Chapter 6. Endocrine

Contents

Key

R	**Red drug** see GMMMG RAG list *Click on the symbols to access this list*
A	**Amber drug** see GMMMG RAG list *Click on the symbols to access this list*
Gn	**Green drug** see GMMMG RAG list *Click on the symbols to access this list*
U	**If a medicine is unlicensed this should be highlighted in the template as follows** **Drug name** U
	Not Recommended
OTC	**Over the Counter** In line with NHS England guidance, GM do not routinely support prescribing for conditions which are self-limiting or amenable to self-care. For further details see GM commissioning statement.
Order of Drug Choice	Where there is no preferred 1st line agent provided, the drug choice appears in alphabetical order.

BNF chapter	**6**	**Endocrine**
Section	**6.1**	**Drugs used in Diabetes**
Subsection	**6.1.1**	**Insulin**
Subsection	**6.1.1.1**	**Short-acting insulin**

Soluble insulin

Additional notes

- Patients starting on insulin should receive an insulin passport; See the adult patient's passport to safer insulin use (NPSA). A passport should be provided by the prescriber initiating treatment
- The NPSA issued an alert in June 2010 for the safer administration of insulin.
- All patients starting on insulin must inform the DVLA and also their motor vehicle insurance company.
- Insulins are available in a variety of vial, cartridge and pre-loaded pen presentations. Not all cartridges fit all pens.
- NICE NG17: Type 1 diabetes in adults: diagnosis and management
- NICE NG28: Type 2 diabetes in adults: management
- NICE NG19: Diabetic foot problems: prevention and management
- MHRA DSU: Direct-acting antivirals for chronic hepatitis C: risk of hypoglycaemia in patients with diabetes (December 2018)

First choice	**Actrapid®** (Insulin human, Novo Nordisk) • 10ml vial	
Alternatives	**Humulin S®** (Insulin human, Eli Lilly) • 3ml cartridge (via Autopen® Classic or HumaPen®) • 10ml vial	

Rapid acting insulin analogues

First choice	**Trurapi®▼** (Insulin aspart, Sanofi) • 3ml cartridge (via JuniorSTAR®, Tactipen®, AllStar® and AllStar PRO® pens) • 3ml prefilled disposable pen • 10ml vial	Gn
Alternatives	**Apidra®** (Insulin glulisine, Sanofi) • 3ml cartridge (via ClikSTAR® or Autopen® 24) • 3ml prefilled disposable pen • 10ml vial **Admelog®▼** (Insulin lispro, Sanofi) • 3ml cartridge (via JuniorSTAR® , Tactipen®, AllStar® and AllStar PRO® pens) • 3ml prefilled disposable pen • 10ml vial **NovoRapid®** (Insulin aspart, Novo Nordisk) • 3ml cartridge (via FlexPen® or FlexTouch® devices) • 3ml prefilled disposable pen, • 10ml vial • 1.6ml PumpCart (for infusion pumps)	

Grey drugs Items which are listed as Grey are deemed not suitable for routine prescribing but may be suitable for a defined patient population	**Fiasp®** (Insulin aspart, Novo Nordisk) • 3ml cartridge (via FlexTouch® devices) • 3ml prefilled disposable pen • 10ml vial Only for use in patients who: • Are pregnant or planning a pregnancy • Have post-prandial glucose >10 mmol at 2 hours	Gn following specialist advice Criterion 3 (see RAG list)
	Lyumjev®▼ (Insulin lispro, Eli Lilly) • 100 units/mL prefilled disposable pen, cartridge or vial • 200 units/mL prefilled disposable pen Only for use in patients with type 1 and type 2 diabetes, including patients using insulin pumps, who have significant post-prandial hyperglycaemia (>10 mmol/L at 2 hours) despite optimised use of conventional rapid acting insulin analogues (Humalog®, Novorapid® or Apridra®). Available in strengths of 100 units/mL and 200 units/mL. **Care should be taken to ensure the correct dose is selected for prescribing, dispensing and administration.**	Gn following specialist advice Criterion 2 (see RAG list)
Subsection	**6.1.1.2 Intermediate and long acting insulin**	

Additional notes

- Any decision to commence an insulin analogue needs to be balanced carefully against the lack of long term safety data and increased prescribing costs.
- The NICE guideline on type 2 diabetes; NICE NG28: Type 2 diabetes in adults: management recommends that, when insulin therapy is necessary, **human NPH (isophane) insulin** (e.g. Insuman® Basal, Insulatard®, or Humulin I®) **is the preferred option**. Long-acting insulin analogues have a role in some patients, and can be considered for those who fall into specific categories e.g. those who require assistance from a carer or healthcare professional to administer their insulin injections, or those with problematic hypoglycaemia**. However, for most people with type 2 diabetes, long-acting insulin analogues offer no significant advantage over human NPH insulin and are much more expensive.**
- Current supply disruption of GLP-1 receptor agonists means some patients may need to switch to insulin. Information on which insulins are available and can support uplift is available on the Specialist Pharmacy Service website.
- GM guidance on managing the GLP-1 shortages is also available.

Intermediate Acting Insulin (Isophane)

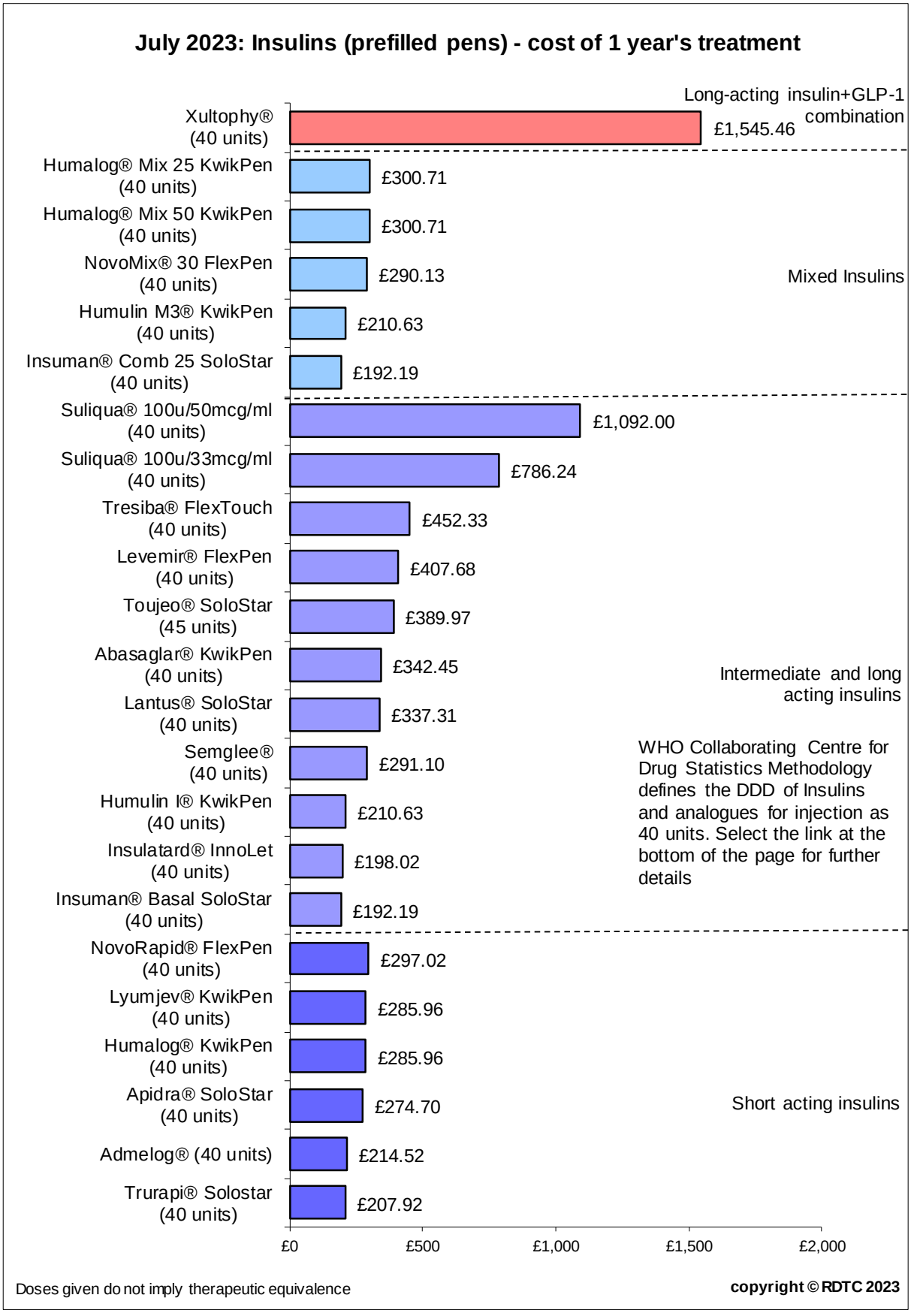
First choice	**Humulin I®** (Lilly) • 3ml cartridge (via *HumaPen® Luxura* device) • 3ml prefilled disposable pen – *KwikPen®* • 10ml vial	NICE NG28: Type 2 diabetes in adults: management
Alternatives	**Insulatard®** (Novo Nordisk) • 3ml cartridge (via *NovoPen® 5* device) • 3ml prefilled disposable pen - *InnoLet®* • 10ml vial	

Long Acting Insulin Analogues

Current supply disruption of GLP-1 receptor agonists means some patients may need to switch to insulin. Information on which insulins are available and can support uplift is available on the Specialist Pharmacy Service website.

GM guidance on managing the GLP-1 shortages is also available.

First choice	**Semglee®▼** (Insulin glargine, Mylan) • 3ml prefilled disposable pen **Abasaglar®** (Insulin glargine, Eli Lilly) • 3ml cartridge (via HumaPen Savvio®) • 3ml prefilled disposable pen (via KwikPen®)	NICE NG28: Type 2 diabetes in adults: management
Alternatives	**Levemir®** (Insulin detemir, Novo Nordisk) • 3ml cartridges (via NovoPen ® 4 device) • 3ml prefilled disposable pen - FlexPen® or Innolet® (only for patients with manual dexterity problems)	NICE NG17: Type 1 diabetes in adults: diagnosis and management
	Toujeo® (insulin glargine 300 units/mL, Sanofi)* • 1.5mL prefilled disposable pen (SoloStar®) • 3ml prefilled disposable pen (DoubleStar®)** Toujeo is a high-strength insulin* preparation. *** Toujeo preparations must always be prescribed by brand and device to minimise the risks associated with the prescribing, dispensing, and administration of high strength insulins.** **** Toujeo DoubleStar administers two units of insulin per click:** there is a risk patients could receive double the dose of insulin if the wrong Toujeo product is dispensed or the Toujeo DoubleStar is used incorrectly by assuming one click is equivalent to one unit of insulin.	Gn Formulary & RAG status have been temporarily amended to support management of patients impacted by the GLP-1 shortages. By default when the shortages have resolved the previous position of green (specialist advice) and grey will be reinstated, unless a successful application is received to make the change permanent.
Grey drugs Items which are listed as Grey are deemed not suitable for routine prescribing but may be suitable for a defined patient population	**Tresiba®** (insulin degludec, Novo Nordisk) • 100 units/mL prefilled disposable pen or cartridge • 200 units/mL prefilled disposable pen For treatment of type 1 or type 2 diabetes, only for use: i) If there is particular concern about nocturnal hypoglycaemia despite optimisation of medication regimen ii) For patients with an unpredictable lifestyle (e.g. shift workers) iii) For patients who need help from a carer or healthcare professional to administer injections [NEW from NICE NG17] Available in strengths of 100 units/mL and 200 units/mL. **Care should be taken to ensure the correct dose is selected for prescribing, dispensing and administration.**	Gn following specialist initiation Criterion 3 (see RAG list)



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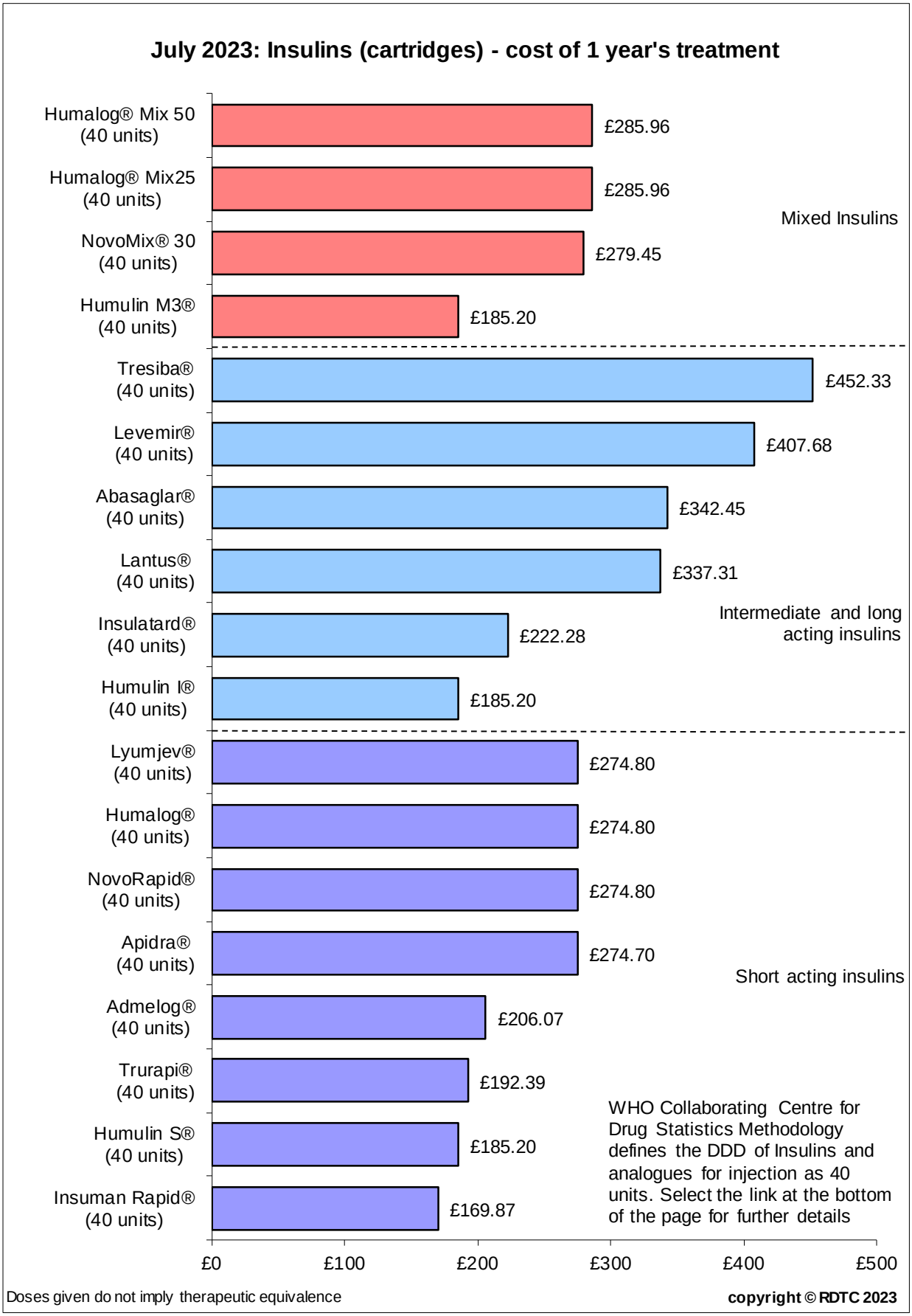

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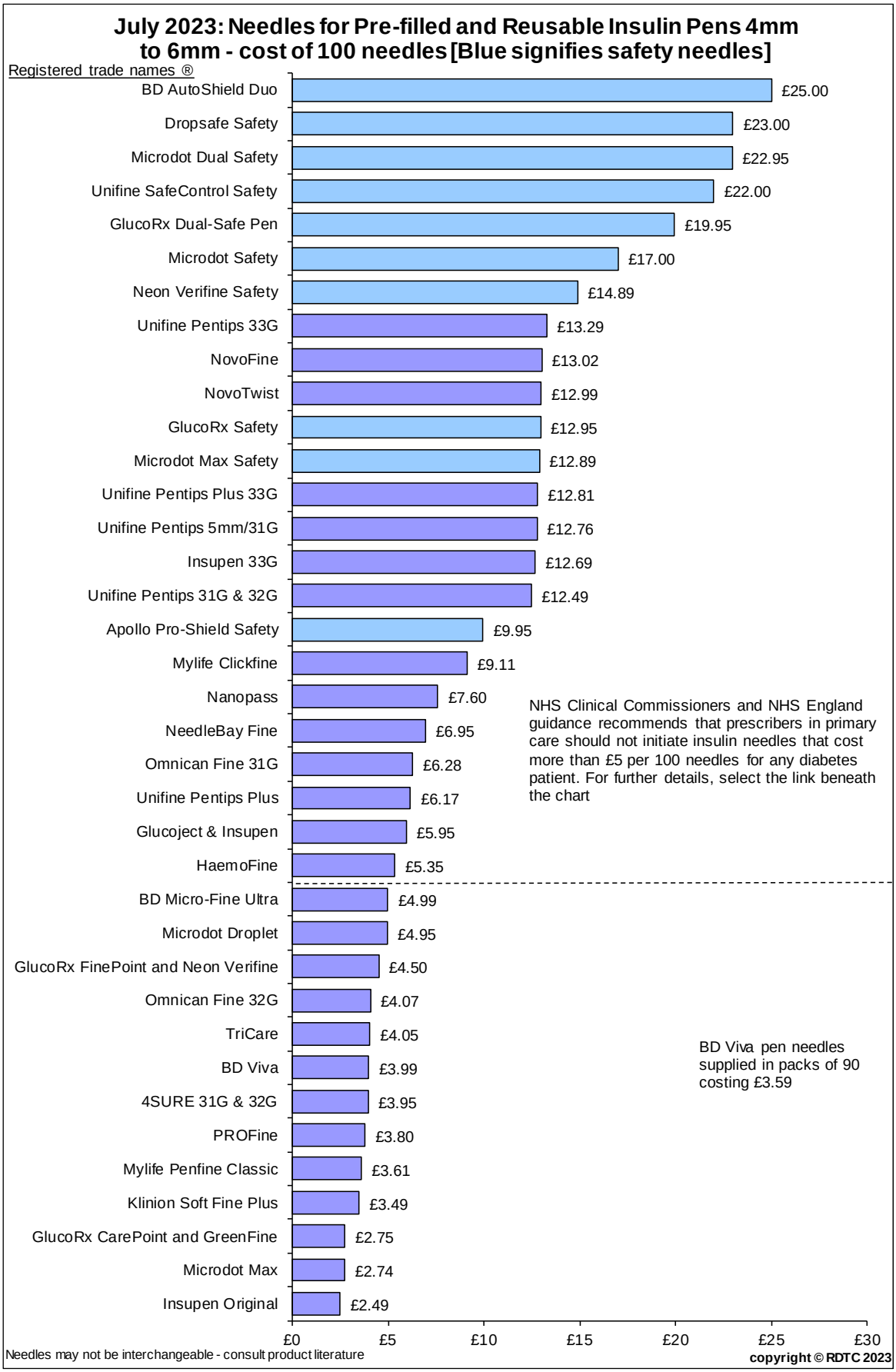
Biphasic Insulin		
Current supply disruption of GLP-1 receptor agonists means some patients may need to switch to insulin. Information on which insulins are available and can support uplift is available on the Specialist Pharmacy Service website. GM guidance on managing the GLP-1 shortages is also available.		
First choice	**Soluble/isophane Mixtures** **Humulin M3®** (Lilly) • 3ml cartridge (via *HumaPen® Luxura* device) • 3ml prefilled disposable - *KwikPen®* • 10ml vial	
Alternatives	**Intermediate Acting Analogue Mixtures** **NovoMix® 30** (Novo Nordisk) • 3ml cartridge (via *NovoPen® 4* device) • 3ml prefilled disposable pen - *FlexPen®* **Humalog® Mix25** (Lilly) • 3ml cartridge (via *HumaPen® Luxura* device) • 3ml prefilled disposable pen - *KwikPen®* • 10ml vial **Humalog® Mix50** (Lilly) • 3ml cartridge (via *HumaPen® Luxura* device) • 3ml disposable prefilled pen - *KwikPen®*	
Additional notes • Biphasic analogue insulin (Novomix, Humalog Mix) do not offer any advantage over conventional human biphasic insulin in terms of efficacy, long term outcomes or safety but they cost considerably more.		
Subsection	**6.1.1.2 Animal insulins**	
Bovine and Porcine Insulin		
Additional notes • Some long-standing type 1 diabetic patients may be on animal insulin. These are made by the company Wockhardt and come in 10ml vials or 3ml Cartridges that fit into the *Autopen Classic®* which is available on prescription • Patients need not be transferred to human insulin unless clinical need dictates • Human insulin and analogues should be used in preference to animal insulin		

Subsection	6.1.1.3 Hypodermic equipment	
Lancets, needles, syringes and accessories are listed under Hypodermic Equipment in Part 1XA of the Drug Tariff.		
Lancets		
Additional notes • There are many different lancets available. Prescribing of lancets should be based on the compatibility of the device the patient has. • Finger-pricking devices are not prescribable on the NHS		
Needles		
First choice	4mm 31G needles	
Additional notes • First choice should usually be a 4mm needle to reduce injection pain		
Do Not Prescribe	**Pen needles 8 mm, 10 mm or 12 mm in length** **Pen needles costing in excess of £5 per 100** See cost comparison chart below	Criterion 1 (see RAG list) Criterion 2 (see RAG list) NHS England Items which should not be routinely prescribed in primary care: Guidance for CCGs
Insulin pumps		
Insulin pumps and pump consumables specifically used for the deployment of the device are commissioned via Monitored Approval within CCGs, in line with NICE TA151		



Items which should not routinely be prescribed in primary care: policy guidance

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Needle clipping device		
First choice	**BD Safe-Clip®**	Should be given to all patients who do not have a sharps bin
Alternatives	**Sharpsguard®** 1 litre & 5 litre sharps bin **Sharpsafe®** 1 litre sharps bin	5 litre sharps bins are suitable for regular users of injectables, e.g. insulin & insulin pumps.
Subsection	**6.1.2 Anti Diabetic drugs**	
Subsection	**6.1.2.1 Sulphonylureas**	
First choice	**Gliclazide** Immediate release tablets 40mg, 80mg **Glimepiride** Tablets 1mg, 2mg, 4mg	
Do Not Prescribe	**Chlorpropamide** Tablets **Gliclazide MR** Modified release tablets (e.g. Diamicron® MR)	Criterion 1 (see RAG list) Criterion 2 (see RAG list)
Subsection	**6.1.2.2. Biguanides**	
First choice	**Metformin** Tablets 500mg, 850mg	MHRA DSU: Metformin and reduced vitamin B12 levels: new advice for monitoring patients at risk, June 2022
Alternatives	**Metformin modified release** Tablets 500mg, 750mg, 1g	
Do Not Prescribe	**Metformin 1g immediate-release tablets**	Criterion 2 (see RAG list)

Additional notes

- Metformin modified release should only be used where the standard metformin tablets have been tried and are not tolerated due to GI problems. Any new prescription of the SR preparation should be reviewed soon after initiation (recommend checking HbA_{1c} after 3 months and assess patient for adherence to treatment / adverse effects), discontinue if not tolerated or ineffective.
- Metformin can be used in pregnancy under specialist supervision see NICE NG3: Diabetes in pregnancy and MHRA DSU: Metformin in pregnancy: study shows no safety concerns, March 2022
- Liquid formulations of metformin are available, however prescribers should note these are significantly more expensive, and should assess the requirement for a liquid preparation on an individual patient basis.
- In line with NICE PH38: Type 2 diabetes: prevention in people at high risk, metformin can be used to reduce the risk or delay the onset of T2DM in adult, overweight patients with impaired glucose tolerance and/or increased HbA1c who are:
    - at high risk of developing overt T2DM **and**
    - still progressing towards T2DM despite implementation of intensive lifestyle change for 3-6 months

Subsection	**6.1.2.3 Other antidiabetic drugs**	
Thiazolidinediones (Glitazones)		
First choice	**Pioglitazone** Tablets 15mg, 30mg, 45mg	NICE NG28: Type 2 diabetes in adults: management NICE NG49: Non-alcoholic fatty liver disease (NAFLD): assessment and management MHRA DSU: Pioglitazone bladder cancer, Aug 2011 MHRA DSU: Pioglitazone cardiovascular safety, Jan 2011
Dipeptidylpeptidase-4 inhibitors (gliptins)		
Notes MHRA DSU: Gliptins: Risk of pancreatitis, Sept 2012 Acute pancreatitis associated with gliptins has been reported. Inform patients of the symptoms of acute pancreatitis. If pancreatitis is suspected, the DPP-4 inhibitor should be discontinued. • Monotherapy: saxagliptin, sitagliptin and linagliptin – only if metformin contra-indicated or not tolerated. Alogliptin is not licensed for monotherapy. • Renal impairment: ○ Alogliptin: dose reduced to half of the recommended dose (12.5mg once daily) in moderate renal impairment. In patients with severe renal impairment one-quarter of the recommended dose (6.25mg once daily) should be administered. ○ Linagliptin: no dose adjustment required. ○ Saxagliptin: Dose reduced to 2.5mg for use in moderate to severe renal impairment; caution in patients with severe renal impairment due to very limited experience of use in this group of patients. ○ Sitagliptin: dose is 50mg per day for use in moderate renal impairment and 25mg per day for use in severe renal impairment. • There are no head-to-head trial data to support the use of any gliptin over another in relation to patients who may fast during Ramadan.		
First choice	**Sitagliptin** Tablets 25mg, 50mg, 100mg	Gn **NICE NG28** **MHRA DSU: DPP4 inhibitors: risk of acute pancreatitis (Sept 2012)**
Alternatives	**Alogliptin** Tablets 6.25mg, 12.5mg, 25mg tablets **Linagliptin** Tablets 5mg **Saxagliptin** Tablets 5mg	Linagliptin is an alternative for use in patients with moderate or severe renal impairment (CrCl <50ml/min, eGFR <59ml/min)

Gliptin plus metformin		
Only to be prescribed where there is a genuine issue with adherence to therapy		
First choice	**Sitagliptin plus metformin** Tablets 50mg plus metformin 1g	MHRA DSU: Metformin and reduced vitamin B12 levels: new advice for monitoring patients at risk, June 2022
Alternatives	**Alogliptin plus metformin** Tablets 12.5mg plus metformin 1000mg **Saxagliptin plus metformin** Tablets 2.5mg plus metformin 850mg / 1g **Linagliptin plus metformin** Tablets 2.5mg plus metformin 850mg/1g	MHRA DSU: Metformin and reduced vitamin B12 levels: new advice for monitoring patients at risk, June 2022 Linagliptin is an alternative for patients with renal impairment (CrCl <50ml/min, eGFR <59ml/min)

GLP-1 receptor mimetics (glucagon-like peptide-1)

Notes

- GLP-1 mimetics should only be considered as third-line therapy in accordance with NICE NG28
- GLP-1 mimetics should only be continued if reduction of at least 1% point in HbA_{1c} AND a weight loss of at least 3% of initial body weight at 6 months
- For individuals with type 2 diabetes and established cardiovascular disease, GLP-1 receptor agonist therapies with proven cardiovascular benefit (currently dulaglutide, liraglutide, semaglutide) should be considered
- There are ongoing shortages of GLP-1 receptor mimetics. See Specialist Pharmacy Service website for information on which products are available.
- If considering switching impacted patients to insulin, see formulary section 6.1.1.2 for advice.

DAILY GLP-1 receptor mimetics		
First choice	**Liraglutide (Victoza®)** Disposable pen 0.6mg, 1.2mg	Gn NICE NG28: Type 2 diabetes in adults: management NICE NG18: Diabetes (type 1 and type 2) in children and young people: diagnosis and management
Alternatives	**Semaglutide (Rybelsus®)** Oral tablets 3mg, 7mg, 14mg Where a patient expresses a preference for the oral option, prescribers should discuss that there are injectable options in the same class with proven cardiovascular benefit. An agent with proven cardiovascular benefit would be preferable to oral semaglutide in patients with established cardiovascular disease or high cardiovascular risk. This includes all patients with diabetes of 10 years duration plus one other risk factor (e.g. age over 50, hypertension, dyslipidaemia, smoking, or obesity).	

Notes

Lixisenatide (Lyxumia®) 10 microgram and lixisenatide treatment initiation pack (10 microgram and 20 microgram) have been discontinued. This means no new patients can be initiated on lixisenatide. Patients who are currently clinically stable on lixisenatide may continue and should not be changed without clinical reason.

WEEKLY GLP-1 receptor mimetics		
First choice	**Semaglutide (Ozempic®▼)** Solution for injection. Disposable pen 0.25mg, 0.5mg and 1.0mg **NB: semaglutide pre-filled pens contain FOUR doses per pen**	Gn NICE NG28: Type 2 diabetes in adults: management NICE NG18: Diabetes (type 1 and type 2) in children and young people: diagnosis and management
Alternatives	**Dulaglutide (Trulicity®▼)** Disposable pen 0.75mg, 1.5mg, 3 mg, 4.5 mg **Exenatide (Bydureon®)** Disposable pen 2mg **NB: dulaglutide and exenatide pre-filled pens contain ONE dose per pen**	

Notes

NB: the GIP/GLP-1 agonist tirzepatide (Mounjaro®▼) is not approved by GMMMG. NICE guidance is expected in April 2023. Tirzepatide should be considered non-formulary/not approved until guidance is available.

Sodium glucose cotransporter-2 (SGLT-2) inhibitors

Notes

- In individuals with type 2 diabetes and established cardiovascular disease, SGLT2 inhibitors with proven cardiovascular benefit should be considered. See chapter 2 for use of SGLT2 inhibitors in heart failure.
- For individuals with type 2 diabetes and diabetic kidney disease, SGLT2 inhibitors with proven renal outcome benefit should be considered. See SPC for details of dosing and kidney function.

NICE NG28: Type 2 diabetes in adults: management

NICE NG203: Chronic kidney disease: assessment and management

NICE TA390: Canagliflozin, dapagliflozin and empagliflozin as monotherapies for treating type 2 diabetes

MHRA DSU: SGLT2 inhibitors: updated advice on the risk of diabetic ketoacidosis, April 2016

MHRA DSU: Updated advice on increased risk of lower limb amputation (mainly toes), March 2017

MHRA DSU: SGLT2 inhibitors: reports of Fournier's gangrene (necrotising fasciitis of the genitalia or perineum), February 2019

MHRA DSU: SGLT2 inhibitors: monitor ketones in blood during treatment interruption for surgical procedures or acute serious medical illness, March 2020

First choices	**Canagliflozin (Invokana®)** Tablets 100mg, 300mg	NICE TA315: Canagliflozin in combination therapy for treating type 2 diabetes.
	Dapagliflozin (Forxiga®) Tablets 5mg, 10mg	NICE TA288: Dapagliflozin in combination therapy for treating type 2 diabetes NICE TA418: Dapagliflozin in triple therapy for treating type 2 diabetes MHRA DSU: Dapagliflozin (Forxiga): no longer authorised for treatment of type 1 diabetes mellitus, Dec 2021 Dapagliflozin 5mg is no longer authorised for the treatment of patients with T1DM and should no longer be used in this population.

	Empagliflozin (Jardiance®▼) Tablets 10mg, 25mg	NICE TA336: Empagliflozin in combination therapy for treating type 2 diabetes NICE NG18: Diabetes (type 1 and type 2) in children and young people: diagnosis and management
Alternative	**Ertugliflozin (Steglatro®▼)** Tablets 5mg, 15mg	NICE TA572: Ertugliflozin as monotherapy or with metformin for treating type 2 diabetes NICE TA583: Ertugliflozin with metformin and a dipeptidyl peptidase-4 inhibitor for treating type 2 diabetes

Other antidiabetic agents (no class)		
First choice	**Repaglinide** Tablets 500micrograms, 1mg, 2mg	
Alternatives	**Nateglinide** Tablets 60mg, 120mg, 180mg	
Additional notes • Nateglinide only licensed for use in combination with metformin. Cautioned in moderate hepatic impairment. • Repaglinide can be given as monotherapy or in combination with metformin. It should be avoided in patients >75 years old and in patients with severe liver disease.		

Subsection	**6.1.3 Diabetic ketoacidosis**
Refer to national diabetic ketoacidosis guidance for management of this condition: The Management of Diabetic acidosis (full report)	

Subsection	**6.1.4 Treatment of hypoglycaemia**	
First choice	Patients will normally be able to recognise and self-treat hypoglycaemia themselves with fast acting carbohydrate – e.g. 2 teaspoons of sugar, small glass of fruit juice, Coca-Cola® or Lucozade® Energy Original or 4 glucose tablets. This would be followed by the next meal if due or a snack e.g. sandwich, fruit or biscuits.	
Alternatives	**GlucoGel®** Oral gel tube. Pack Size: box of 3 tubes (containing 10g of glucose in each 23g tube) **GlucaGen® Hypokit** Injection: 1mg NB: Family members can be taught to inject GlucaGen® in emergencies where the patient becomes unconscious during a hypoglycaemic event.	Only to be used in specific circumstances as most patients will be able to take oral sugar If the patient is unconscious or experiencing frequent hypoglycaemic episodes (this may be an option first-line)

Subsection	6.1.5 Treatment of diabetic neuropathy

Diabetic neuropathy

See chapter 4 section 4.7.3 (Neuropathic pain), and GMMMG Guideline for Primary Care: Neuropathic Pain in Adults.

Subsection	6.1.6 Diagnostic and monitoring devices for diabetes mellitus

Blood monitoring

Each locality will have their own agreed choice of blood glucose testing meters and corresponding test strips, due to local procurement arrangements (under review).

DVLA current guidance states there must be appropriate blood glucose monitoring for patients receiving insulin therapy. This has been defined by the Secretary of State's Honorary Medical Advisory Panel on Driving and Diabetes as no more than 2 hours before the start of the first journey and every 2 hours while driving. DVLA also provides advice for testing for blood glucose for patients receiving medication with a higher risk of causing hypoglycaemia.

Continuous glucose monitoring (CGM)

GMMMG recommendation on FreeStyle Libre Flash Glucose Monitoring System (under review)

First choices	**Dexcom ONE** Sensors and transmitters **Freestyle Libre 2** Sensors	
Urinalysis — Glucose		
	Diastix®	
Urinalysis — Ketones		
	Ketostix® N.B. Tests for ketones by patients are rarely required unless they become unwell.	
Alternatives	All other test strips should only be used in clinics for proteinuria / microalbuminuria and renal screening.	

Chapter	**6** **Endocrine**	
Section	**6.2** **Thyroid and antithyroid drugs**	
Subsection	**6.2.1** **Thyroid hormones**	
NICE NG145: Thyroid disease: assessment and management NICE NG230: Thyroid cancer: assessment and management		
First choice	**Levothyroxine** Tablets 25 microgram, 50 microgram, 100 microgram	MHRA DSU: Levothyroxine: new prescribing advice for patients who experience symptoms on switching between different levothyroxine products, May 2021
Grey drugs Items which are listed as Grey are deemed not suitable for routine prescribing but may be suitable for a defined patient population	**Liothyronine** Where levothyroxine has failed, endocrinologists treating patients under the NHS may recommend liothyronine in exceptional circumstances for individual patients after a carefully audited trial of at least 3 months duration, in line with BTA guidance. Such patients should be reviewed at least annually by their NHS Endocrinologist.	Gn following specialist initiation Criterion 2 (see RAG list)
	Liothyronine Hypothyroid crisis and short-term use post-thyroid surgery only	R for new patients only Criterion 2 (see RAG list)
Do Not Prescribe	**Liothyronine combination products and unlicensed thyroid extract products** Including Armour Thyroid and ERFA Thyroid	Criterion 2 (see RAG list)
	Liothyronine For resistant depression. There is very limited evidence for thyroid hormones in depression. Where thyroid hormones are necessary due to hypothyroidism, treatment should be initiated with standard levothyroxine. All psychiatric patients currently receiving liothyronine should be reviewed by a consultant NHS psychiatrist	Criterion 2 (see RAG list) See: NHSE guidance on items not for routine prescribing in primary care, and RMOC Guidance on Liothyronine
Additional notes • Micrograms should not be abbreviated		
Subsection	**6.2.2** **Antithyroid hormones**	
First choice	**Carbimazole** Tablets 5mg, 20mg	
Alternatives	**Propylthiouracil** Tablets 50mg	Gn following specialist initiation Prescribing to remain with specialist care until stable. CKS: propylthiouracil cautions and contraindications. Adverse effects include hepatitis, hepatic failure.

Chapter	**6 Endocrine**	
Section	**6.3 Corticosteroids**	
Subsection	**6.3.1 Replacement therapy**	
First choice	**Fludrocortisone acetate** Tablets (scored) 100 micrograms	When prescribing fludrocortisone do not abbreviate micrograms.
Subsection	**6.3.2 Glucocorticoid therapy**	
First choice	**Prednisolone (NOT enteric coated)** Tablets 1mg, 5mg, 25mg	
	Hydrocortisone Tablets 10mg, 20mg Injection (as sodium phosphate) 100mg in 1ml Injection (as sodium succinate) 100mg	MHRA DSU: Hydrocortisone muco-adhesive buccal tablets: should not be used off-label for adrenal insufficiency in children due to serious risks (December 2018)
	Dexamethasone Tablets 500 microgram, 2mg Injection (as sodium phosphate) 4mg/ml Oral solution SF 2mg/5ml	
Alternatives	**Betamethasone** Injection 4mg in 1ml Soluble tablets 500 microgram	
	Methylprednisolone Injection (as sodium succinate) 40mg, 125mg, 500mg, 1g, 2g (Solu-Medrone) Depot Injection (as acetate – aqueous suspension) 40mg/ml (Depo-Medrone) Tablets 100mg	MHRA DSU: Methylprednisolone injectable medicine containing lactose (Solu-Medrone 40 mg): do not use in patients with cows' milk allergy, Oct 2017
	Hydrocortisone Modified release capsules: 5mg, 10mg (Efmody®) For use only for patients who are not well controlled on standard release hydrocortisone when there is: • Development of testicular cell rests • Excess glucocorticoid burden • Evidence of poor growth and/or poor pubertal development • Excess virilisation • Poor compliance	Gn following specialist initiation
Additional notes • Steroid cards should be issued to all patients who are prescribed steroids for longer than 3 weeks.		

Do Not Prescribe	**Prednisolone enteric 1mg coated tablets**	Criterion 2 (see RAG list)
	Prednisone MR tablets (e.g. Lodotra®)	Criterion 2 (see RAG list)
	Hydrocortisone MR tablets (Plenadren®)	Criterion 2 (see RAG list)

Chapter	**6**	**Endocrine**
Section	**6.4**	**Sex hormones**
Subsection	**6.4.1**	**Female sex hormones and their modulators**
Subsection	**6.4.1.1**	**Oestrogens and HRT**

Additional notes

- NICE NG23: Menopause: diagnosis and management (updated Dec 2019)
- GM HRT Guidance for Menopause Management

The MHRA provides information on risks and benefits of HRT:

- Hormone Replacement Therapy, March 2007
- Hormone replacement therapy (HRT): further information on the known increased risk of breast cancer with HRT and its persistence after stopping, August 2019

Joint BMS FSRH RCGP RCOG SfE and RCN Women's Health Forum safety alert on high doses of oestrogen which exceed the product licences.

Some low dose preparations only provide relief from menopausal symptoms. Other preparations offer relief from menopausal symptoms plus osteoporosis prophylaxis – check BNF.

For information on the ongoing HRT supply disruptions, see information from:

- the Specialist Pharmacy Service, on available HRT products
- British Menopause Society, on HRT preparations and equivalent alternatives

Sequential combined therapy – for women with a uterus & last menstrual period (LMP) <12 months

Oral treatment options	**Elleste Duet®** Tablets Estradiol 1 mg / 2 mg + norethisterone 1mg	• Choice of product should be individualised based on age, symptoms and co-morbidities, after discussing potential risks, benefits, adverse effects and contraindications • Women ≥60 should be offered transdermal formulation first line
	Femoston® Tablets Estradiol 1 mg / 2 mg + dydrogesterone 10 mg	
Transdermal treatment options	**Evorel Sequi®** Patches Estradiol 50 micrograms + norethisterone acetate 170 micrograms	

Continuous combined therapy – for women with a uterus and LMP > 12 months

Oral treatment options	**Bijuve®** Capsules Estradiol 1mg + progesterone 100mg	• Choice of product should be individualised based on age, symptoms and co-morbidities, after discussing potential risks, benefits, adverse effects and contraindications • Women ≥60 should be offered transdermal formulation first line • Bijuve® contains progesterone and might help with symptoms of poor sleep
	Elleste Duet Conti® Tablets Estradiol 2mg + norethisterone acetate 1mg	
	Femoston conti® Tablets Estradiol 0.5mg + dydrogesterone 2.5mg Estradiol 1mg + dydrogesterone 5.0mg	
	Kliofem® Tablets Estradiol 2mg + norethisterone acetate 1mg	
	Kliovance® Tablets Estradiol 1mg + norethisterone acetate 500micrograms	
	Premique® low dose Tablets conjugated oestrogen 300micrograms + medroxyprogesterone acetate 1.5mg	• To be prescribed only in women already taking it and well tolerating this therapy • Women ≥60 should be offered transdermal formulation first line
Transdermal treatment options	**Evorel conti®** Patches Estradiol 50micrograms/24 hours + norethisterone acetate 170micrograms/24hours	• Choice of product should be individualised based on age, symptoms and co-morbidities, after discussing potential risks, benefits, adverse effects and contraindications • Women ≥60 should be offered transdermal formulation first line
Others – for women with a uterus and LMP > 12 months		
	Tibolone Tablets 2.5 mg	• See GMMMG HRT Guidance for Menopause Management for further information on treatment with tibolone
Do Not Prescribe	**Bazedoxifene/conjugated oestrogens** Modified release tablets (Duavive®)	Criterion 1 (see RAG list)
Unopposed oestrogen – for women without a uterus		
Oral treatment options	**Elleste-Solo®** Tablets Estradiol 1mg, 2mg	• Choice of product should be individualised based on age, symptoms and co-morbidities, after discussing potential risks, benefits,

		adverse effects and contraindications • Women ≥60 should be offered transdermal formulation first line
	Premarin® Tablets Conjugated oestrogen 300micrograms	• To be prescribed only in women already taking it and well tolerating this therapy • Women ≥60 should be offered transdermal formulation first line
Transdermal treatment options	**Evorel®** Patches Estradiol 25, 50, 75, 100 micrograms	• Choice of product should be individualised based on age, symptoms and co-morbidities, after discussing potential risks, benefits, adverse effects and contraindications • Women ≥60 should be offered transdermal formulation first line
	Estradot® Patches Estradiol 25, 37.5, 50, 75, 100 micrograms	
	Oestrogel® Gel pump pack Estradiol 600microgram per 1 gram	
	Sandrena® Gel sachets Estradiol 500microgram	
	Lenzetto® Spray Estradiol 1.5mg / spray	
Others – secondary prevention of osteoporotic fragility fractures in postmenopausal women		
	Raloxifene hydrochloride Tablets 60mg	NICE TA161: Raloxifene and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women
Subsection	**6.4.1.2. Progestogens and progesterone receptor modulators**	
Progesterones should be prescribed in combination with either oral or transdermal oestrogen		
Oral treatment options	**Utrogestan®** Oral capsules Micronised progesterone 100mg	• Utrogestan® oral capsule is indicated for adjunctive use with oestrogen in postmenopausal women with an intact uterus, as HRT • Can cause drowsiness, which might help with symptoms of poor sleep. Care should be taken when driving or using machines
	Norethisterone U	• Unlicensed treatment for endometrial protection with

	Tablets 5mg	unopposed oestrogen. It should be prescribed if licensed combination products are not suitable • Refer to GMMMG HRT Guidance for Menopause Management for further information about dosing.
	Provera® U Tablets Medroxyprogesterone acetate 2.5mg, 5mg, 10mg	• Unlicensed treatment for endometrial protection with unopposed oestrogen. It should be prescribed if licensed combination products are not suitable • Refer to GMMMG HRT Guidance for Menopause Management for further information about dosing
Intrauterine options	**Mirena®** Intrauterine delivery system Levonorgestrel 20 micrograms/24 hours	• Mirena® is licensed for protection from endometrial hyperplasia during oestrogen replacement therapy. After insertion for HRT Mirena® should be removed after 5 years ("off label" use).
Management of threatened miscarriage		
	Micronised progesterone Pessaries 200mg, 400mg (Cyclogest®) Vaginal capsules 200mg (Utrogestan®)	Gn following specialist initiation for management NICE NG126: Ectopic pregnancy and miscarriage: diagnosis and initial management
Progesterone receptor modulators		
	Ulipristal acetate Tablets 5mg (Esmya®) For the intermittent treatment of moderate to severe symptoms of uterine fibroids in adult women who have not reached menopause when uterine fibroid embolisation and/or surgical treatment options are not suitable or have failed.	R MHRA DSU, Ulipristal acetate 5mg (Esmya): further restrictions due to risk of serious liver injury, Feb 2021 NICE NG88: Heavy menstrual bleeding: assessment and management

Subsection	**6.4.2. Male sex hormones and antagonists**	
Testosterone and esters		
Intra-muscular injection	**Testosterone enatate** 250mg/ml, 1ml amp **Testosterone undecanoate** 250mg/ml (Nebido®), 4ml amp	Gn **Following specialist advice** See information for primary care on testosterone preparations for hypogonadism in adult men MHRA DSU: Topical testosterone (Testogel): risk of harm to children following accidental exposure. Jan 2023.
Implant	**Testosterone 100mg, 200mg**	
Gel	**Testosterone 2%** (Tostran®) 60g multi-dose dispenser **Testosterone 1%** (50mg/5ml) (Testogel®) 30 x 5g sachets	
Oral	**Testosterone** (Restandol®) Capsules 40mg	
	Mesterolone Tablets: 25mg	
Grey drugs Items which are listed as Grey are deemed not suitable for routine prescribing but may be suitable for a defined patient population	**Testosterone** U For menopausal women with low sexual desire (hypoactive sexual desire disorder, HSDD), only if HRT alone is not effective. This treatment is unlicensed.	Gn following specialist advice Criterion 3 (see RAG list) NICE NG23: Menopause: diagnosis and management British Menopause Society: Testosterone replacement in menopause MHRA DSU: Topical testosterone (Testogel): risk of harm to children following accidental exposure. Jan 2023.
	Tostran® U 2% gel 60g multi-dose dispenser (10mg/0.5g) Tostran comes in a multi-dose canister providing measured doses, thus may more easily allow administration of lower doses.	
	Testogel® U 30 x 2.5g gel sachets (40.5mg/2.5g)	
	Testim® U 1% gel 30x 5g tubes (50mg/5g)	
Do Not Prescribe	**Testosterone patches** (e.g. Intrinsa®)	Criterion 1 (see RAG list)

Other male sex hormones and antagonists		
	Finasteride Tablets: 5mg	MHRA DSU (2017): Finasteride: rare reports of depression and suicidal thoughts

Chapter	**6**	**Endocrine**
Section	**6.5**	**Hypothalamic and pituitary hormones and anti-oestrogens**
Subsection	**6.5.1.**	**Hypothalamic and anterior pituitary hormones and anti-oestrogens**

Anti-oestrogens		
First choice	**Clomifene** Tablets: 50mg	R

Additional notes

- Clomifene is only indicated for patients in whom ovulatory dysfunction has been demonstrated and other causes of infertility have been excluded or adequately treated

Anterior pituitary hormones – Corticotrophins

This section is managed in Specialist care therefore is not considered in this formulary.

Anterior pituitary hormones - Gonadotrophins

This section is managed in Specialist care therefore is not considered in this formulary.

Growth hormone		
	Somatropin Injection (s/c) 6mg (16unit cartridge) (Humatrope®) 12mg (36unit cartridge) (Humatrope®) MiniQuick® injection (s/c) Genotropin® (MiniQuick®) injection 0.2mg (0.6unit), 0.4mg, 0.6mg, 0.8mg, 1mg, 1.2mg, 1.4mg, 1.6mg, 1.8mg, 2mg	Gn following specialist initiation NICE TA64: Growth hormone deficiency (adults) August 2003 R Adults, except in proven primary and secondary hypopituitarism.
	Somatrogon Injection (s/c) 24mg, 60mg (Ngenla®▼)	R pending availability of a shared care protocol NICE TA863: Somatrogon for treating growth disturbance in children and young people aged 3 years and over

Growth hormone receptor antagonists		
	Pegvisomant Injection 10mg, 15mg, 20mg (Somavert®)	R
Hypothalamic hormones		
This section is managed in Specialist care therefore is not considered in this formulary		

Subsection	**6.5.2 Posterior pituitary hormones and antagonists**	
Posterior pituitary hormones		
First choice	**Desmopressin** Tablets 100microgram, 200micrograms	
Alternatives	**Desmopressin** Sublingual tablets • 60micrograms (DDAVP® melt) • 120micrograms (Desmomelt®) • 240micrograms (Desmomelt®) Nasal spray 6ml (60 sprays) • 10micrograms per metered spray	
Additional notes MHRA DSU: Desmopressin nasal spray: Removal of the primary nocturnal enuresis (bedwetting) indication, Sept 2007		
Antidiuretic hormone antagonists		
	Demeclocycline For treating hyponatraemia associated with syndrome of inappropriate antidiuretic hormone (SIADH)	R for new patients only (October 2021)
	Tolvaptan▼ (Jinarc®) For treating autosomal dominant polycystic kidney disease **only** as per NICE TA358 Tablets 15mg, 30mg, 45mg and 15mg 60mg and 30mg 90mg and 30mg	R NICE TA358: Tolvaptan for treating autosomal dominant polycystic kidney disease

Chapter	**6**	**Endocrine**
Section	**6.6.**	**Drugs affecting bone metabolism**
Subsection	**6.6.1.**	**Calcitonin and parathyroid hormone**

Additional notes:

NICE TA160: Raloxifene for the primary prevention of osteoporotic fragility fractures in postmenopausal women

NICE TA161: Raloxifene and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women

NICE TA464: Bisphosphonates for treating osteoporosis

MHRA DSU: Bisphosphonates: atypical femoral fractures, June 2011

MHRA DSU: Bisphosphonates: very rare reports of osteonecrosis of the external auditory canal, Dec 2015

MHRA DSU: Strontium ranelate: cardiovascular risk—restricted indication and new monitoring requirements, March 2014

First choices	**Teriparatide** (Forsteo®) 250micrograms/ml 2.4ml pre-filled pens	R **For Specialist use only** Equal first line treatment alongside romosozumab (see section 6.6.2) NICE TA161: Raloxifene and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women
Alternatives	**Parathyroid hormone** Injection s/c: 1.61mg (14 dose)	R **For Specialist use only**

Subsection	**6.6.2. Bisphosphonates and other drugs affecting bone metabolism**	

Bisphosphonates

Additional notes:

NICE TA464: Bisphosphonates for treating osteoporosis

First choice	**Alendronic acid** Tablet: 70mg (once weekly preparation)	Gn NB: not licensed for use in men, but this is common practice
Alternatives	**Risedronate** Tablet: 35mg (once weekly preparation)	Gn
	Ibandronic acid Tablets: 150 mg Solution for injection: 3 mg/3mL	Gn tablets R solution for injection
	Sodium clodronate Tablets: 800mg	**Specialist initiation only**
	Zoledronic acid Solution for infusion vial: 4mg/5ml Infusion bottles: 4mg/100ml, 5mg/100ml	R **Specialist use only**

Do Not Prescribe	Alendronic acid with vitamin D Tablets	Criterion 2 (see RAG list)
Other drugs affecting bone metabolism		
	Denosumab (Prolia®) – Osteoporosis in men & women Injection s/c 60mg/ml x 1ml	A MHRA DSU: Denosumab 60mg (Prolia): should not be used in patients under 18 years due to the risk of serious hypercalcaemia, May 2022
	Denosumab (Xgeva®▼) - Oncology indication Injection s/c 120mg/ml x 1.7ml	R **Specialist use only**
	Romosozumab Pre-filled pen: 105mg	R Equal first choice alongside teriparatide (see section 6.6.1) NICE TA791: Romosozumab for treating severe osteoporosis National Osteoporosis Guideline Group (NOGG): Clinical Guideline, 2021

Additional notes:

- NICE TA204: Denosumab – Osteoporotic fractures
- MHRA DSU: denosumab, Feb 2013
- MHRA DSU: denosumab, Sept 2014
- MHRA DSU: denosumab and osteonecrosis of the jaw, July 2015
- MHRA DSU: denosumab (Prolia, Xgeva): reports of osteonecrosis of the external auditory canal
- MHRA DSU: denosumab (Xgeva)- risk of clinically significant hypercalcaemia following discontinuation
- MHRA DSU: denosumab (Xgeva) – study data show new primary malignancies reported more frequently compared to zolendronate
- MHRA DSU: Denosumab 60mg (Prolia): increased risk of multiple vertebral fractures after stopping or delaying ongoing treatment, August 2020

Chapter	**6 Endocrine**	
Section	**6.7. Other endocrine drugs**	
Subsection	**6.7.1. Bromocriptine and other dopaminergic drugs**	
First choice	**Bromocriptine** Tablets 1mg, 2.5mg **Cabergoline** Tablets 500micrograms	See BNF chapter 4, section 4.9.1. for use in Parkinson's disease
Additional notes • MHRA: Ergot derived dopamine agonists: risk of fibrotic reactions in chronic endocrine uses (2014)		
Subsection	**6.7.2 Drugs affecting gonadotrophins**	
Gonadorelin analogues		
First choice	**Goserelin** Intradermal implant 3.6mg (every 28 days) 10.8mg (3 monthly)	A (for licensed indications) See section 8.3.4.2. – leuprolinor use in prostate cancer and section 8.3.4.1. for use in breast cancer R (for long term, >6 months use, for precocious puberty, testosterone castration in sex offenders and all unlicensed uses)
	Leuprorelin Prefilled dual chamber syringe (DCS) 3.75mg (monthly) 11.25mg (every 3 months)	A (for licensed indications) See section 8.3.4.2. – for use in prostate cancer R (for long term, >6 months use, for precocious puberty, testosterone castration in sex offenders and all unlicensed uses)
Alternatives	**Buserelin** Nasal spray 150micrograms/metered spray Injection (s/c) 1mg/ml	R
	Nafarelin Nasal spray 200micrograms/metered spray	
Additional notes • Goserelin and leuprorelin are included in this section for endometriosis only. Please refer to chapter 8 for other indications. • Gonadorelin analogues are contraindicated for use longer than 6 months (do not repeat), where there is undiagnosed vaginal bleeding, in pregnancy and in breast-feeding.		

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Other GnRH receptor antagonists		
	Estradiol / norethisterone / relugolix 1 mg / 0.5 mg / 40 mg tablets	Gn following specialist advice NICE TA832: Relugolix–estradiol–norethisterone acetate for treating moderate to severe symptoms of uterine fibroids
Subsection	**6.7.3. Metyrapone**	
	Metyrapone Capsules 250mg	**For specialist use only**

Additional notes

- Metyrapone is used for Cushing's syndrome, often in a lower dose combination with aminoglutethamide to reduce side effects.