *Problem Area in Diabetes Questionnaire for Parents (PAID-P)* |
| **8** | **Being upset when my**  **child’s blood sugar values**  **are too high or too low** |  |  |  |  |  |
| **9** | **Worrying about low**  **blood sugar values**  **(hypos)** |  |  |  |  |  |
| **10** | **Feeling angry when I**  **think about my child**  **living with diabetes** |  |  |  |  |  |
| **11** | **Always worrying about**  **what my child is eating** |  |  |  |  |  |
| **12** | **Worrying about the**  **future and the possibility**  **of serious complications**  **for my child** |  |  |  |  |  |
| **13** | **Feeling guilty or anxious**  **when my child’s diabetes**  **is out of control** |  |  |  |  |  |
|  |  | **Not a problem** | **A slight problem** | **A reasonable problem** | **A considerable problem** | **A serious problem** |
| **14** | **Worrying that my child**  **will not receive care if**  **he/she is not at home** |  |  |  |  |  |
| **15** | **Feeling like the ‘diabetes**  **police’** |  |  |  |  |  |
| **16** | **Feeling that diabetes is**  **taking up too much of**  **my physical and mental**  **energy every day** |  |  |  |  |  |
| **17** | **Feeling alone in**  **controlling my child’s**  **diabetes** |  |  |  |  |  |
| **18** | **family are unsupportive**  **in my attempts to**  **control my child’s**  **diabetes** |  |  |  |  |  |
| **19** | **Worrying whether my**  **child will eat his/her**  **snack** |  |  |  |  |  |
| **20** | **Feeling ‘burned out’**  **by the constant effort**  **required to control the**  **diabetes** |  |  |  |  |  |

***Problem Areas in Diabetes Questionnaire for Parents (PAID-P)***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Over the **PAST 2 WEEKS**, how often have you been bothered by any of the following problems? | **Not at all** | **Several days** | **More than ½ the days** | **Nearly every day** |
| **Little interest or pleasure in doing things** |  |  |  |  |
| **Feeling down, depressed or hopeless** |  |  |  |  |

***Patient Health Questionnaire (phq-9)***

|  |
| --- |
| ***Other worries or concerns you would like to mention:*** |

**Emotional Well-Being Check up**

**Score Sheet**

***The following sections are to be completed by a member of staff. Please pass this questionnaire pack to Emma Peakman once completed.***

|  |  |
| --- | --- |
| **Young person’s Name** | **Date of birth** |
|  |  |
| **Date today** | **Parent or Guardian** |
|  |  |

**Key areas flagged on the Wellbeing in Diabetes Questionnaire:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Eating** |  | **Mood/Happiness** |  |
| **Worry** |  | **Friends** |  |
| **Diabetes** |  | **Family Coping** |  |
| **Home life** |  | **School** |  |

**Moods and Feelings Questionnaire**

|  |  |  |
| --- | --- | --- |
| **NOT TRUE** | **SOMETIMES** | **TRUE** |
| **0** | **1** | **2** |
| **TOTAL SCORE** |  | |

***A total score of 12 or higher may indicate elevated levels of distress/low mood.***

***Problem Areas in Diabetes Questionnaire for Parents (PAID-P)***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Not a problem** | **A slight problem** | **A reasonable problem** | **A considerable problem** | **A serious problem** |
| **0** | **1** | **2** | **3** | **4** |
| **TOTAL SCORE** |  | | | |
| **TOTAL SCORE X 1.25** |  | | | |

***A total score of 40 or higher indicates elevated levels of distress.***

**Phq-9**

|  |  |  |  |
| --- | --- | --- | --- |
| **Not at all** | **Several days** | **More than ½ the days** | **Nearly every day** |
| **0** | **1** | **2** | **3** |
| **TOTAL SCORE** |  | | |

***Any score above ‘0’ indicates low mood.***

**Agreed Plan:**

**Notes on plan:**

What we have agreed will happen next:

* No action needed
* Refer to psychologist
* CAMHS referral
* Review in ongoing clinic appointments
* Extra Nursing Input
* Refer to Dietician for additional input

**Children and Young people Diabetes Workshop for ward-based Nursing Staff**

8.30 Welcome, introduction and outcomes.

8.40 Complete quiz

8.50 Refresher of physiology of type 1 diabetes

9.30 Insulin regimes

9.50 Hypoglycaemia

10.15 Break

10. 30 Hyperglycaemia and sick day rules

11.00 Blood testing technique

11.30 Injecting technique including safety needles

12.15 Lunch

13.00 Principles of pump therapy

14.15 break

14.30 Healthy eating and carbohydrate counting

15.50 Young People with diabetes

16.10 Revisit quiz

16.20 Questions and evaluation

**To complete:**

**Teaching package – POWERPOINT Presentation Diabetes in Children and Young People on Children’s services XDrive York Hospital network**

**eLearning Safe Use of Insulin**

**on York Hospital trust network eLearning area**

**Information Booklet for Children and Young People with Type 1 Diabetes**

**Contents**

|  |  |
| --- | --- |
| **The Team & Contact information** | **3** |
| **What is Diabetes?** | **4** |
| **Treatment of type 1 diabetes?** | **5** |
| **Starting your Insulin** | **5** |
| **Insulin injections** | **6** |
| **Insulin pen device** | **6** |
| **Blood Glucose Tests** | **7** |
| **When to test** | **8** |
| **Hypoglycaemia** | **9** |
| **Treatment of Hypoglycaemia** | **10** |
| **Hyperglycaemia** | **11** |
| **What happens if I am ill?** | **12** |
| **Hyperglycaemia & ketones** | **13** |
| **What can I eat** | **14** |
| **Exercise** | **15** |
| **HbA1c What is it?** | **16** |
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| **Diabetes supplies & equipment** | **18** |
| **Diabetes Living Allowance** | **19** |
| **Suggested reading** | **20** |

**The Children and Young Peoples Diabetes Team**

**Doctors**

Dr Dominic Smith secretary - 01904 726447

Dr Jo Mannion and Dr Liz Baker secretary - 01904 725519

Dr Jonathan Thow secretary - 01904 725604

**Diabetes Nurses**

Office number 01904 721317

Email yhs-tr.ChildrensDiabetesTeam@nhs.net

Ruth Kingsley mobile - 0795 759 1236/ ruth.kingsley@nhs.net

Sally Jennians Mobile – 07912775825/ sally.jennians@nhs.net

Katie Holmes mobile - 0753 467 4869/ katieholmes3@nhs.net

Diane Mitchell mobile -0795 134 2001/diane.mitchell6@nhs.net

Vik Clancey - 01904 725779

Children’s ward (open 24hrs) 01904 726017

Sarah Jayes (Dietitian) 01904 725266

Emma Peakman (Psychologist) 01904 721317

Kieran Stennett (Admin) 01904 721317

**Clinics**

Children’s Development Centre - 01904 726539

Diabetes Centre (Transition Clinic) - 01904 726510

New Selby War Memorial Hospital - 01904 724300

**What is Diabetes?**

Type 1 diabetes is a condition that occurs when the cells in the pancreas (organ in your body) which normally produce insulin are damaged. Insulin is a hormone which acts as a ‘key’ that opens the door from the blood stream to the muscles and cells, to be used and stored as energy.

Without insulin the blood glucose cannot be used by the body as fuel, resulting in high levels of glucose in the blood.

No one knows what causes Type 1 diabetes, and developing it is no one’s fault. Scientists believe that genetics, environment and autoimmune factors may be involved.

Life does change on diagnosis, but it doesn’t mean you have to give anything up. Please discuss any concerns with your diabetes team.

The warning signs when a child/young person develops Type 1 diabetes are:-

* Passing urine frequently – caused by increased sugar in the urine.
* Extreme thirst.
* Weight loss – which may be dramatic.
* Drowsiness & lethargy.
* Sudden changes in vision.
* Increased appetite.

**Treatment of Type 1 Diabetes**

Type 1 diabetes is controlled with insulin, given via injections or a pump, carbohydrate counting and exercise. The amount of insulin injected needs to be balanced against the amount of food eaten, the current blood glucose level and the amount of exercise or activity.

Insulin

Food

Exercise

The amount of insulin you need alters regularly. You may need more insulin if you are ill and less insulin if you are doing lots of exercise. Doing blood glucose tests at home will help you decide how much insulin to take and also help you decide whether the amounts of insulin you are taking is right for you.

**Starting your Insulin**

On diagnosis, the doctor will prescribe a starting dose of insulin. This will alter over time according to your blood glucose levels and lifestyle.

Insulin is measured in units and you will take 2 types of insulin each day. A long acting/slow release insulin, such as Levemir or Lantus. This is usually taken once a day, usually at night. This is the basal insulin, often called the background insulin. You will also take rapid acting insulin with each meal, called NovoRapid. These are known as bolus injections. The amount of this insulin will vary according to your pre-meal blood glucose test and how much you eat at that meal.

Initially the diabetes team will be able to advise you on how and when to adjust your insulin doses, but as time goes by you will become expert in this yourselves. BUT, remember the diabetes team is always here for advice.

**Never Miss Your Insulin Injections.**

**Insulin Injections**

The nurses and doctors will show you and your parents how to give your insulin injections. The insulin is injected into the fat just under the skin and as long as your skin is not dirty, there is no need to wash the area you are injecting into. It is not advisable to inject through clothes.



The sites recommended for injections are:-

* The top and side of the legs.
* Abdomen.
* Buttocks.
* Upper arms (in older teens and adults only).

It is important to make sure that you use a different area each time you inject. If you use the same site too often, the area will become lumpy and thick, preventing the absorption of insulin.

**Insulin pen devices.**

There 2 types of insulin pen devices available – pre-filled pens that are disposable, and reusable pens that you put disposable cartridges/penfills into.

The nurses will show you how to assemble and prepare your insulin pen for injection. Remember to do an “air shot” of 2 units to prime the needle before you administer your injection. You must make sure that the dial has returned to ‘0’. You must remove the needle after each injection, and use a fresh one each time.

**Administering the injection**

Your nurse will show you how to hold the area that is to be injected. Once you have dialled up your dose of insulin you push the needle into the skin at 90 degrees (right angle) and press the plunger as far as it will go, ensuring the dial has again returned to ‘0’. Once the insulin has been delivered it is advisable to keep the insulin pen in position for the count of 10, so that the full amount of insulin has been delivered. This also reduces any leakage.



**Storage of insulin**

Store the insulin you are not using in the fridge in its original packaging.

The insulin **in use** can be kept at room temperature but should be discarded after 4 weeks for NovoRapid and Lantus, 6 weeks for Levemir.

**Blood Glucose Tests**

This is a very important way of monitoring your diabetes which is carried out using a blood glucose meter. These levels are measured in mmol/litre. The normal blood glucose levels are between 4 and 7mmol/l but this is sometimes difficult to maintain, so with diabetes we aim for blood glucose levels to be between 4 and 10mmol/l.



We expect your blood glucose levels to be higher when you are first diagnosed with diabetes. Your diabetes team will guide you on this. Checking your blood glucose level and keeping a diary of the results allows you, together with the diabetes team, to see how effective and balanced your activity, insulin doses and diet are.

During your stay on the children’s ward you will be shown how to perform and record your results.

Checking blood glucose levels is also used to know when to adjust your insulin doses and to determine hypoglycaemia (low blood glucose) and/or hyperglycaemia (high blood glucose).

Tips for successful testing:

1. Wash your hands in warm water and dry thoroughly. This will remove any substance that may interfere with the test. If you expect that you are not going to be able to access hand washing facilities, pack a wet flannel in a plastic bag to wipe your fingers. We do not recommend that you use wet wipes or alcohol rub as these can alter your blood glucose result.
2. Prepare your meter ready for a test.
3. Prick the side of your finger with your finger pricker.
4. Don’t immediately squeeze your finger but hold your hand down below your waist for about 5 seconds.
5. ‘Milk’ the finger so that a small amount of blood appears.
6. Apply the blood to the test strip and wait for the result.

There are lots of different meters available; the diabetes team will help you choose one that suits you best.

**When to test**

The best time to test your blood is before your main meals and before bed. It is also useful to test your blood 2 hours after your food and insulin to assess the effectiveness of your insulin dose and to understand how different foods affect your blood glucose level.

You will also need to do more tests during times of illness as insulin doses will need to be adjusted.

To avoid hypoglycaemia (low blood sugar) it is also important to test at times of exercise.

Your diabetes team will advise you about your particular testing needs.

**Hypoglycaemia (hypos)**

Hypoglycaemia is when your blood glucose is less than 4mmols/l. In a person without diabetes, the body detects when the blood glucose has fallen below normal and switches off the production of insulin and this stops the blood glucose falling any lower.



But when someone has diabetes the insulin that has been injected will go on working even when the blood glucose is low. Therefore it is necessary to eat or drink some fast acting sugar to counteract the effect of the ongoing action of the insulin and this will stop the glucose level falling lower.

It is difficult to avoid hypoglycaemia completely when your diabetes is controlled with insulin and if your everyday blood glucose is fairly low. Symptoms of a hypoglycaemia can vary between people or you may not have any symptoms. Hypoglycaemia are classed as mild, moderate and severe

**Hypoglycaemia can occur if:-**

* You have injected too much insulin.
* You haven’t eaten enough food.
* You do more exercise than usual.
* You have skipped a meal/snack or had it later than usual.
* You are unwell with sickness/diarrhoea.

**Signs and symptoms of hypoglycaemia:**

* Sweating
* Tingling lips
* Hunger
* Paleness
* Lack of concentration
* Difficulty in waking
* Headache
* Personality change
* Irritability
* Shaking/wobbly legs/dizzy
* Dilated pupils

You should always treat a hypo as soon as it happens rather than waiting to see what happens. It is also important not to be left alone when you have a hypo or to do any activity until your blood glucose level is in a normal range as this would reduce your blood glucose further.

**Treatment:**

**Mild**

This is when there are no symptoms or you have symptoms but are still able to treat it yourself. It is always important to tell an adult when this happens.

Take dextrose in the form of 3-4 dextrose tablets, lucozade drink (90mls), full sugar coke (150mls) or fresh orange/apple juice.

It is important to recheck your blood glucose after 15 minutes, if your blood glucose is not above 4mmols then repeat the above. When it has come back into a normal range, it is a good idea to repeat your blood test within an hour.

A carbohydrate snack may be required depending on the time of the hypoglycaemia, e.g. a few hours before the next meal, before bed and if exercise is going to be performed. Should a carbohydrate be necessary then the following may be an option:-

* 1-2 slices of bread (toast/sandwich)
* 400mls milk
* 3-4 rich tea biscuits
* 1-2 digestives
* 1 large banana
* 1 large piece of fruit

**Moderate**

This is when you are drowsy but still able to swallow GlucoGel/Dextragel can be used. This is a sugary gel that can be rubbed into your lips, gums and the inside of your cheeks, a whole tube is usually needed. Follow the above process after the initial glucose treatment.

**Severe**

In severe hypos it is possible that you may have a fit (seizure) or become unconscious. This can be very worrying for your parents but we wouldn’t expect you to remember it. If this happens, or if the GlucoGel is not affective or you are unconscious, you may be given an injection of Glucagen. Glucagen is a hormone that releases the stored glucose from your liver. Again, follow the above process after your injection, although the Glucagen injection may cause nauseas or vomiting. Your parents will be shown how to give this injection by the diabetes team. It is important that nobody gives you anything to drink if you are unconscious.

You may be completely fine after a hypo or you may feel unwell, tired and a headache for a number of hours afterwards.

**Hyperglycaemia**

A **hyperglycaemia** is when your blood glucose is **high.**

It may be caused by:-

* Too little or no insulin.
* Eaten more carbohydrates than your insulin allows.
* Infection, fever.
* Emotional stress.
* Less exercise taken than usual.

**What to look out for:-**

* Increased thirst and passing urine.
* Weakness and lethargy.
* Tummy ache.
* Loss of appetite.
* Mood changes.
* Loss of concentration.

If your blood glucose level stays in the high range, it could mean that you need more insulin. The diabetes team will teach you how to adjust your insulin dose in response to high blood glucose levels.

**Seek advice if:-**

* Your blood glucose levels stay high despite extra insulin.
* Your blood glucose levels are high and you feel ill.

REMEMBER – never miss your insulin & contact your diabetes team for advice.

**What happens when I am ill?**

When you are ill, particularly if you have a fever, your body needs more energy, and therefore more glucose to fight the infection. Normally extra insulin is produced to cope with the rise in blood glucose, but when you have diabetes the body cannot meet the extra demands. Many people with diabetes make the mistake of thinking that because they eat very little or nothing at all they should cut down or omit their insulin. This is not the case and contact with your diabetes team is important so adjustments and advice can be made to your treatment.

**MC900360982[1]**

Drink regular amounts of fluid and if your blood glucose levels are on the low side drink a sugary drink to maintain your levels.

* Measure and monitor your blood glucose and ketones levels more frequently.
* Adjust your insulin requirements according to your results.
* By monitoring your ketone levels will tell you if you are at risk of diabetic ketoacidosis (DKA).

It is a good idea to drink extra non sugary fluid if you levels are high and you may need to do more blood tests.

**Hyperglycaemia and ketones**



Ketones show in your blood when your body is short of insulin. This happens because your body starts to burn fat for energy, if it is unable to use the glucose in your blood due to a shortage of insulin.

If there are too many ketones, this can make your blood acidic and lead to a condition called diabetic ketoacidosis which is serious.

This can happen when you are unwell as the body needs more insulin during times of illness.

You will be given a blood meter to test your ketones if needed. Your parents will also be given some guidelines called “Sick day rules” to follow along with help from the diabetes team.

Ketones are produced in the body when:

* There is not enough insulin in the body.
* Muscles use the body’s fats for energy.
* You are not getting enough carbohydrates to eat.

**What to look out for:**

* Weeing a lot.
* Thirsty.
* High blood glucose levels.
* Levels of ketones on testing greater than 0.6mmol/L
* Tummy ache.
* Nausea and or vomiting.
* Difficulty breathing.
* Acid (pear drop) smell on the breath.

**With guidance from the diabetes team or hospital you will need to:-**

* Adjust your insulin dose according to your results
* Test your blood glucose more frequently
* Test your blood ketones
* Drink fluids such as water or non sugary drinks

**Blood ketone levels:**

* Below 0.6mmol/L - Readings below 0.6 mmol/L are in the normal range. Follow your healthcare professional’s advice before making any changes to your diabetes medication.
* Between 0.6 and 1.5 mmol/L - Readings in this range, with a blood glucose level is higher than 16.7 mmol/L, may indicate the development of a problem. Follow your health care instructions.
* More than 1.5 mmol/L – Readings above 1.5 mmol/L, with blood glucose level higher than 16.7 mmol/L, suggest you may be at risk of developing diabetic ketoacidosis (DKA)

**Contact your diabetes team, GP, children’s ward or A&E department for advice.**

**What can I eat?**

A healthy diet is a very important part of your treatment. It is not a special diet but a healthy eating plan which the whole family can follow. You will see a dietitian during your stay on the ward or an appointment will be sent to you.

The dietitian will also speak to you about carbohydrate counting. Carbohydrate in the food that you eat is measured in grams and is an accurate way of matching your food to your insulin requirements. Working with your diabetes team to balance your insulin with what and how much you eat, along with your activity will help to get your blood glucose levels within target range.

**MC900232913[1]**

**Exercise**

Why do exercise and Diabetes go well together?

* It improves the body’s ability to use glucose.
* It can make the action of insulin on fat and muscle cells more efficient.
* It lowers blood pressure.
* It helps with weight control.

MC900440520[1]

What should you do before and after exercise?

* Monitor your blood glucose and record your result, making a note of anything that may affect them.
* Eat enough carbohydrate to compensate for using extra energy OR reduce your insulin if you know you are going to perform exercise.
* Carry a fast-acting glucose and carbohydrate with you.
* Avoid injecting into an arm or leg as this sometimes increases the action of the insulin when you are exercising.

You may like some extra advice on exercise from the diabetes team, please don’t hesitate to contact the team.

**Follow-up**

We expect to see you in clinic every 3 months. It is important to come this often as things are often changing as you grow and this will allow the diabetes team to advise you on changes more frequently.

When you are there we will weigh and measure you and take your blood pressure. We also ask for a finger prick blood sample to test your HbA1c (see below).

**HbA1c** – what is it?

Another way of looking at your overall blood glucose control is by monitoring and performing an HbA1c blood test. It is performed by a finger prick blood test, and shows the average blood glucose over a 2-3 month period. The HbA1c level is a long term average of blood glucose control and can help the diabetes team recommend changes to your insulin regime.

**School, Nursery and Playschool**

After you have been diagnosed with diabetes it is important you are able to go back to school, nursery and playschool as soon as possible. However, it is important that your teacher/assistants understand your condition.



Your key nurse will make an appointment to go in to school and discuss your particular regime. Points discussed are:-

* What diabetes is?
* What to do if your blood glucose level is low or high.
* How to manage your injections and blood test.
* When you should have meals and snacks.
* School trips.
* To be aware of different signs about your daily routine.

It is important that you take your ‘hypo’ supplies into school and keep them stocked up. These include:-

* Dextrose/Lucazade tablets or sugary drink.
* A tube of Glucogel.
* Some biscuits or cereal bar
* **School Meals and Packed lunches**



It is always advisable to choose the healthier options if you have a school meal. Both school meals and packed lunches should consist of carbohydrate; this will keep your energy levels up.

The dietician will give you ideas for your packed lunches.

**Feeling a bit fed up?**

Your health care team understands that from time to time you may feel a bit fed up about having diabetes, testing your blood glucose levels and injecting insulin. It helps to share your feelings with someone else. You may need to talk to your parents, doctor, our team psychologist, or diabetes nurses.

We hope that you feel you are able to talk to a member of the diabetes team - we can arrange for you to be seen by the Children and Adolescent Mental Health team who are used to helping people find ways of coping with their diagnosis.

**Long Term Complications of Diabetes**

Diabetes affects all parts of your body; if your blood glucose levels remain raised over long period of time, then these organs can become damaged. By monitoring your blood glucose levels and taking control, the risk is reduced.

It is important to understand that these complications will not occur for some years after. It is important that you visit and attend your clinic appointments. The main areas affected are:-

* Eyes.
* Feet.
* Kidneys.
* Blood pressure.

You will also have a blood check every year and provide a sample of urine for testing.

**What else can you do to avoid the complications associated with diabetes?**

* Do not smoke.
* Reduce the amount of fatty foods you eat.
* Exercise regularly.
* Try to maintain a healthy weight and BMI.

**Diabetes supplies and equipment:**

When leaving the hospital you will be given enough supplies to last a few days - this will give you time to see your GP and request a repeat prescription. You should allow your GP 48 hours when requesting your supplies, so don’t let your supplies get too low before you do this.

Meters and finger pickers’ are available from the diabetes team. Should you have a problem with your meter you can ring the help line printed on the instruction booklet or contact the diabetes team.

It is also a good idea to register your meter with the manufacturers as they will send you free batteries.

Sharps bins for safe disposal of needles can be obtained on prescription from your GP. You will need to contact the council to arrange safe disposal of these.

Contact number: York: 01904 551551

Selby: 01757 705101

East Riding: 01482 393939

**Storage of equipment:**

All equipment should be stored in a safe place at room temperature apart from insulin supplies not in use, which should be kept in the fridge.

NB. Some blood glucose meters will not work if they are too cold.

**Disability Living Allowance.**

Although we do not class diabetes as a physical disability, you are entitled to claim an allowance because of the extra care required to look after a child with diabetes. This allowance helps to make life a little easier. The allowance is paid in varying rates - higher, medium and lower and is available to everyone independent of any other allowances you may receive.

The diabetes team will inform the Department of Works and Pensions (DWP) of your diagnosis. The DWP will forward you the necessary forms to complete and the diabetes nurses are available to help you with these forms.

You are not eligible to payment until three months after diagnosis, so there is plenty of time to fill them in. The allowance is reassessed from every 1-3 years, when you will have to complete another form.

Should your application be refused, we can always appeal against the decision. It is helpful to make a copy of your completed application form to refer to if you need to appeal or for when you need to re-apply. It is usual to receive this payment until you are 16. At the age of 16 years you will need to apply for Personal Independence Payments through the department of works and pensions.

**Suggested Reading**

* Type 1 Diabetes in children, adolescents and young adults.

Author: Dr. Ragnar Hana.

* Diabetes – Through the looking glass.

Author: Dr. Rachel Besser.

* No Added Sugar – growing up with type 1 diabetes.

Author: Fibi Ward.

* Carbs & Cals.

Author: Chris Cheyette and Yello Balolia.

* [www.childrenwithdiabetesuk.org](http://www.childrenwithdiabetesuk.org)
* [www.upbete.co.uk](http://www.upbete.co.uk)
* [www.jdrf.org.uk](http://www.jdrf.org.uk)
* [www.diabetes.org.uk](http://www.diabetes.org.uk)
* [www.runsweet.com](http://www.runsweet.com)

Our Shared Commitment is Caring with Pride.

Our ultimate objective is to be trusted to deliver safe, effective and

sustainable healthcare within our communities.

Providing care together in York, Scarborough, Bridlington, Malton, Whitby,Selby and Easingwold.

Our values, drivers and motivators are:

 Caring about what we do

 Respecting and valuing each other

 Listening in order to improve

 Always doing what we can to be helpful

If you found this information useful and have any comments or queries please contact a member of the Paediatric diabetes team on 01904 721317.

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**York Children's/ Young**

**Person's Diabetes Team.**

**Telephone 01904 721317.**

York Children's/ Young

Published by

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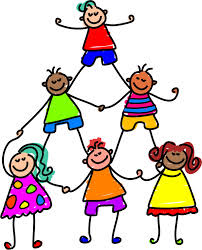
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Introduction

Education is a cornerstone of childhood and diabetes mellitus should not alter a child’s ability to achieve in school (1). However, this is reliant upon appropriate and effective care, not only from parents and carers, but also from other agencies including schools and early year’s settings. It is therefore essential that all school staff have an awareness of diabetes mellitus and the needs of the child / young person with diabetes. This document has been written to guide all those involved in the care of a child / young person with diabetes during the school day in order to ensure their safety, long term well being and optimal academic performance (2).

1. International Society of Paediatric and Adolescent Diabetes (ISPAD 2000). Consensus Guidelines for the management of type 1 diabetes mellitus in children and adolescents.
2. Department of Health (2007). Making every young person with diabetes matter.



**Our Philosophy**

* It is important that children are supported to manage their diabetes according to the agreed management plan;
* Each child /young person with diabetes will have different care needs, depending on age, ability, and need;
* We believe in collaborative working between all parties to implement these guidelines for all aspects of diabetes care, from insulin injections to blood glucose monitoring, food to physical activity and mental health.

**Collaborative Working…**

Collaborative working between all stakeholders is essential to ensure the safety and wellbeing of the child / young person with diabetes in the school or early years setting. Pupils with diabetes will have to attend clinic appointments at the hospital to review their condition. Appointments are typically every three months but may be more frequent. These appointments do not require a full day’s absence from education.

The role of the Diabetes Care Team is to provide support and advice to all groups including:

* The child or young person;
* The parents / family;
* The school and Governing Body;
* The Local Authority;
* The School Nursing Service.

**Individual Health Care Plans**

The Individual Health Care Plan (IHCP) is a document compiled by the child / young person’s diabetes healthcare team and their parents / carers to identify the needs of that child during the school day. This plan should be provided after a child has been diagnosed with diabetes and should be reviewed at 12 monthly intervals. Training should always involve the child / young person, their parents or carers as they are the people who know the child and how the diabetes affects them in more detail than the health care professionals (Diabetes Care Team or School Nursing Team).



**Staff Administering Medication**

Anyone caring for children and young people, including teachers and other school staff, have a common law duty of care to act like any reasonably prudent parent. School staff need to ensure that their pupils are healthy and safe and in some circumstances this can also include administering medication. This duty of care also extends to school staff leading activities that take place away from the school setting such as day trips, sports matches and residential visits.

Many Local Authority’s policies are based on the DFES document ‘ **Supporting pupils at school with medical conditions**’. It provides details on Individual Health Care Plans, how to identify the pupil’s needs and how they will be fulfilled. Schools and staff should be covered by the Local Authority’s / individual school’s public liability insurance if they follow their Local Authority’s guidance and the child’s Individual Health Care Plan, and have received the appropriate training.

**Roles & Responsibilities:**

Looking after a child / young person with diabetes during school hours is not the sole responsibility of one individual but is a collaborative approach from a number of people, each with a series of roles and responsibilities which are defined below…

**Parent / family**

* Provide school with up-to-date, sufficient information;
* Inform appropriate person if care plan needs amending;
* Ensure appropriate food & equipment are supplied;
* Review the guidance in place on a regular basis with the school setting;
* Have responsibility for the child’s health and ensure that the child is well enough to attend school. If the child is acutely unwell, they should remain at home.

**What is Diabetes Mellitus?**

**School/ School governing body**

* Have a common law ‘duty of care’ to act in the same manner as a responsible parent;
* Must not treat a child / young person with diabetes less favourably;
* Must make ‘reasonable adjustments’ to ensure child is not disadvantaged (Equality Act 2010);
* Ensure they have sufficient members of support staff trained in medicines management;
* Provide agreed school policy with Governing Body for managing medicines in school;
* Inform parents / carers if diabetes supplies management run low;
* Where appropriate, assist with diabetes supplies management;
* Contact insurance provider to ensure appropriate indemnity for all appropriate diabetes care;
* Ensure local service provision adheres to current OFSTED guidance including equality, diversity and safeguarding.

**Child / young person**

* Comply with the individual Health Care Plan (HCP);
* If appropriate, carry diabetes kit safely;
* Where appropriate, assist with

diabetes supplies management.

**Diabetes Care Team**

Inform school nursing service / health visitor as soon as a child is diagnosed;

* Provide advice, support and “where necessary” training to schools and early years settings;
* Provide initial HCP; Update if clinical changes occur;
* Provide all schools with up-to-date resources;

**Local authority/ Council**

* Employer should provide written evidence of confirmed insurance cover who provides specific medical support;
* Assist with resource management for those children /young people deemed in need of additional funded medical support in school.

**School Nurse/ Health Visitor**

* Act as a point of contact in the education environment with the help of parents/ family;
* Work alongside the diabetes team to ensure sufficient staff have appropriate training in medicines management;
* Review and update HCP as necessary in discussion with parents / carers and diabetes team;
* School nurse involvement may vary from area to area.

Diabetes is a life-long condition that affects approximately 1 in 1000 children. Effective management of this disease is vital in order to reduce the risk of developing long-term complications such as blindness, kidney failure and nerve damage. In general there are two types of diabetes…

**Type 2 diabetes**

A small number of children have Type 2 diabetes but it is more common in adults because of obesity and a more sedentary lifestyle...

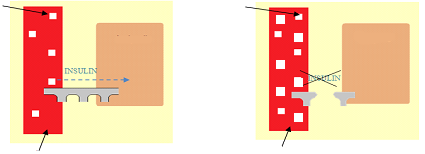
Insulin is still produced, but is inefficient. Initial management is therefore with diet, lifestyle changes and tablets, and sometimes injections.

**Type 1 diabetes**

Type 1 diabetes accounts for 99% of cases of diabetes in children and young people. It is an auto-immune condition where the body’s has killed off the cells in the pancreas that produce insulin, a hormone that helps regulate the body’s energy and glucose supply. It requires regular injections or a pump to replace the insulin in order to stay alive.

**What happens in diabetes?**

The body requires energy to perform its normal functions. This energy is usually made from glucose and is obtained from the food that is eaten. The food is broken down in the stomach into glucose and this glucose is absorbed into the bloodstream to be transported around the body to be used by the cells in making energy. In order for the glucose to enter the cell where it can be transformed into energy, insulin is required. As the level of glucose rises in the blood, usually following a meal, the amount of insulin that is released is increased, allowing more glucose to be moved into the cell, maintaining the blood glucose level at a constant rate.



glucose

body cell

body cell

glucose

bloodstream

bloodstream

What happens in a person without diabetes What happens in a person with diabetes

Fig. 1: the physiology of diabetes

In a person with Type 1 diabetes mellitus, the insulin is not present so the glucose level in the blood constantly rises, causing the body to employ a range of compensatory mechanisms which try to provide the body with energy.

**The symptoms of diabetes**

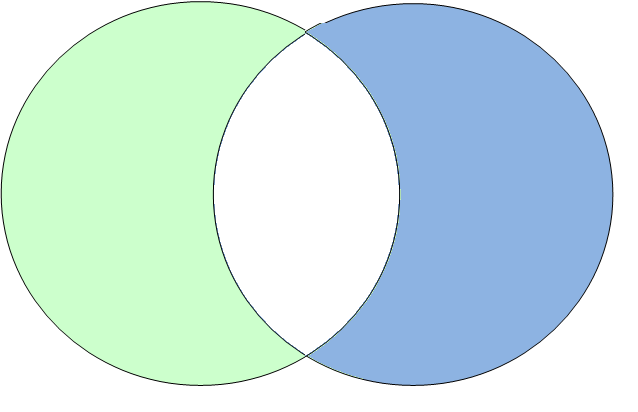
The symptoms of undiagnosed diabetes are shown below. If the condition is left untreated, or not managed effectively, then the same symptoms will recur:

* dehydration;
* generally unwell;
* extreme thirst;
* passing lots of urine;
* losing weight;
* tired / lethargic;
* abdominal pain;

The symptoms shown are the body’s attempt to rid itself of the excess glucose in the bloodstream and to make additional supplies of energy from body fat. However, this alternative system of producing energy releases substances which, if left to build up, change the blood chemistry and ultimately can be fatal if not treated.

**How is diabetes treated?**

Treating diabetes depends upon the type of diabetes diagnosed (as mentioned above). However, both types do also share some similarities listed below.



**both**

healthy eating

frequent clinic follow-up

regular exercise

**Type 1**

Multiple insulin injections or insulin pump

Blood glucose monitoring at least 4 times a day

Carbohydrate counting

**Type 2**

Tablets or liquid medication or injections

Blood glucose monitoring infrequently

Weight management

Fig. 2: Management of type 1 and type 2 diabetes mellitus

**Insulin injections**

* Insulin needs to be injected as it would be destroyed by the stomach acid if it was taken by mouth;
* Most children inject with a pen device and very small needles making it less painful and easier to do;
* Children require injections of rapid-acting insulin whenever they eat a meal or large snack, so children will require an injection during school hours;
* Many children adjust the dose of insulin needed depending upon the current blood glucose level and the amount of carbohydrate in the meal they are eating;
* Injection sites commonly are the outer thigh, abdomen, upper buttock and upper arm.

[](https://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiMs6mIrqvJAhVCOBQKHaB4CBwQjRwIBw&url=https://www.novologpro.com/prescribing/insulin-pens.html&psig=AFQjCNF7EEu5X4Wyc1tFEjEQi8ULez2Czg&ust=1448533502413570)

**Insulin pumps**

* An insulin pump is a small pager-sized device which continually delivers insulin through a small tube sited just under the child’s skin;
* Extra insulin can be delivered with food and/or when the blood glucose level is high;
* The insulin pump is programmed to calculate the insulin dose required;
* Some insulin pumps can also continuously monitor the child’s glucose level, alarming if set targets are breached.



**Injecting at school**

**Children will require an injection of insulin during school hours**, either before or after lunch (details will be documented in the child’s IHCP). Older children will usually be able to do this independently. However, some children will need supervision to ensure that the correct technique is used to give the correct dose, and younger children may need staff to give the injection. **The child or young person’s Individual Health Care Plan should detail their needs.** If staff are required to give injectionsfull training should be given by family / carers, health care professionals, or an insulin pump health care specialist. Some children will require a quiet room set aside to perform this while others are able to perform this safely in a public space.

Injection technique

Where appropriate, the paediatric diabetes nurse will train staff how to do insulin injections. The insulin is injected into the fat just under the skin, and as long as the skin is not dirty there is no need to wash the area you are injecting into. It is advised not to inject through clothes.

The sites recommended for injections are:-

* The top and side of the legs.
* Abdomen.
* Buttocks.
* Upper arms in older teens and adults.

It is important to make sure that different areas are used for each injection. If you the same site is used too often, the area will become lumpy and thick, preventing the absorption of insulin.

**Insulin pen devices**

The nurses will show staff how to prepare the insulin pen for injection. Remember to do an “air shot” of 2units to prime the needle before the injection. It is advised to remove the needle after each injection, using a fresh one each time.

**Doing the injection**

The nurse will show staff how to hold the area that is to be injected. It is important that 2 members of staff check and agree on the dose that has been dialled up. Once the insulin has been dialled up the needle is pushed into the skin at 90 degrees (right angle) and then press the plunger as far as it will go. Once the insulin has been delivered it is advisable to keep the insulin pen in position for the count of 10 so that the full amount of insulin has been delivered and this also reduces any leakage.

**Blood glucose monitoring**

Blood glucose monitoring is essential to ensure that the diabetes is being managed effectively, and to prevent high blood glucose levels (hyperglycaemia) and low blood glucose levels (hypoglycaemia). In order to reduce the risk of developing the long-term complications of diabetes such as blindness, kidney failure and limb amputation, the blood glucose needs to be kept within the **target range of 4 – 8mmol** as much as possible. This can be very difficult to achieve in the under 5 age group, in young people during puberty, after a meal, and during periods of stress and anxiety.



**Common times to test:** Before lunch – many children / young people will decide upon the dose of insulin required depending upon the blood glucose level and/or the carbohydrate amount about to be eaten;

* Before P.E / Sport – to determine whether any additional carbohydrate is needed before or during the activity session. The ability to test the blood glucose level at any point during the activity is essential to maintain their safety **so the blood glucose monitoring kit must be taken with the child if participating in sport off-site or away from the school building;**
* When the child / young person is displaying or complaining of the signs of a low blood glucose level (hypoglycaemia);
* When the child feels unwell;
* At other times when discussed with the parents / carers, such as during exams.

**Important points to remember…**

* Not all children are able to test their own blood glucose level, therefore training will initially be required from **parents / carers**, and health care professionals to support school staff in undertaking this task;
* The blood testing kit should be kept in the classroom/with the child for the health and safety of the child;
* Older children should be allowed to carry their own blood glucose monitoring equipment for their own use;
* Sharps and used strips should be disposed of according to the school’s local policy. A sharps container should be available from the child’s family via their GP for safe disposal.
* Testing blood glucose levels too soon after injecting (or eating) will provide little usable information. Testing should therefore be at least 2 hours after injecting unless the child is complaining of feeling unwell, or directed to for a specific reason in the HCP.

**Tips for successful testing:**

1. Hands should be washed in warm water and dried thoroughly. This will remove any substance that may interfere with the test. If it is expected that you are not going to be able to access hand washing facilities, pack a wet flannel in a plastic bag to wipe the fingers. It is best not to use wet wipes or alcohol rub as these can alter the blood glucose result.
2. Prick the side of the finger with the finger pricker.
3. Don’t immediately squeeze the finger but hold the hand down below the waist for about 5 seconds.
4. Apply the blood to the test strip and wait for the result.

**Hypoglycaemia:**

Hypoglycaemia (or a hypo) is when the blood glucose level drops too **low**. For most children and young people this level is **below 4mmol**. When glucose levels are kept in a healthy range, it is normal for a child with diabetes to experience some hypos.

Hypos can happen rapidly and, if left untreated, can lead to unconsciousness and seizures. Hypos tend to happen when a child has been very active, has had too much insulin or not enough carbohydrate to eat. Whenever a child / young person feels any symptoms or displays any signs of hypoglycaemia a blood glucose test should be performed prior to the appropriate treatment being given (according to the HCP).

**Warning signs:**

The symptoms vary for each child but generally include:

* Mild signs and symptoms -

**sweaty shaky pallor**

hunger, fast heart rate / palpitations, tingling or pins & needles in fingers, toes or around lips.

* Moderate to severe signs and symptoms -



**moody aggressive quiet**

anxiety, irritability, glazed eyes, vagueness, drowsiness, lack of concentration, inability to perform simple tasks, seizures, loss of consciousness.

**Treatment**

**The treatment of hypoglycaemia should be immediate to prevent the episode deteriorating. The hypo should be treated wherever it occurs, including the classroom settings in secondary schools, as walking any distance will use up more energy and can lead to deterioration including collapse.** **This should happen even when there are no symptoms.**

The child / young person’s HCP will document what treatment is required, but this will consist of eating or drinking rapid acting glucose such as Lucozade, dextrose tablets or glucose gel to rapidly raise the blood glucose level. It is important to recheck the level after 15 minutes and to repeat the process if the level has not risen above 4mmol. Children will require longer acting carbohydrate following this initial treatment if their next snack or meal is more than an hour away. The child’s glucose level should generally respond within 15 minutes, but their cognition may be affected for a couple of hours afterwards, particularly if the episode was of moderate severity.

**Hyperglycaemia:**

Hyperglycaemia (hyper) is an episode of a high blood glucose level. This can be caused by too little insulin, too much food, stress or illness. These episodes tend to happen over a few hours, and if left untreated for a prolonged period of time, can deteriorate into a potentially fatal condition called **diabetic ketoacidosis** or **DKA**. Regular blood glucose monitoring and giving additional insulin to correct high blood glucose levels can prevent this from occurring. For the majority of children and young people, a blood glucose level of 13.9 mmol or greater is considered to be hyperglycaemia.

**Warning signs:**

The symptoms vary for each child but generally include:



**thirst frequent passing of urine lethargy**

**Treatment**

The treatment of hyperglycaemia is very individual depending upon the child / young person, the cause and their insulin regimen. Specific details regarding its treatment and whether any additional insulin is required should be discussed with parents at the time of the event. It is important that any child with a high blood glucose level should be allowed to drink water and go to the toilet as often as necessary.

If the child is using an insulin pump, a check should be made to ensure that it is still connected to the child / young person and that the pump is still working.

High blood glucose levels AND illness at school requires immediate action and is documented on the child / young person’s HCP and parents should be contacted at this point. If in any doubt ring 999.

**Important points to remember…**

* In episodes of prolonged and un-treated hyperglycaemia, a child / young person may develop **ketones** – a substance that can build up in the blood, changing its chemistry and leading to **DKA**. The presence of ketones can be indicated by a ‘pear drop’ or acetone scent to the child’s breath which can be detected by some people. If this is detected contact parents / carers immediately for advice. In some cases, it may be necessary to perform a blood ketone test which is carried out in a similar way to blood glucose monitoring and would be performed at home.

**Food and Diabetes**

**Due to more intensive and effective diabetes management, children and young people with diabetes are now encouraged to follow a normal healthy diet that is encouraged for every child / young person.**

Children with diabetes are able to have either a packed lunch or a cooked school meal. For all children / young people with diabetes, eating carbohydrate at mealtimes is essential (unless documented in their HCP) to maintain blood glucose levels. Slowly digested carbohydrates help to maintain more stable blood glucose levels and should be eaten at each meal. These foods include: wholegrain bread, potatoes, rice, pasta, milk, milk products and fruit. Foods containing glucose such as sweets, drinks and sweet puddings will act more rapidly, but these are not excluded. Where possible, sugar-free alternatives such as squash, diet drinks and sugar-free jelly are encouraged to prevent sudden increases in blood glucose levels.



**Important points to remember…**

* Many children and young people who need injections at lunchtime or use insulin pumps need to calculate the amount of carbohydrate that they have eaten so they can inject the appropriate dose of insulin. Many young people can independently ‘count carbs’ but younger children will need help doing this or will have their food supplied by the family with the carbohydrate content already calculated (e.g. by supplying a packed lunch). Guidance will be documented on their HCP as to how to calculate the insulin dose according to the carbohydrate eaten.
* Some children will use an ‘Expert’ meter which calculates the insulin dose required for their lunch, depending upon the child’s blood glucose level and carbohydrate intake. The guidance given by this meter should be followed unless stated in the child’s HCP.
* Treats such as birthday cake and biscuits should be given to the child / young person when everyone else is having them – inform parents at the end of the day. Special ‘diabetic’ foods are not recommended as they are expensive, high in fat and, if eaten in large quantities, can cause diarrhoea.
* Young children may require some supervision at lunchtime to ensure that they eat their lunch and do not swap it with others.

**PE, Exercise and Diabetes**

Physical activity is vital for all children and young people and this is also true for children and young people with diabetes. Exercise of any kind increases the use of energy and therefore children / young people with diabetes are likely to see a drop in their blood glucose level but sometimes it may also cause an increase in the blood glucose level. Therefore the child/ young person may need additional carbohydrate before, during or after sport - or a reduction of insulin prior to the event. This should be documented on their HCP. It is important to note that for some children / young people, exercise also includes running around at break time or long periods of walking between classrooms.

Pupils with diabetes should check their blood glucose level before exercise, if they are going swimming, or the activity is strenuous or prolonged (more than 45 minutes). High blood glucose levels (above 13.9 mmol) may make it dangerous for some children to participate in certain activities – this will be documented on their HCP.

It is important that all PE staff know the signs and symptoms of hypoglycaemia and how to treat it. It will also be necessary for staff to carry ‘hypo treatment’ out to the lesson at all times.

**Important points to remember…**



* Children and young people should be encouraged to test

their blood glucose level before taking part in PE and activity.

* The child’s IHCP may indicate an ideal blood glucose target

range in which the child / young person can safely take part in

the activity.

* All children / young people with diabetes should have swift access

to hypo treatment no matter where the activity is taking place.

For young children, the teacher or support staff should be

responsible for ensuring this.

* Children and young people using an insulin pump may need

to disconnect the device during the activity and reconnect

once finished. The pump should be stored in a secure place

if disconnected. This may need to be checked by a member of

staff and should be documented in their IHCP.

* The IHCP will document whether the child / young person

will require additional carbohydrate via food or drink. This may

be related to their blood glucose level, or may be a ‘fixed’ snack.

* Some children will need an adjustment to their lunchtime

insulin dose depending on when the activity session is – this

will be documented in their IHCP.

**Day Trips & Residential Visits**

**Diabetes should not prevent a child from going on school or residential trips. Full participation and opportunities in all academic, social and sporting activities should be encouraged as development of self-esteem and confidence in such activities can have positive effects on the management of diabetes.**

(ISPAD, 2000)

Trips are an important part of school life and, for many children; these activities can increase their excitement and activity levels! Careful planning along with the family is essential for the trip to be successful for all parties, no matter whether it is a few hours or a week away in another country. As soon as a child / young person is known to be attending a trip, the planning process with the family, and, where necessary, the diabetes care team should begin.

**Important points to remember…for day trips the school should:**

* Provide a plan for the day for the parents / carers. This should include times of arrival and departure, and the likely activities during the day.
* Ensure a risk assessment is carried out by the school and appropriate action taken;
* Identify at least 1 key worker that the child / young person and their parents / carers can liaise with both before and during the trip.
* Provide an emergency contact number for the parents / carers for the day.
* Ensure a copy of the HCP is reviewed and taken on the trip.

**Important points to remember…** **for residential visits the school should:**

* Provide a plan for the trip, including itinerary, meal plans etc.
* Ensure a risk assessment is carried out by the school and appropriate action taken;
* Identify at least 2 key workers that the child / young person and their parents / carers can liaise with both before and during the trip.
* Additional training may be required for the overnight care of a child / young person with diabetes. Make certain that these training needs are identified and discussed to allow plenty of time to ensure an adequate number of staff are trained and supported.
* For younger children it may be advisable for contact to be made with the parents / carers each evening to review the day and highlight areas of concern.
* Ensure a copy of the HCP is reviewed and discuss it’s adaptation with parents to include evening and overnight care, and taken on the trip.

**Early Years Settings**

**Young children with Type 1 diabetes pose a set of unique challenges for carers for a number of reasons. These include their inability to recognize signs of hypo- or hyperglycaemia, their fluctuations in activity and food intake, and their fluctuating emotional state, which can have an effect on their blood glucose levels.**

**Important points to remember…**

* A pre-school child will require more supervision during activities, especially active ones, as they are less likely to recognize any warning symptoms of hypoglycaemia.
* Children in this age group are less likely to recognize and act upon the warning signs of both hypo- and hyperglycaemia. Therefore, more blood glucose testing may be required, especially if the child is new to the environment. If in doubt, a blood glucose test can easily help staff decide whether action to treat a diabetes related problem is required.
* The provision of mid-morning and mid-afternoon snacks should be discussed with parents. It is very difficult in this age group to achieve the blood glucose target range at all times – excitement, stress, and anxiety can cause fluctuations that cannot be prevented.
* Activity that could cause the child’s blood glucose levels to drop is not limited to scheduled PE lessons and activities, but can also include running around during break times and active play. The child’s parents / carers will be able to advise on which types of activities are more likely to cause a drop in blood glucose level and therefore pose a risk of hypoglycaemia. Rainy playtimes will often make the blood glucose level rise as the child is not as active and this needs to be taken into account.
* Liaise with the parents /carers about snack times, as some children will require food with no carbohydrate, whereas others will require additional insulin when eating / drinking carbohydrate at snack times. These will be documented on the HCP.
* Assign a ‘diabetes coordinator’ in the early years setting to ensure appropriate risk assessment, training and documentation is carried out.
* Contact the child’s health visitor (up to their 5th birthday) for advice and support as well as contacting the diabetes care team.



**Storage of medication and supplies**

It is the **family’s** responsibility to ensure that there are enough supplies of insulin, pen needles, blood glucose (and ketone) monitoring supplies, hypo treatment and snacks for their child. Regular communication between the school and family may be required in order to maintain sufficient supplies of all items. A box of diabetes supplies, to keep the majority of items together, is a useful idea.

All students should have access to their blood glucose monitoring kit, hypo treatment and medication at all times – this should be discussed with the school and documented in the HCP.

**Insulin:**

* The insulin in use should be stored at room temperature and should only be used for 28 days before being replaced;
* Any spare insulin that is not in use should be named and stored in a fridge, in a secure, safe place (e.g. medical room).

**Pen needles and spare monitoring equipment:**

* Should be stored in a safe place, but the child should have immediate access to the supplies as required. Safety needles should be used if staff assist the child to inject.

**Hypo treatment and snacks:**

* Should be accessible at all times as required. Every child and young person should be allowed to treat a hypo wherever it occurs including the classroom. These are usually carried by the young person or, in primary schools supplies should be kept in the classroom.

**Glucagen:**

* This is an emergency injection to correct a severe episode of hypoglycaemia when the child has lost consciousness;
* Some school staff are trained in how to use this injection. However, many schools do not have the training to administer this, but store it in case of emergency, for use by parents / carers / or emergency ambulance staff.

[](http://www.jdrf.org.uk/)

**Local Authority, Governance and Insurance**

**Further Information and Resources**

**Supporting Pupils At School With Medical Conditions (2014)**

States that:

* It is for Local Authorities, schools and governing bodies, settings and management groups to work out their own policies in the light of statutory responsibilities and their own assessment of local needs and resources.
* Local Authorities, schools and other employers should consider the issue of managing administration of medicines and supporting children with more complex health needs as part of their accessibility planning duties.
* Most children with medical needs can attend school or a setting regularly and take part in normal activities, sometimes with support. However, staff may need to take extra care in supervising some activities to make sure that these children, and others, are not put at risk.
* Anyone caring for children, including teachers, other school staff and day care staff in charge of children have a common law duty of care to act like any reasonably prudent parent. Staff need to make sure that children are healthy and safe. This duty of care can extend to administering medicine and taking action in an emergency. This guidance also extends to staff leading activities taking place off site, such as visits and field trips.

**The SEN and Disability Act (SENDA, 2001)**

This covers all areas of school and early year’s settings and advises that:

* Since September 2002, schools have been under a duty to make reasonable adjustments to ensure that disabled pupils are not put at a substantial disadvantage in comparison to those who are not disabled.

**In summary:**

Local authorities / employers should fully indemnify all members of school staff through their insurance scheme against claims for alleged negligence providing that they:

* Education Authority staff should be released to attend the necessary Diabetes training by an appropriately qualified health care professional;
* Are acting within their scope of duties;
* Have followed documented procedures such as those in this guidance;
* Have maintained their competence by regular practice of the skills taught.
* Juvenile Diabetes Research Foundation (JDRF)

[www.jdrf.org.uk](http://www.jdrf.org.uk)

classroom toolkit and information for primary and secondary schools.

* Diabetes UK

[www.diabetes.org.uk](http://www.diabetes.org.uk)

information for schools

* [www.medicalconditionsatschool.org.uk](http://www.medicalconditionsatschool.org.uk)

documentation and templates for common chronic conditions, including diabetes, in schools.

* [www.teachernet.gov.uk/publications](http://www.teachernet.gov.uk/publications)
* Managing Medicines in Schools and Early Years Settings

<https://www.education.gov.uk/publications/standard/publicationDetail/Page1/DFES-1448-2005>

* Disability Discrimination:
* <http://www.diabetes.org.uk/Guide-to-diabetes/Living_with_diabetes/Discrimination/>
* <http://www.equalityhumanrights.com/uploaded_files/EqualityAct/schools_nsg_3.doc>
* <http://media.education.gov.uk/assets/files/pdf/e/equality%20act%20guidance%20february%202013.pdf>
* <http://www.equalityhumanrights.com/advice-and-guidance/education-providers-schools-guidance/key-concepts/reasonable-adjustments/>

Our Shared Commitment is Caring with Pride.

Our ultimate objective is to be trusted to deliver safe, effective and

sustainable healthcare within our communities.

Providing care together in York, Scarborough, Bridlington, Malton, Whitby,Selby and Easingwold.

Our values, drivers and motivators are:

• Caring about what we do

• Respecting and valuing each other

• Listening in order to improve

• Always doing what we can to be helpful

If you found this information useful and have any comments or queries please contact a member of the Paediatric diabetes team on 01904 721317.

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