

Birmingham, Solihull, Sandwell and Environs Area Prescribing Committee (APC)

Insulin Guidelines for Adults and Children with Type 1 or Type 2 Diabetes Mellitus

Diabetes Medicines Management Advisory Group (DMMAG)

These guidelines are not to be used for the management of diabetes mellitus during preconception or pregnancy.

This guideline can be used in conjunction with the local or national diabetes competencies

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Enquiries or questions about the policy document should be directed to the APC Secretary:

mlcsu.medicines-management@nhs.net

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Guideline authors

- Wasim Hanif, Professor in Diabetes & Endocrinology, Consultant Physician, University Hospitals Birmingham NHS Foundation Trust (UHB), Queen Elizabeth Hospital (QEH) and DMMAG Co-Chair
- Sharon Coane, Diabetes Pharmacist, Medicines Management and Optimisation (MMOT), NHS Birmingham and Solihull Clinical Commissioning Group (BSol CCG)
- Louise Collins, Paediatric Diabetes Nurse, Birmingham Women's and Children's Hospital Foundation trust. (Guidance for Children and Young People)

Guideline contributors and reviewers (DMMAG membership)

- Rakhi Aggarwal, Senior Prescribing Advisor, MMOT, BSol CCG.
- Dr Chizo Agwu, Consultant Paediatrician in Diabetes and Endocrinology, Sandwell and West Birmingham Hospitals NHS Trust. (SWBH NHS Trust)
- Hanadi Alkhder, Senior Prescribing Advisor, NHS Birmingham and Solihull CCG
- Srikanth Bellary, Consultant Physician-Diabetes and Endocrinology, UHB - Heartlands, Good Hope and Solihull Hospitals (HGS)
- Ruth Cook, Operational Lead, Diabetes Specialist Nurse, UHB HGS
- Lesley Drummond, Paediatric Diabetes Nurse, Birmingham Women's and Children's Hospital Foundation trust.
- Atif Hassan, GP at University Medical Practice Birmingham and BSol CCG Diabetes Lead GP for Structured Education
- Natasha Jacques, Principal Pharmacist – Specialist Services, UHB HGS
- Muhammad Ali Karamat, Consultant Physician and Honorary Senior Lecturer - Diabetes and Endocrinology, UHB HGS
- Gurpreet Kaur, Primary Care Network, Lead Pharmacist, Sandwell & West Birmingham CCG (SWB CCG)
- Ruth Krone, Consultant Endocrinology and Diabetes Service Lead, Diabetes Education Lead, Birmingham Women's and Children's Hospital Foundation trust
- Joanne Lloyd, Diabetes Specialist Nurse, City Hospital, SWBH NHS Trust
- Waqar Malik, Consultant Diabetologist, Birmingham Community HealthCare NHS Foundation Trust. (BCHC)
- Manjusha Rathi, Consultant physician endocrinology, diabetes and lipid metabolism, SWBH NHS Trust
- Amar Puttanna, Consultant Diabetes and Endocrinology, UHB HGS
- Nashat Qamar, GP at Hall Green Health Medical Centre and BSol CCG, Diabetes Locality Lead & BSSE APC
- Veronica Quarton Specialist Clinical Pharmacist – General Medicines (Diabetes) and Teacher Practitioner – UHB - QEH
- Mujahid Saeed, Consultant Physician & Diabetologist, UHB QEH
- Mukesh Sinha, GP at Church Road Surgery, Sandwell & West Birmingham CCG
- Theresa Smyth, Nurse Consultant in Diabetes, UHB QEH
- Karen Tait, Consultant Diabetologist, Birmingham Community HealthCare Trust (BCHC)
- Jackie Webb, Lead Diabetes Specialist Nurse, UHB HGS

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1. SCOPE

These guidelines have been developed to support healthcare professionals managing paediatric and adult patients with type 1 and type 2 diabetes mellitus using insulin therapy.

The guidelines should not be used for the management of diabetes during pre-conception or pregnancy.

Please ensure you consult the most appropriate treatment pathway within the guidelines. However, for the treatment of adult patients (prescribed insulin) who have had a pancreas transplant or an islet cell transplant or who have had pancreatitis or a pancreatectomy - refer to the type 1 pathway unless otherwise directed by the specialist centre.

The guidelines have been developed taking into consideration the most recent local, national and international publications available at the time of preparation:

1. NICE Guideline NG28: Type 2 diabetes in adults (2015 updated August 2019).
2. [EASD/ADA Management of Hyperglycaemia in Type 2 Diabetes](#) (Oct 2018).
3. Licence indications and product availability in the UK market.
4. APC Formulary for Birmingham, Solihull, Sandwell and environs
5. [Type 2 Diabetes Mellitus - Guidelines for the choice of oral and non-insulin antihyperglycaemic agents in adults](#)
6. Safety advice from the MHRA.
7. Cost implications for primary care.
8. Local population needs and local clinical expertise.
9. NICE Guideline NG17 – Type 1 Diabetes in Adults: Diagnosis and management (2015 updated Jul 16).
10. NICE Guideline: NG18 Diabetes (type 1 and type 2) in children and young people: diagnosis and management (August 2015: updated November 2016)
11. NICE Guideline: TA151: Continuous subcutaneous insulin infusion for the treatment of diabetes mellitus: 23rd July 2008.
12. [TREND UK](#)

It is recognised that research in the world of diabetes is fast moving, and whilst DMMAG will aim to support prescribers with appropriate clinical guidelines, it remains the responsibility of prescribers to ensure they adhere to the latest guidelines, licence changes and product availability.

2. LOCAL PREVALENCE OF DIABETES

Four million people in the UK are thought to be living with diabetes, 90% of whom have Type 2 diabetes. It is estimated that by 2025 the number of diabetes diagnoses is estimated to increase to 5 million.¹ According to figures published by NHS digital (Quality and Outcomes Framework) the Midlands has the highest prevalence of diabetes in England.²

	Number of patients over 17 years (prevalence)		Ranking of CCG prevalence of diabetes CCG (2018/19)
	2017/18	2018/19	
Birmingham and Solihull CCG (BSol CCG)	80,252 (8.25%)	86,222 (8.41%)	15th
Sandwell and West Birmingham CCG (SWB CCG)	20,281 (9.17%)	21,581 (9.31%)	4th

The total number of children with diabetes in the West Midlands in 2018 was reported to be 3,206 with 2,969 (92.6%) with Type 1 diabetes and 138 (4.3%) with Type 2 diabetes mellitus and 99 (3.1%) with other type of diabetes such as cystic fibrosis related or MODY (Maturity Onset Diabetes of the Young).³

BSol CCG spent 9 million pounds on insulin products between January 2019 and December 2019 with NPH (Neutral Protamine Hagedorn -isophane insulin) the first line basal insulin only accounting for 6% of the total spend.⁴

SWB CCG spent just under 4 million pounds on insulin products January 2019 and December 2019 with NPH (Neutral Protamine Hagedorn -isophane insulin) the first line basal insulin only accounting for 9% of the total spend.⁴⁴

The National Audit Office from the Department of Health reported that there was no correlation between primary care spending on diabetes drugs and the percentage of people with diabetes meeting treatment standards to control blood glucose.⁴

The [Diabetes Outcomes Versus Expenditure \(DOVE\) Tool](#) in local populations reports a comparison between CCGs results for BSol CCG and SWB CCG for specified criteria from National Diabetes Audit (NDA) and Quality Outcomes Frameworks. This reports that some CCGs spend significantly more on diabetes medications compared to the rest of England but still achieve the same percentage of people with diabetes treated to target with an HbA1c.⁵

Figure 1: Dove Quadrant Graph Legend

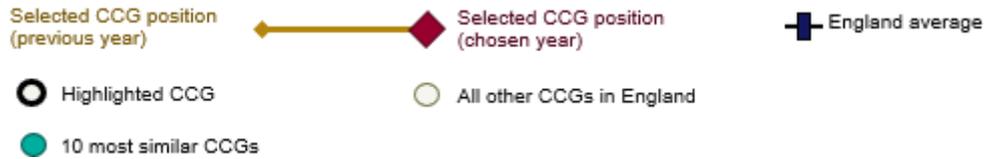


Figure 2: BSOL CCG Dove Quadrant Graph

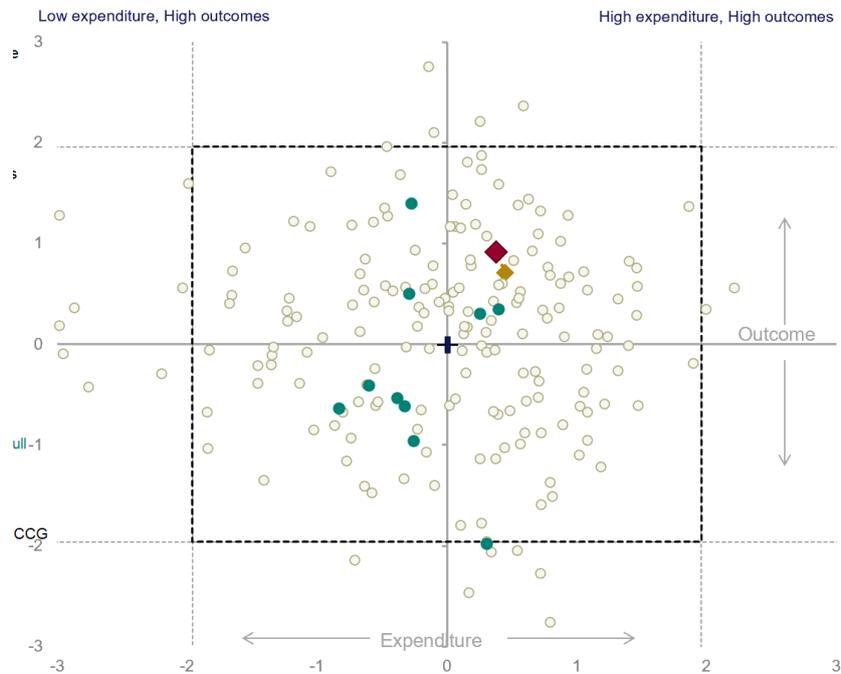
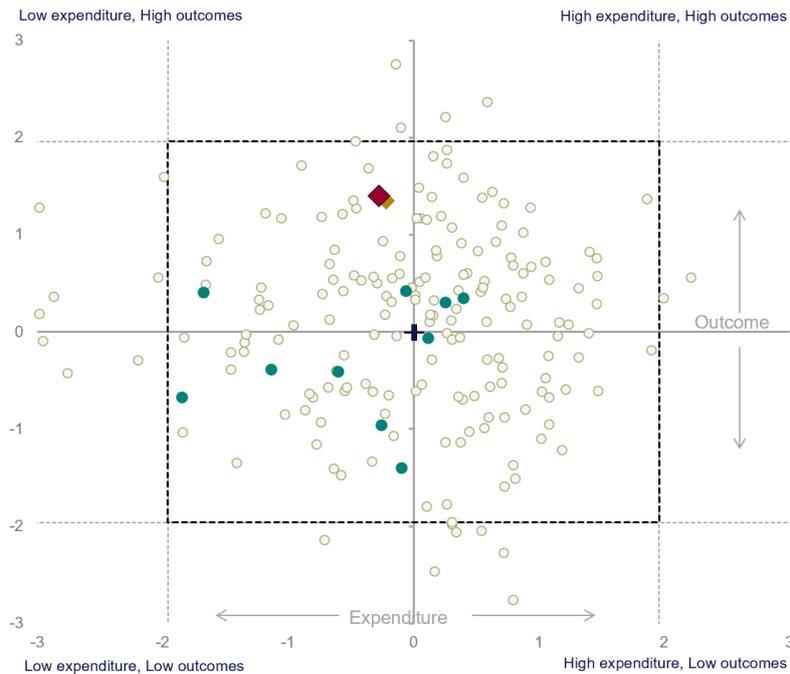


Figure 3: SWB CCG Dove Quadrant Graph



All graphs show total spend on all insulin items per person with diabetes compared to people with diabetes (type 1 and type 2) from NDA with a HbA1c <58 mmol/mol (7.5%) for NHS – 2017/18.⁵

3. COMPETENCIES

Insulin therapy should only be initiated and managed by healthcare professionals with the relevant expertise and training. [Trend UK Adult Nursing Diabetes competencies 5th ed 2019](#) can be used as a framework to determine competencies at various levels and identify knowledge and skills which need to be developed for the management of adult patients with Diabetes Mellitus.⁶

There may be CCG specific competencies applicable to different areas of the APC.⁷

4. GUIDANCE FOR ADULTS

Decision To Start Insulin: Adults

This guideline excludes preconception, pregnancy, or any other type of diabetes - these patients should be managed by a specialist only.

The decision to start insulin and HbA1c targets should be individualised according to patient factors and disease features.^{8,9,10}

ADULTS with Type 1 Diabetes Mellitus

Refer urgently to specialist services – insulin should be started without delay.

ADULTS with Type 2 Diabetes Mellitus

Insulin can be considered:

- At any stage, if the patient is symptomatically hyperglycaemic.
- At diagnosis if HbA1c >86mmol/mol (>10%).
- At any stage if HbA1c >75mmol/mol (>9%).
- If HbA1c is above patient's target despite dual/triple therapy.
- During intercurrent illness or steroid-induced diabetes.

Insulin Pathway - Type 1 Diabetes Mellitus : Adults

**Aim for HbA1c of 48mmol/mol (6.5%)
OR an individualised target**

Consider: Daily activities, patient choice, co-morbidities, likelihood of complications, hypoglycaemia.

Apply individualised treatment and targets for patients in the following categories: moderate to severe frailty, housebound, renal impairment, mental health issues, end of life.

- All patients with Type 1 Diabetes mellitus require insulin.
- Insulin therapy should only be initiated and managed by healthcare professionals with relevant expertise and training, usually within a specialist care setting.
- Structured education, dietary and lifestyle interventions should be offered to support patients.
 - ① - **Problematic hypoglycaemia:** Two or more episodes per year of severe hypoglycaemia OR one episode associated with impaired awareness of hypoglycaemia, extreme glycaemic variance, or major fear and maladaptive behaviour.

Long acting insulin analogue BASAL

GREEN FORMULARY STATUS

FIRST LINE

Levemir[®] 100 units/ml: twice daily dosing
Insulin detemir 100units/ml

SECOND LINE

Semglee[®] 100units/ml - preferred brand
Abasaglar[®] 100units/ml – pen cartridges required.
Insulin glargine **100units/ml**: usually once daily

AMBER FORMULARY STATUS - SPECIALIST INITIATION

Toujeo[®] - supported by RICaD (see formulary)
Insulin glargine **300units/ml**: once daily

If any of following apply:

- using ≥ 80 units / day, or
- has problematic hypoglycaemia ①

Tresiba[®]- supported by RICaD (see formulary)
Insulin degludec 100units/ml: once daily

If any of following apply:

- (to avoid the need for an insulin pump):
- has nocturnal hypoglycaemia, or
 - severe hypoglycaemia requiring 3rd party assistance, or
 - recurrent DKA despite good insulin regimen adherence.

AND

Rapid-acting insulin analogue BOLUS – mealtime insulin

GREEN FORMULARY STATUS

Apidra[®]
Insulin glulisine 100units/ml
Humalog[®]
Insulin lispro 100units/ml
Novorapid[®]
Insulin aspart 100units/ml

FOR INFORMATION ONLY AMBER FORMULARY STATUS - SHARED CARE (ESCA REQUIRED)

Fiasp[®]
Insulin aspart 100units/ml supported by an ESCA [BSSE APC formulary guidance](#)
Only use in **pregnant women** with either gestational diabetes or pre-existing diabetes, after other insulins have been tried and failed to reach post-prandial glucose targets.

Consider for Flash glucose monitoring or Continuous Glucose Monitoring (CGM) if despite optimised use of insulin and conventional blood glucose monitoring one or more essential criteria apply. [See BSSE APC Formulary guidance](#).

ADJUNCT THERAPIES

GREEN FORMULARY STATUS

Metformin

Consider if:

- Experience of Metformin use in Type 1 diabetes AND
- HbA1c is above individualised target AND
- Patient BMI > 25kg/m² (BMI>23kg/m² if patient South Asian or related minority ethnic group)

SPECIALIST CENTRE USE ONLY (FOR ALL PRODUCTS BELOW)

SGLT2i (Sodium-glucose Cotransporter 2 inhibitors)
Consider if all following apply:

- optimal insulin therapy does not provide adequate glycaemic control
- BMI ≥ 27 kg/m²
- Insulin dose > 0.5units / kg / day
- Completed structured education

RED FORMULARY STATUS

Dapagliflozin (Forxiga[®])

GREY FORMULARY STATUS

Sotagliflozin

- Not currently available on NHS

If HbA1c remains above individualised target or if the patient is experiencing hypoglycaemia then review

Insulin Pathway - Type 2 Diabetes Mellitus : Adults

Apply individualised treatment and targets for patients in the following categories: moderate to severe frailty, housebound, renal impairment, mental health issues, end of life.

HbA1c lower than 75mmol/mol (9%)

BASAL Regimen

GREEN FORMULARY STATUS

FIRST LINE: Intermediate-acting human insulin

NPH insulin (isophane): Once or twice daily

Humulin I[®] 100units/ml

Insulatard[®] 100units/ml

Insuman Basal[®] 100units/ml

SECOND LINE: Long-acting insulin analogues

Consider only if any of the following apply:

- needs assistance to inject insulin, and the use of insulin glargine would reduce the frequency of injections.
- is restricted by recurrent symptomatic hypoglycaemia.
- would otherwise need twice daily NPH insulin with oral glucose lowering drugs.
- cannot use the NPH device.

Insulin Glargine 100units/ml – usually once daily

Semglee[®] 100units/ml - preferred brand

Abasaglar[®] 100units/ml – if pen cartridges required

SPECIALIST RECOMMENDATION AMBER FORMULARY STATUS - SPECIALIST INITIATION

Toujeo[®] supported by RICaD

Insulin Glargine **300units/ml** : Once daily

Consider if any of following apply:

- using \geq 80units / day
- has problematic hypoglycaemia ①

- Insulin therapy should only be initiated and managed by healthcare professionals with the relevant expertise and training. Structured education, dietary and lifestyle interventions should be offered to support patients.
- Metformin is usually continued for people without contraindications or intolerance. Review the continued need for other blood glucose lowering therapies to avoid the risk of hypoglycaemia.
- Use this pathway in conjunction with '[Type 2 Diabetes mellitus guidelines for oral and non-insulin agents](#)' and the [BSSE APC Formulary](#). Always consider the most cost-effective choice on the formulary.

① - **Problematic hypoglycaemia**: Two or more episodes per year of severe hypoglycaemia OR one episode associated with impaired awareness of hypoglycaemia, extreme glycaemic variance, or major fear and maladaptive behaviour.

HbA1c 75mmol/mol (9%) or higher

Consider patient preference and other factors to decide whether basal bolus, basal plus or premixed insulin is the most appropriate regimen. (Examples: mealtimes, lifestyle, occupation, dexterity issues, ability to manage regimen and blood glucose testing). **STOP sulphonylureas when initiating premix or basal bolus regimens to avoid hypoglycaemia**

BASAL BOLUS, BASAL PLUS Regimens

GREEN FORMULARY STATUS

BASAL: Long-acting insulin analogues

Insulin Glargine: usually once daily

Semglee[®] 100units/ml - preferred brand

Abasaglar[®] 100units/ml - if pen cartridges required

SPECIALIST RECOMMENDATION AMBER FORMULARY STATUS- SPECIALIST INITIATION

Toujeo[®] - supported by RICaD

Insulin Glargine **300units/ml**: Once daily

Consider if any of following apply:

- using \geq 80units / day
- has problematic hypoglycaemia ①

AND

GREEN FORMULARY STATUS

BOLUS: Rapid-acting insulin analogues - mealtime insulin

Apidra[®] Insulin glulisine 100units/ml

Humalog[®] Insulin lispro 100units/ml

Novorapid[®] Insulin aspart 100units/ml

PREMIXED INSULIN (BIPHASIC)

GREEN FORMULARY STATUS

FIRST LINE: Premixed human insulin

Usually twice daily

Humulin[®] M3

Insulatard Comb[®] 25

Insuman Comb[®] 50

SECOND LINE: Premixed insulin analogues

Consider only if any of the following apply:

- patient prefers injecting insulin immediately before a meal
- hypoglycaemia is a problem
- blood glucose levels rise markedly after meals
- administration is via a third party

Usually twice daily

Humalog Mix[®] 25

Novomix[®] 30

Humalog Mix[®] 50 when patient meals have a large carbohydrate content (specialist advice needed)

OR

If HbA1c remains above individualised target or if the patient is experiencing hypoglycaemia then review

Hypoglycaemia And Treatment: Adults

Healthcare professionals should provide patients on insulin therapy with written information about awareness and management of [hypoglycaemia](#).¹¹ This information can be provided and reinforced through structured education. For examples of patient information see: [Hypoglycaemia In Adults In The Community](#) and [What is a hypo?](#) and the Trend UK leaflets [Diabetes: Why do I sometimes feel shakey, dizzy and sweaty? Hypoglycaemia explained.](#)^{12,13,14,15}

Patients are encouraged to buy the treatments for hypoglycaemia over the counter and to carry a supply with them. However, if the treatments bought over the counter cannot be safely taken by the person with hypoglycaemia, see the APC formulary section - [Treatment of hypoglycaemia products](#) for the range of products.⁷

DMMAG has produced new local guidance for the [Treatment and Management of Hypoglycaemia in Adults with Diabetes Mellitus](#) which can be accessed via the BSSE APC formulary website.¹⁶

The NICE Quality Standards for diabetes in adults recommend that people with diabetes receive an on-going review of treatment to minimise the risk of hypoglycaemia. If they have experienced an episode of hypoglycaemia requiring medical attention, they should be referred to a specialist diabetes team.¹⁷

The insulin pathways in this guidance suggest alternative insulins for use in patients with problematic hypoglycaemia, following specialist recommendation.¹⁸

Sick Day Information: Adults

Healthcare Professionals should be aware of 'sick-day' rules and ensure that people who are receiving insulin therapy are given appropriate information about these. [Diabetes UK](#) has a useful patient leaflet on [dealing with illness](#). A quick reference guide on '[how to advise patients on sick day rules](#)' has been published in the *Diabetes and Primary Care Journal*. Patient information leaflets '*Type 2 diabetes: What to do when you're ill*' are also available for download at [TREND UK](#).

DMMAG have produced new specific local guidance for primary care; "[Primary Care Sick Day Guidance for the Management of Adult Patients with Diabetes Mellitus](#)."¹⁹ This is particularly helpful for clinicians managing patients with diabetes during the Covid pandemic.

5. GUIDANCE FOR CHILDREN AND YOUNG PEOPLE (CYP)

Suspected Diagnosis : Children and Young People (0-18 years)

- Refer **URGENTLY** to paediatric specialist services regardless of type.

City and Sandwell hospitals: (0-18 years)	0121 553 1831 (switchboard) Ask for paediatric registrar on-call
Birmingham Children's Hospital: < 16 years	0121 333 9999 (switchboard) Ask for the on-call endocrine team.
UHB – Queen Elizabeth Hospital : ≥ 16 years	0121 3712000 (switch board QE) Ask for Diabetes Consultant on call.
UHB – Heartlands/ Good Hope and Solihull:	07956662852 on call consultant Monday - Friday 09:00-17:00

For referral out of hours, after 5pm and at weekends then as below:

Birmingham Heartlands/Solihull – Ring 0121 424 2000 and ask to bleep Paediatric Registrar on call, bleep 2923 and referral to PAU at Heartlands.

Good Hope Hospital – Ring 0121 424 7736 and ask for paediatric registrar at Good Hope Hospital and referral into CAU at Good Hope.

- INSULIN SHOULD BE STARTED WITHIN 24 HOURS OF SUSPECTED DIAGNOSIS.**

Please **refer immediately by telephone** to the local paediatrician on-call (see contact details above).

If the GP is unable to contact the local paediatrician on-call, then the patient **SHOULD** be sent to the local hospital.

DO NOT

- Send the child/young person to pathology or children's outpatients for a blood test; the paediatric team will take samples as required.
- Refer as an outpatient.
- Waste time by arranging a fasting blood glucose level or HbA1c test.

If there is any diagnostic doubt, discuss urgently with paediatrics

Insulin Pathway: Children and Young People (CYP 0 to <19 years old)

For CYP with a diagnosis of type 1 diabetes mellitus OR symptomatic OR HbA1c is 69mmol/mol (8.5%) or higher

Intensive Insulin therapy is commenced immediately by the specialist centre

Long-acting insulin analogue BASAL

GREEN FORMULARY STATUS

Consider the most cost-effective choice dependent on type of device available.

Insulin glargine 100units/ml: Once daily dosing
(NB ½ unit pen only available for Lantus®)

Lantus® Insulin glargine 100units/ml

Semglee® Insulin glargine 100units/ml

Abasaglar® Insulin glargine 100units/ml
• If pen cartridges required

OR

GREEN FORMULARY STATUS

Levemir® Insulin detemir 100units/ml
Twice daily dosing
Consider in pubertal or sporty CYP.

OR

**SPECIALIST RECOMMENDATION
AMBER FORMULARY STATUS
SPECIALIST INITIATION**

Tresiba® supported by RICaD
Insulin degludec 100units/ml: once daily

If any of following apply:
(to avoid the need for an insulin pump):

- has nocturnal hypoglycaemia
- severe hypoglycaemia requiring 3rd party assistance.
- recurrent DKA despite good insulin regimen adherence.

Option 1 – Multiple Daily Injection (MDI) basal bolus regimen (usually for CYP > 2 years old)

Please ensure that the patient is prescribed the correct pen device.

Rapid-acting insulin analogue BOLUS – Mealtime insulin

GREEN FORMULARY STATUS

Rapid-acting insulin analogues:

Apidra® Insulin glulisine 100units/ml
• Only licensed > 6 years old

Humalog® Insulin lispro 100units/ml

Novorapid® Insulin aspart 100units/ml

FOR INFORMATION

**AMBER FORMULARY STATUS
- SHARED CARE**

Fiasp® Insulin aspart 100units/ml supported by an ESCA [BSSE APC formulary guidance](#)
Only use in **pregnant women** with either gestational diabetes or pre-existing diabetes, after other insulins have been tried and failed to reach post-prandial glucose targets. Not to be used in paediatrics.

AND

- All CYP with diabetes mellitus who require insulin therapy **should be managed in a specialist care setting.**
- Structured education, dietary and lifestyle interventions should be offered to support CYP with diabetes; this is a continuing process.
- The paediatric specialist team will complete the CYP annual review.

ⓘ - **Problematic hypoglycaemia:** Two or more episodes per year of severe hypoglycaemia OR one episode associated with impaired awareness of hypoglycaemia, extreme glycaemic variance, or major fear and maladaptive behaviour.

Option 2

Continuous Subcutaneous Insulin Infusion (CSII – Pump Therapy)- **specialist only**

Using rapid acting analogues as per MDI regimen shown to left.

Considered if patient fulfils either of the following criteria:

- Less than 2 years old at diagnosis whereby insulin injections are impractical / unsafe with regards to incremental adjustment
- Patient fulfils mandatory eligibility criteria ([NICE TA151 - July 2008](#))

Management of acute complications following commencement of insulin

All CYP and their parents/carers should have support and access to structured education relating to the management of both hypoglycaemia and hyperglycaemia which needs to be revisited at regular intervals.²⁰

Hypoglycaemia Guidance - Type 1 Diabetes: Children and Young People

All CYP with diabetes on insulin therapy should have access to fast acting carbohydrate to treat episodes of hypoglycaemia, parents and carers should also have access to glucagon (Glucogen®) intramuscular injection kit along with appropriate training.

A paediatric study has shown that 0.3g/kg of rapidly acting carbohydrate-containing preparations effectively resolves hypoglycaemia in most children and raises the median blood glucose by 2 to 2.1mmol/L in 15 minutes without rebound hypoglycaemia. This has also been shown to be effective in treating hypoglycaemia in paediatric insulin pump patients. Please see: UK Association of Children's Diabetes Clinicians (ACDC): [Management of Hypoglycaemia In Children and Young People With Type1 Diabetes](#)

Sick Day Information: Children and Young People

All children and young children (CYP) with diabetes and their parents/carers should have access to 24-hour advice and support should they become unwell specifically relating to their diabetes. Each local team will have their own arrangements for the provision of this.

All CYP with diabetes should have access to written detailed advice regarding sick day rules. This advice should be revisited annually and can form part of their annual review.²¹

Please see : UK Association of Children's Diabetes Clinicians (ACDC) : [Management of Type 1 Diabetes Mellitus During Illness in Children and Young People under 18 years Sick-Day Rules](#)

General Sick Day Diabetes Management Principles

Sick day guidelines, including when and how to adjust insulin should be taught soon after diagnosis and reviewed at least annually with patient and family members in order to reduce relative risk of diabetic ketoacidosis and severe hypoglycaemia (potentially brought on by mis-management of gastrointestinal illnesses).

1. Ensure CYP and parents/carers know that they should be monitoring both their blood glucose levels and blood ketone levels more frequently and know when to call for help, advice and support from their local team
2. Never stop insulin – ensure that CYP and their parents/carers know that there are times they may need more or less insulin.
3. Monitor and maintain hydration with adequate salt and water balance.
4. Ensure that any underlying precipitating illness is treated appropriately.

6. BIOSIMILAR INSULINS

A biosimilar medicine is defined as “a biological medicine that is developed to be highly similar and clinically equivalent (in terms of quality, safety and efficacy) to an existing biological medicine that has already been authorised in the European Union, (known as the reference biological medicine or originator medicine)”. Biosimilar medicines are considered to be therapeutically equivalent to the reference medicine within their authorised indications. [What is a biosimilar medicine NHS England June 2019](#) can be accessed for more information.²²

The Association of British Clinical Diabetologists (ABCD) have acknowledged that the introduction of biosimilar insulins has the potential to offer the NHS a considerable cost saving without compromising either efficacy or safety.²³

In patients with type 2 diabetes who require a basal insulin analogue, the [BSSE APC formulary](#) recommends that a biosimilar insulin glargine 100 units/ml is prescribed first line; this is currently Semglee®.

Local guidance has been approved by DMMAG for clinicians wishing to consider switching patients from Lantus® to Semglee®.²⁴ This should only be completed by those healthcare professionals with the relevant expertise and training and with direct contact with the patient during a review. The change should not be communicated solely via a letter. More information can be found in the [Guideline for the managed introduction of Basal Insulin August 2019](#) and in the DMMAG document [Biosimilar Insulin Glargine \(Semglee® ▼\) for patients with Type 2 Diabetes – Guidance for switch from Originator Insulin Glargine \(Lantus®\)](#)^{24,25}

7. INJECTION TECHNIQUE

Poor injection technique, incorrect needle length, failure to rotate injection sites and reusing needles could lead to unpredictable absorption. For this reason, it is important that healthcare professionals teach patients the correct injection technique when initiating and reviewing insulin.²⁶

If insulin is injected into the muscle in error, this increases the risk of pain, bruising, bleeding and/or unpredictable blood glucose levels and severe hypoglycaemia (if the insulin is absorbed more quickly). If insulin is injected into an area where it is poorly absorbed (such as with lipohypertrophy), hyperglycaemia, and possibly diabetic ketoacidosis in those with type 1 diabetes, could occur. Patients should be taught to recognise the signs of lipohypertrophy and how this can develop as well as be encouraged to report this to their healthcare professional.^{26,27,28}

Good sources of information include about injection technique can be found in the following:

- Diabetes UK [How to inject insulin](#),
- [The Forum for Injection Technique \(FIT\)](#)
- Trend UK [Injection Technique Matters](#)

The [Insulin Pen needles](#) guideline provides clinicians with formulary options for the prescribing of needles for pre-filled and reusable insulin pens and advice regarding safety needles.²⁹

8. BLOOD GLUCOSE AND KETONE MONITORING

People on insulin therapy should be offered self-monitoring of blood glucose (and ketones when required). Patients who self-monitor must be given adequate training around the purpose, the interpretation, and what actions they need to take with the readings. Self-monitoring of blood glucose should always be an integral part of a wider agreed management plan. Refer to the BSSE APC for advice on choice of blood glucose meters: [Guideline for the choice of blood glucose, ketone meters, test strips and lancets \(plus self-monitoring\)](#).³⁰

For patients with type 1 diabetes using Flash Glucose, monitoring refer to the Bsol CCG [Commissioning policy for Flash Glucose Monitoring](#), and for guidance on Continuous Glucose Monitoring (CGM) refer to [Clinical Commissioning Policy for CGM](#).⁷

9. INSULIN SAFETY

The [Insulin passport](#) was first introduced by the [National Patient Safety Agency \(NPSA\) in 2011](#) with the purpose of reducing insulin errors. It is a credit card-sized paper record that patients carry with them containing details of the type of insulin and device that a patient use, as well as emergency contact information. The NPSA advised that a **healthcare professional should check the passport every time insulin is prescribed, dispensed or administered**. This requirement has been recently reinforced by a range of national advisory and regulatory bodies, including [NICE](#) and [TREND UK](#).³¹

The diabetes services at the local acute Trusts (including UHB and the Solihull Community Diabetes Service), issue new insulin passports and a patient information booklet each time insulin is initiated or changed. It is imperative that the information in the passport is kept up to date in primary care. The insulin passport should be visually checked by a healthcare professional **at least** once a year at the annual diabetes review to confirm it is up-to-date and again every time the insulin type or device is changed. Carrying out of date information is as dangerous as not carrying it at all.

Practices can order printed copies of insulin passports via [Primary Care Support England \(PCSE\) supplies](#). **(see Appendix 3 for further information on where Insulin passports or manufacturer safety cards can be ordered)**.

All clinicians prescribing, managing or administering insulin should complete a free e-learning continuous professional development CPD module: [The Six Steps to Insulin Therapy](#) developed by the Primary Care Diabetes Society in association with Training, Research and Education for Nurses in Diabetes (TREND-UK), which is endorsed by NICE.³²

See appendix 3 for information for advice on good practice in primary care.

DMMAG have prepared an [Insulin Risk Assessment Tool](#) which contains practical risk reduction strategies for primary and secondary care, this can be downloaded from the Area Prescribing Committee (APC) website. Clinicians should only prescribe high strength, combination, or biosimilar insulins in line with the APC formulary.³³

10. DRIVING AND INSULIN

Clinicians should Inform people who use insulin and drive to notify the Driver and Vehicle Licensing Agency (DVLA). Refer to the DVLA's [Assessing fitness to drive – a guide for healthcare professionals](#) for more information.³⁴ There are also some useful patient information leaflets on Trend UK e.g. [Diabetes safe driving and the DVLA](#)

11. APPENDIX 1: FORMULARY INSULINS : ADULTS

FORMULARY CHOICE	BRAND NAME	APPROVED NAME	FORM / PREFILLED DEVICE*Oct 20			COMPATIBLE PEN/DEVICE WITH CARTRIDGE	ADMINISTRATION TIME	INSULIN PROFILES			
			10ml Vial Price	Pre-filled Device (5x3ml)	3ml Cartridge (5x3ml)			Onset	Peak	Duration	Notes
Intermediate Acting Basal Human Insulins – NPH											
First line NPH basal Human insulins (Type 2 Diabetes Mellitus)	Humulin I	Isophane insulin 100 units/ml	£15.68	Kwikpen £21.70	£19.08	HumaPens Autopen Classic	Once or twice day: not food dependent	<p>Onset: 2-4 hours Peak: 4-8 hours Duration: 14-16 hours</p>			
	Insulatard	Isophane insulin 100 units/ml	£7.48	Innolet £20.40	£22.90	Novopens					
	Insuman Basal	Isophane insulin 100 units/ml	N/A	Solostar £19.80	£17.50	AllStarPro/ Autopen 24	45-60 minutes before food				
Long-Acting Basal Analogue Insulins											
First line basal analogue	Semglee Biosimilar	Insulin Glargine 100 units/ml	N/A	Semglee £29.99	N/A	N/A	Once daily or twice at the same time; not food dependent	<p>Onset: 0-2 hours Peak: None Duration: 18-42 hours</p>			
Second line if cartridges preferred	Abasaglar Biosimilar	Insulin Glargine 100units/ml	N/A	Kwikpen £35.28	£35.28	HumaPens Autopen Classic					
Type 1 only or special considerations	Levemir	Insulin Detemir 100 units/ml	N/A	Flexpen £42.00 Innolet £44.85	£42.00	Novopens					

FORMULARY CHOICE	BRAND NAME	APPROVED NAME	FORM / PREFILLED DEVICE*Oct 20			COMPATIBLE PEN/DEVICE WITH CARTRIDGE	ADMINISTRATION TIME	INSULIN PROFILES			
			10ml Vial Price	Pre-filled Device (5x3ml)	3ml Cartridge (5x3ml)			Onset	Peak	Duration	Notes
Ultra-Long Acting Basal Insulin Analogues – High Risk Insulins LINK to Risk Assessment											
Specialist recommendation only See BSSE APC Formulary guidance	Toujeo	Insulin Glargine 300 units/ml	N/A	Solostar 3x 1.5ml £32.14 DoubleStar 3x 3ml £64.26	N/A	N/A	Once daily at the same time; not food dependent	30-60 mins	No peak	24-36 hours	
	Tresiba	Insulin Degludec 100 units/ml	N/A	Flextouch £46.60	£46.60	Novopens		0.5-1.5 hours	No peak	Up to 42 hours	*there is a 200 unit/ml strength
Rapid Acting Insulin Analogues											
First line rapid acting insulin analogues	Apidra	Insulin Glulisine 100 units/ml	£16.00	Solostar £28.30	£28.30	AllStarPro/ Autopen 24	Just before/with or after food	<p>Onset: 5-15 mins Peak: 0.5-1.5 hours Duration: 3-5 hours</p>			
	Humalog	Insulin Lispro 100 units/ml (200 units/ml is non-formulary)	£16.61	Kwikpen £29.46	£28.31	HumaPens Autopen 24					
	Novorapid	Insulin aspart 100 units/ml	£14.08	Flexpen £30.60 Flextouch £32.13	£28.31 PumpCart 1.6ml £15.10	Novopens Accuchek Insight S/C Pump					

FORMULARY CHOICE	BRAND NAME	APPROVED NAME	FORM / PREFILLED DEVICE*Oct 20			COMPATIBLE PEN/DEVICE WITH CARTRIDGE	ADMINISTRATION TIME	INSULIN PROFILES			
			10ml Vial Price	Pre-filled Device (5x3ml)	3ml Cartridge (5x3ml)			Onset	Peak	Duration	Notes
Ultra Rapid Acting Insulin Analogues											
Specialist recommendation See BSSE APC Formulary guidance	Fiasp	Ultra-rapid insulin aspart 100 units/ml	£14.08	Solostar £30.60	£28.31	Novopens	Up to 2 mins before the start of a meal and up to 20 mins after the start of a meal.	4 mins	1-3 hours	3-5 hours	
Biphasic (Premixed) Human Insulin – contain a mixture of short acting soluble insulin and intermediate isophane insulin											
First line premixed human insulins	Humulin M3	Soluble 30% and isophane insulin 70%	£15.68	Kwikpen £21.70	£19.08	HumaPens Autopen Classic	20-45 mins before food	<p>From SIX Steps to Insulin safety³⁵ shows time-action profile for Humulin M3</p>			
	Insuman Comb 25	Soluble 25% and isophane insulin 75%	N/A	SoloStar £19.80	£17.50	AllStar Pro Autopen 24	30-45 mins before food				
	Insuman Comb 50	Soluble 50% and isophane insulin 50%	N/A	N/A	£17.50	AllStar Pro Autopen 24	20-30 mins before food				
Biphasic (Premixed) Insulin Analogues– contain a mixture of rapid acting insulin analogue and intermediate acting insulin											
First line premixed insulin analogues	Humalog Mix 25	Biphasic lispro 25%	£16.61	Kwikpen £30.98	£29.46	HumaPens Autopen Classic	Just before/with or after food	<p>From SIX Steps to Insulin safety³⁵ for premixed insulin analogues</p>			
	Humalog Mix 50	Biphasic lispro 50%	N/A	Kwikpen £30.98	£29.46	HumaPens Autopen Classic					
	Novomix 30	Biphasic aspart 30%	N/A	Flexpen £29.89	£28.79	Novopens					

Appendix one has been adapted from Leeds Teaching Hospital NHS Trust – Insulin Poster

12. APPENDIX 2: REUSABLE INSULIN PEN DEVICES

(Reproduced with permission from the North West London Health and Care Partnership – July 2019)

DEVICE	ALLSTAR PRO	AUTOOPEN CLASSIC	AUTOOPEN 24	HUMAPEN LUXURA HD	HUMAPEN SAVVIO	JUNIORSTAR	NOVOPEN 5	NOVOPEN ECHO
DOSING	1 unit (1-80)	1 unit (1-21) 2 units (2-42)	1 unit (1-21) 2 units (2-42)	0.5 unit (1-30)	1 unit (1-60)	0.5 unit (1-30)	1 unit (1-60)	0.5 unit (0.5-30)
GENERAL FEATURES	Blue or silver	Plastic Green (1-21) Blue (2-42)		green	Metal Audible click Blue, graphite, green, pink, red, silver	Blue, red or silver	Metal Silver or blue	Metal Blue or red
SPECIAL USES		Release button on side makes it easier for some to handle. Spring loaded release button ensures that force required to push the insulin is significantly less than other insulin pens				Allows for half-unit dose increments which helps to provide flexibility especially in young people.	Memory function on the pen indicated timing and units of last dose	Memory function record dose and time since last injection for extra reassurance
INSULIN COMPATIBILITY	Sanofi Apidra Insulin lispro- Sanofi Insuman Lantus	Lilly Abasaglar Humalog Humulin Lyumjev Wockhardt	Sanofi Apidra Insulin lispro- Sanofi Insuman Lantus	Lilly Abasaglar Humalog Humulin Lyumjev	Lilly Humulin Humalog Abasaglar	Sanofi Apidra Insulin lispro - Sanofi Insuman Lantus	NovoNordisk Fiasp Insulatard Novorapid Novomix Levemir Tresiba	Novo Nordisk Fiasp Insulatard Novorapid Novomix Levemir Tresiba
DEVICE								

13. APPENDIX 3: DISPOSABLE INSULIN PEN DEVICES

(Reproduced with permission from the North West London Health and Care Partnership – July 2019)

DEVICE	DOUBLESTAR	SOLOSTAR	FLEXPEN	FLEXTOUCH	INNOLET	KWIKPEN	SEMGLEE
Dosing	2 unit (2-160)	1 unit (1-80)	1 unit (1-60)	1 unit (1-80) 2 unit (2-160) - Tresiba	1 unit (1-50)	1 unit (1-60) Junior 0.5 unit (0.5-30)	1 unit (1-80)
General features		Apridra and lantus versions of this pen have different colours (blue for Apidra, grey for Lantus) and features to help users distinguish between the types of insulin. Insuman is a white pen. Green label for basal and blue for Comb	Pen is blue with labels of different colours for various types of insulin.		A easy-to-use doser with a large ergonomic dial	Buff colour for human insulin, Blue for analogue. Humalog junior kwikpen can be differentiated by an orange and white label	A light blue pen with white label
Special uses				Reduced manual dexterity (usually due to different joint related conditions)	Poor eyesight. Reduced manual dexterity (usually due to different joint related conditions)		
Insulin compatibility	Sanofi Toujeo	Sanofi Apidra Insuman Insulin Lispro Sanofi Lantus Toujeo	Novo Nordisk Novorapid Novomix Levemir	Novo Nordisk Novorapid Fiasp Tresiba	Novo Nordisk Insulatard Levemir	Lilly Abasaglar Humulin Humalog and Junior Lyumjev and Junior	Mylan Semglee
Device							

14. APPENDIX 4: ADVICE FOR DOSE ADJUSTMENTS REQUIRED WHEN ORAL/NON-INSULIN MEDICATION ARE USED WITH INSULIN : ADULTS

Oral or non-insulin therapy	Can be used with insulin?	Considerations
Metformin	Yes	Metformin is usually continued for people without contraindications or intolerance. The combination does not require dose adjustments.
Sulfonylureas Gliclazide Glimepiride (non-formulary)	Yes (except with rapid/short acting insulins)	If starting once a day basal NPH or insulin analogue continue to complete reviews and adjust doses according to the risks of hypoglycaemia. Stop sulfonylureas when starting a biphasic (premixed) or basal-bolus regimens.
DPP4 inhibitors (DPP4i) Alogliptin Linagliptin Saxagliptin (non-formulary) Sitagliptin Vildagliptin (non-formulary)	Yes	If it is appropriate to add or continue a DPP4 inhibitor with insulin therapy, a lower dose of insulin may be considered to reduce the risk of hypoglycaemia
SGLT2 inhibitors Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	Yes	If it is appropriate to add or continue a SGLT2i with insulin therapy, a lower dose of insulin may be considered to reduce the risk of hypoglycaemia
Pioglitazone	Yes – caution. Discontinue if any deterioration of cardiac status occurs* NICE NG28 Drug Safety - Dec 2014 Insulin and pioglitazone	If appropriate to use pioglitazone with insulin (if metformin is inappropriate because of contraindications or intolerance) the current insulin dose can be continued. If patients report hypoglycaemia, the dose of insulin should be decreased. There have been post- marketing cases of cardiac failure reported when pioglitazone was used in combination with insulin or in patients with a history of cardiac failure. <i>Patients should be observed for signs and symptoms of heart failure, weight gain and oedema when pioglitazone is used in combination with insulin</i>
Glucagon-like peptide-1 receptor agonist (GLP1-RA) Dulaglutide Exenatide (non-formulary) Liraglutide Lixisenatide (non-formulary) Semaglutide	Yes Drug Safety Update - June 2019 GLP1-RA and insulin	Combine GLP1-RA with insulin only if HbA1c > 75 mmol/mol (9%) and BMI > 35 kg/m ² (or lower in minority ethnic groups) and patient is currently using insulin. The regime must be initiated by a diabetes specialist, with ongoing support from a consultant-led multidisciplinary team (primary/secondary/community care). See “Guideline for antidiabetics therapy for type 2 diabetes” (BSSE APC Formulary) If it is appropriate to use a GLP1-RA with insulin therapy, a lower dose of insulin may be considered to reduce the risk of hypoglycaemia however: there have been reports of diabetic ketoacidosis when concomitant insulin was rapidly reduced or discontinued. If the insulin dose is to be reduced, a stepwise approach is recommended.

Oral or non-insulin therapy	Can be used with insulin?	Considerations
Acarbose	No	When administered alone, acarbose does not cause hypoglycaemia. It may, however, act to potentiate the hypoglycaemic effects of insulin, and the dose may need to be modified accordingly. In individual cases hypoglycaemic shock may occur.
Repaglinide	No	Not recommended in combination with insulin

References:

BNF updated 11th March 2020 <https://bnf.nice.org.uk/>

The North West London Health and Care Partnership- North West London Diabetes Guidelines Aug19

<https://www.hounslowccg.nhs.uk/media/116668/diabetes-north-west-london-diabetes-guidelines-.pdf>

Electronic Medicines Compendium: Summary of Product Characteristics <https://www.medicines.org.uk/emc>

15. APPENDIX 5: INSULIN POSTER

- Prescribe all insulins by **brand name and the dose as UNITS**.
- Never withdraw insulin from a cartridge or pen and only use **insulin** syringes to withdraw insulin from vials.
- Only convert between standard and high strength insulin on the advice of a specialist diabetes team.
- Issue a new insulin passport when starting or changing an insulin (remove any incorrect previous passports).



Intermediate – acting NPH/Isophane Insulins

- Insulatard 100units/ml
- Humulin-I 100units/ml
- Insuman Basal 100units/ml

Short-acting human soluble insulin (Usually only prescribed in hospital)

- Actrapid 100units/ml
- Humulin-S 100units/ml
- Insuman Rapid 100units/ml

Pre-mix (biphasic) Insulin Short acting/NPH

- Humulin-M3
- Insuman Comb 25
- Insuman Comb 50

Long-Acting Analogues

- Abasaglar (glargine) 100units/ml
- Levemir (detemir) 100units/ml
- Lantus (glargine) 100units/ml ^{*not for new patients}
- Semglee (glargine) 100units/ml ^{*first line analogue}

Rapid-acting Insulin Analogues

- Apidra (glulisine) 100units/ml
- Humalog (lispro) 100 units/ml
- **Humalog (lispro) 200 units/ml** ^{NF *high strength}
- **Insulin Lispro Sanofi (lispro) 100units/ml**
- Novorapid (aspart) 100units/ml

Pre-mix (biphasic) analogues Rapid acting/intermediate

- Humalog Mix25
- Humalog Mix50
- Novomix 30

Ultra-long Acting Analogues

- Toujeo (glargine) 300 units/ml ^{Ⓢ *high strength}
- Tresiba (degludec) 100 units/ml [Ⓢ]
- **Tresiba (degludec) 200 units/ml** ^{Ⓢ NF *high strength}

Ultra-Rapid Acting Insulin Analogues

- Fiasp (aspart) 100units/ml [Ⓢ]
- **Lyumjev (lispro)100units/ml** ^{NF}
- **Lyumjev (lispro) 200units/ml** ^{NF *high strength}

Combinations- GLP1-RA and insulin

- **Xultophy (liraglutide/ degludec)** ^{NF}
- **Suliqua (lixisenatide/ glargine)** ^{NF}

NF: Non-Formulary products (also shown in red)

Ⓢ: additional prescribing criteria applies [see formulary](#) *high strength: Warning - high strength product

16. APPENDIX 6: SAFER INSULIN PRESCRIBING

Strategies to ensure the safe prescribing of insulin in primary care

BACKGROUND

There are currently over 30 different insulin products available in the UK and this market is growing rapidly. Most insulin preparations come in a strength of 100 units/ml but there are now 200 units/ml and 300 units/ml strengths, as well as insulins combined with other injectable antidiabetic agents, and new biosimilar insulins (a 'generic' form of an existing insulin). Insulin is a high-risk drug; prescribing errors are very common and can lead to patient harm. It is important that healthcare professionals and patients take appropriate action to reduce these risks.

NICE “SAFER INSULIN PRESCRIBING” ADVICE (KTT20) – JANUARY 2017

Key recommendations for clinicians:

- Provide people on insulin therapy with information about awareness and management of [hypoglycaemia](#).
- Inform people who use insulin and drive to notify the Driver and Vehicle Licensing Agency (DVLA). Refer to the DVLA's [Assessing fitness to drive – a guide for healthcare professionals](#) for more information.
- Be aware of 'sick-day' rules and ensure that people who are receiving insulin therapy are given appropriate information about these. [Diabetes UK](#) has a useful patient leaflet on [dealing with illness](#).
- Clinicians should be aware of the differences between high strength, fixed combination, and biosimilar insulins and ensure that people receive appropriate training on their correct use.
- Adults who are using insulin therapy should receive a patient information booklet and an Insulin Passport.

INSULIN PRESCRIBING RISK ASSESSMENT

In the [April 2015 edition of Drug Safety Update](#) the MHRA issued advice on how to minimise the risk of medication errors with the recently launched high-strength, fixed combination and biosimilar insulin products. The Birmingham and Solihull Diabetes Medicines Management Advisory Group (DMMAG) have prepared an [insulin risk assessment tool](#) which contains practical risk reduction strategies for primary and secondary care. This can be downloaded from the Area Prescribing Committee (APC) website. Clinicians should only prescribe high strength, combination or biosimilar insulins in line with the APC formulary. The risk assessment tool should be completed before prescribing.

If you prescribe or administer insulin:

ALWAYS	NEVER	
<ul style="list-style-type: none"> ✓ Ensure that you are familiar with and understand the type of insulin you are prescribing or administering ✓ Prescribe insulin using the brand name ✓ Check the label on the insulin pen to check insulin strength prior to administration ✓ Refer any patients using high strength insulin to the practice diabetes team 	<ul style="list-style-type: none"> ✗ Withdraw insulin from an insulin cartridge or pre-filled pen using a syringe ✗ Abbreviate units to “U” or “IU” when written e.g. on prescriptions or in letters ✗ Switch between standard and high strength insulin without consulting a diabetes specialist 	

All clinical staff prescribing, managing or administering insulin should complete a free e-learning CPD module: [The Six Steps to Insulin Therapy](#) developed by the Primary Care Diabetes Society in association with Training, Research and Education for Nurses in Diabetes (TREND-UK) and endorsed by NICE.

INSULIN PASSPORTS

The [Insulin passport](#) was first introduced by the NPSA in 2011 with the purpose of reducing insulin errors. It is a credit card-sized paper record that patients carry with them containing details of the type of insulin and device that a patient uses, as well as emergency contact information. The NPSA advised that a **healthcare professional should check the passport every time insulin is prescribed, dispensed or administered**. This requirement has been recently reinforced by a range of national advisory and regulatory bodies, including [NICE](#), [TREND](#) and Diabetes UK.

The diabetes services at the local acute Trusts, including UHB and the Solihull Community Diabetes Service, issue new insulin passports whenever insulin is initiated or changed. It is imperative that the information in the passport is kept up to date in primary care. Carrying out of date information is as dangerous as not carrying it at all.

Local clinical consensus suggests that the following represents good practice for primary care:

1. Anyone started on insulin must be offered a hand-held insulin passport and information booklet in line with the requirements of the NPSA. The manufacturers' safety cards are an appropriate format for the insulin passport.

<p>NHS Insulin Passport GP practices can obtain supplies through their Local Area Team stores/ Primary Care Support England.</p> <p>NHS patient information booklet Available for purchase from: 3M Security Print and Systems Limited Gorse Street, Chadderton Oldham OL9 9QH, Tel: 0845 610 1112</p> <p>Leicestershire Diabetes patient information leaflet The Safe Use of Insulin and you</p> <p>Trend UK patient information booklet Keeping Safe with Insulin Therapy</p>	<p>Insulin manufacturers' safety cards: Eli Lilly & Company, Tel: 01256 315000 www.lilly.co.uk</p> <p>Mylan Tel: 01707 853000 www.mylan.co.uk/</p> <p>Novo Nordisk Ltd, Tel: 0845 6005055 01293 613555 www.novonordisk.co.uk</p> <p>Sanofi-Aventis, Tel: 08450230441 www.sanofi.co.uk</p> <p>Wockhardt UK Ltd, Tel: 01978 661261 www.wockhardt.co.uk</p>
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2. A record should be made in the patients' notes (e.g. within the diabetes template) detailing whether a passport has been issued or declined. If declined, this decision should be regularly reviewed with the patient.
3. The insulin passport must be visually checked by a healthcare professional **at least** once a year at the annual diabetes review to confirm it is up to date, and again every time the insulin type or device is changed. It should also be checked whenever the patient has a diabetes review whether face-to-face or remotely via a video). The healthcare professional should document in the notes that the passport has been checked and confirm it is up to date.
4. Correct use of the insulin passports should be audited regularly by practices.

17. APPENDIX 7: INSULIN EDUCATION CHECKLIST : ADULTS

Patient Name:

AREA OF DISCUSSION	DATE	INITIALS	COMMENTS
Diabetes education			
Discuss reason for insulin therapy			
Consequences of poor control			
Discuss HbA1c - individualised target			
Diet and lifestyle counselling			
Structured education			
Insulin regimens			
Which regimen-discuss factors that influence choice of insulin regimen			
Benefits and limitations of each regimen.			
Choice of delivery device- ensure ability to use (check manual dexterity and eyesight etc.)			
Explanation of action of insulin and timing of injections (especially in relation to meals)			
Oral or non-insulin agents to continue? (Y/N)			
Advice regarding dose changes to oral or non-insulin agents when starting with insulin.			
Give/check Insulin passport or safety card and insulin safety leaflet			
Hypoglycaemia			
What is hypoglycaemia - explained			
Signs, symptoms and treatment of mild, moderate and severe hypoglycaemia (advice regarding carrying treatment for hypoglycaemia)			
Causes of hypoglycaemia			
Driving and hypoglycaemia			
Patient information on hypoglycaemia			
Monitoring			
Has a current formulary meter			
Agreement of individual blood glucose targets			
Titration of insulin dose to achieve blood glucose targets			
Blood Glucose monitoring (interpreting and acting on results)			

AREA OF DISCUSSION	DATE	INITIALS	COMMENTS
Administration			
Demonstration of injection device			
Injection technique: (Site selection, site rotation, changing needles, giving injection, hyperlipotrophy)			
Storage and disposal			
Storage of insulin and how to mix If a suspension is prescribed			
Safe disposal of sharps (where to obtain sharps box)			
Illness / Sick day rules			
Effect of illness on blood sugar			
Explanation of sick day rules and management (leaflet)			
Patients with Type 1 Diabetes - Other counselling points			
Insulin Pump - has basal insulin in case pump fails			
Understanding of flash glucose monitoring			
Has ketone testing strips and meter			
Interpretation of ketone testing results			
Miscellaneous			
Informing DVLA/ insurance company			
Travel advice			
Missed meals			
Cultural considerations (e.g. Ramadan)			
Contraception			
Alcohol			
Annual reviews			
Exercise - advice regarding			
Employment issues			
Mental health			
Impact of different foods (carbohydrate awareness)			
Reliable sources of information			
Relevant contact details			
Out of hours support			

18. REFERENCES:

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- ² NHS Digital Quality Outcomes Framework data 2018-19 <https://digital.nhs.uk/data-and-information/publications/statistical/quality-and-outcomes-framework-achievement-prevalence-and-exceptions-data/2018-19-pas>
- ³ RCPCH -- Royal college of paediatrics and child health 2018-2019: Network Data (West Midlands): Diabetes type breakdown. <https://npda-results.rcpch.ac.uk/unit-data.aspx> <accessed 6th July 2020>
- ⁴ NHS Business Services Authority (NHS BSA)- ePACT2 data Jan 2019- Dec 2019
- ⁵ Gov.uk: Diabetes Outcomes Versus expenditure (DOVE) in local populations.: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/783348/DOVE_tool_report.pdf <accessed 17.3.2020>
- ⁶ Trend UK : An integrated Career and competency framework for adult diabetes nursing. 5th edition 2019: https://diabetestimes.co.uk/wp-content/uploads/2019/03/Framework_5th_EDN_TREND.pdf <accessed 10th July 2020>
- ⁷ Birmingham, Sandwell, Solihull and environs (BSSE) Area Prescribing Committee (APC) formulary.<<http://www.birminghamandsurroundsformulary.nhs.uk/><accessed 6th July 2020>
- ⁸ NICE Guideline NG28: Type 2 diabetes in adults (2015, updated 2019)
- ⁹ APC Formulary for Birmingham, Solihull, Sandwell and environs [Type 2 Diabetes Mellitus - Guidelines for the choice of oral and non-insulin antihyperglycaemic agents in adults](#) V1.3 (Nov 2019)
- ¹⁰ NICE Guideline NG17 – Type 1 Diabetes in Adults: Diagnosis and management (2015 updated Jul 16).
- ¹¹ NHS conditions: Low blood sugar (hypoglycaemia) 17th August 2017 <https://www.nhs.uk/conditions/low-blood-sugar-hypoglycaemia/> < 6th July 2020>
- ¹² Diabetes UK: Having a Hypo :<<https://www.diabetes.org.uk/guide-to-diabetes/complications/hypos/having-a-hypo>> accessed March 2020>
- ¹³ Trend UK; For Healthcare Professionals; Hypoglycaemia in Adults in the Community and Recognition, management and Prevention. <https://trend-uk.org/wp-content/uploads/2018/09/HCP_Hypo_TREND_FINAL.pdf> accessed March 2020
- ¹⁴ National Institute for Health and Care Excellence (NICE) Safer insulin prescribing KTT20 1st September 2019 <https://www.nice.org.uk/advice/ktt20> <accessed 21st May 2020>
- ¹⁵ Trend UK : Diabetes: Why do I sometimes feels shaky. Dizzy and sweaty? Hypoglycaemia explained. May 2018 https://trend-uk.org/wp-content/uploads/2019/07/A5_Hypo_TREND.pdf <accessed 7th July 2020>.
- ¹⁶ DMMAG on behalf of the APC : Amna Eposito and Sharon Coane : Treatment and Management of Hypoglycaemia in Adults with Diabetes Mellitus. November 2020
- ¹⁷ NICE Quality standard QS6 : Diabetes in Adults. First published 30th March 2011: updated 18th August 2016. <https://www.nice.org.uk/guidance/qs6/resources/diabetes-in-adults-pdf-58299425989> <accessed 10th July 2020>
- ¹⁸ Choudhary et al, Evidence-informed clinical practice recommendations for treatment of type 1 diabetes complicated by problematic hypoglycaemia. Diabetes Care, 2015 Jun; 38(6): 1016-1029. <https://care.diabetesjournals.org/content/38/6/1016> <accessed 20.8.2020>
- ¹⁹ DMMAG on behalf of the APC (Gurpreet Kaur, Sharon Coane, Amelia Cook, Mukesh Sinha, Theresa Smyth): Primary Care sick day information for the management of adult patients with diabetes. Dec 2020

- ²⁰ NICE Quality Standard 125 (2016): Diabetes and young people.
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