

Therapeutic management of diabetes & Type 3c diabetes management



Glucose Management

- How can we lower glucose levels?
- Insulin
- Oral medication (type 2 and other types of diabetes)
- Dietary modifications
- Physical activity (if able)

SGLT2 inhibitor

Inhibits glucose re-absorption in the kidneys

Metformin

Decreases hepatic glucose production and increases glucose uptake

GLP-1 receptor agonist

Improves glucose-dependent insulin secretion, suppresses glucagon secretion, slows gastric emptying

Sulphonylureas and meglitinides

Increase insulin secretion from pancreatic β -cells

Pioglitazone

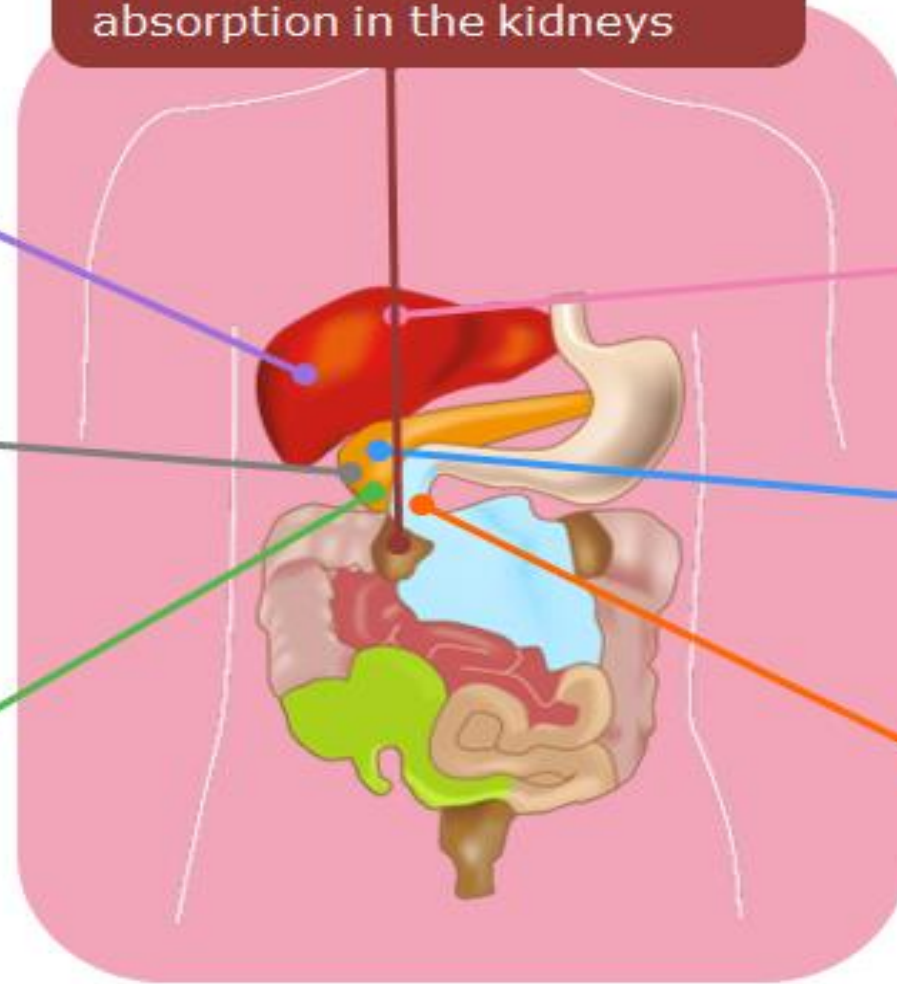
Increases insulin sensitivity and glucose uptake in skeletal muscle. Decrease lipolysis in adipose tissue and decrease hepatic glucose output

Insulin

Increases glucose uptake in skeletal muscle

DPP-4 inhibitors

Prolong GLP-1 action, stimulate insulin secretion, suppress glucagon release



Type 3c diabetes

- 1.3.15 Assess people with type 3c diabetes every 6 months for potential benefit of insulin therapy.
- 1.3.16 For guidance on managing type 3c diabetes for people who are not using insulin therapy, see the [NICE guidelines on type 2 diabetes in adults](#) and [diagnosing and managing diabetes in children and young people](#).
- 1.3.17 For guidance on managing type 3c diabetes for people who need insulin, see:
- the recommendations on insulin therapy and insulin delivery (including rotating injection sites within the same body region) in the [NICE guidelines on type 1 diabetes in adults](#) and [diagnosing and managing diabetes in children and young people](#)
 - [NICE's technology appraisal guidance on continuous subcutaneous insulin infusion for the treatment of diabetes mellitus](#).
[2018, amended 2020]
- 1.3.18 For guidance on education and information for people with pancreatitis and type 3c diabetes requiring insulin, see the [recommendations on education and information in the NICE guideline on diagnosing and managing type 1 diabetes in adults](#), and [diagnosing and managing diabetes in children and young people](#).
- 1.3.19 For guidance on self-monitoring blood glucose for people with pancreatitis and type 3c diabetes requiring insulin, see the [recommendations on blood glucose management in the NICE guideline on diagnosing and managing type 1 diabetes in adults](#), and [blood glucose monitoring in the NICE guideline on diagnosing and managing diabetes in children and young people](#).

Pancreas Fest 2012 Recommendations

- Since the principal endocrine defect is insulin deficiency, insulin therapy is the preferred treatment for most patients.
- The degree of insulin deficiency varies with disease severity and duration.
- Controlling mild hyperglycemia with oral hypoglycemic agents early in the disease history may be a valid approach.

Lifestyle
Alcohol
Smoking cessation
Physical activity if able

Nutrition
Specialist dietitian
Pancreatic enzyme replacement

Pioglitazone
Avoid in HF
Bladder cancer
Risk of fractures

SGLT-2 inhibitors
DKA risk
Little evidence

Insulin
Often needed due to low C-peptide/
insulin deficiency

**T3c diabetes
Management?**

**DPP4-
inhibitors**
Pancreatitis risk

**CVD risk
reduction**
Blood pressure
Lipids
Smoking cessation
Urine ACR

Metformin
if no
contraindications

Sulphonylurea
May be less effective
dependent on beta
cell function

GLP-1 RA
Pancreatitis risk
Appetite suppression
Weight loss

Metformin

- GI symptoms common (modified release available)
- Weigh neutral but weight loss in some studies
- Low hypo risk
- Do not use if eGFR < 30ml/min & reduce dose if eGFR < 45 ml/min
- Omit in severe illness, vomiting or dehydration (rare lactic acidosis risk)
- Monitor and supplement B12



Sulphonylureas

Gliclazide, Glimepiride, Glipizide

- Stimulate insulin secretion from beta cells
- Need beta cell function for them to be effective
- Useful rescue therapy if osmotic symptoms
- High efficacy
- Well established and inexpensive
- Weight gain
- High risk of hypoglycaemia
- No additional CVD benefit



Pancreatic Cancer U

Insulin



Abasaglar[®]
Humalog[®] 100 units/ml
Humalog[®] 200 units/ml
Humalog[®] Mix25
Humalog[®] Mix50
Humulin[®] I
Humulin[®] M3
Humulin[®] S
Lyumjev[®]

Actrapid[®]
Fiasp[®]
Insulatard[®]
Levemir[®]
NovoMix[®] 30
NovoRapid[®]
Tresiba[®] 100 units/ml
Tresiba[®] 200 units/ml

Admelog[®]
Apidra[®]
Lantus[®]
Toujeo 300 units/ml
Trurapi[®]

Hypurin[®] Porcine 30/70
Hypurin[®] Porcine Isophane
Hypurin[®] Porcine Neutral

||| Mylan
Semglee[®]
(Insulin glargine)

Intermediate acting insulin



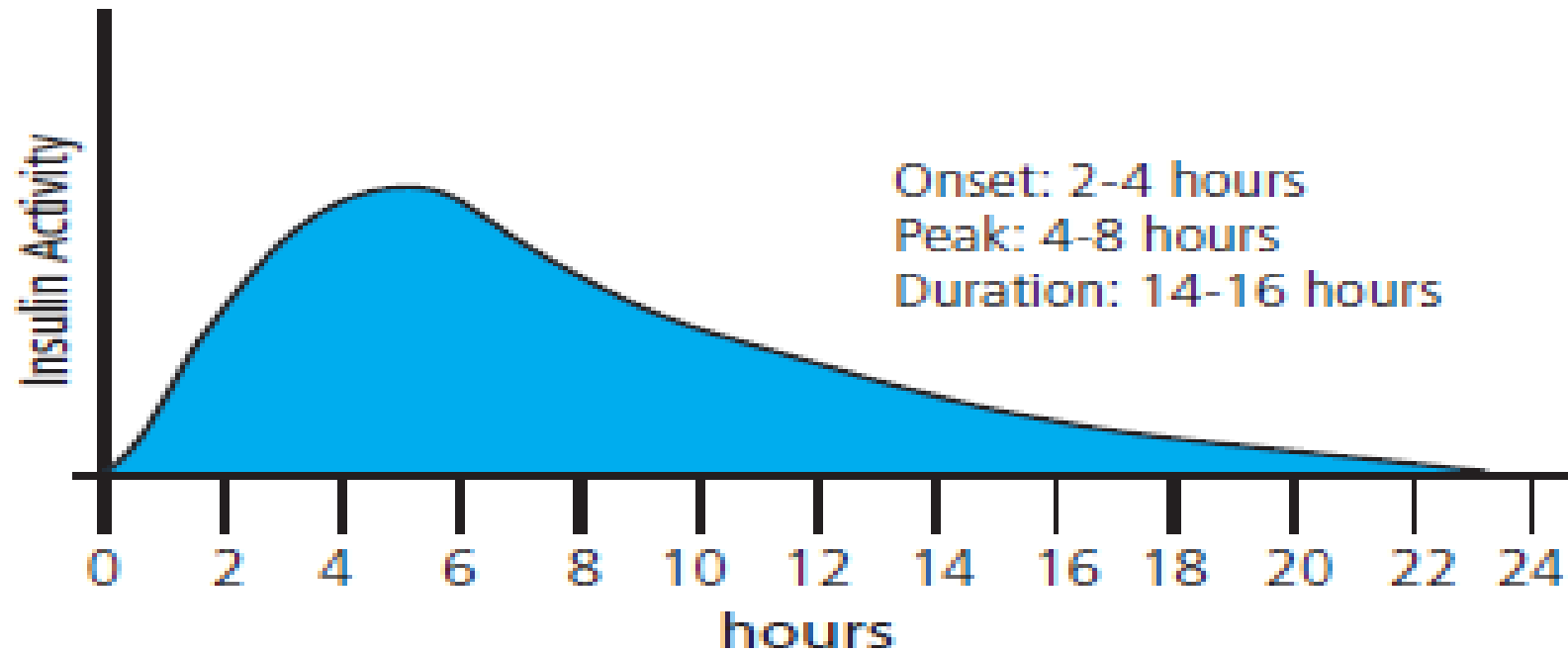
Humulin I



Insulatard

Intermediate-acting insulin

Humulin I, Insulatard



Long acting (basal) insulin



Lantus



Abasaglar



Levemir



Semglee



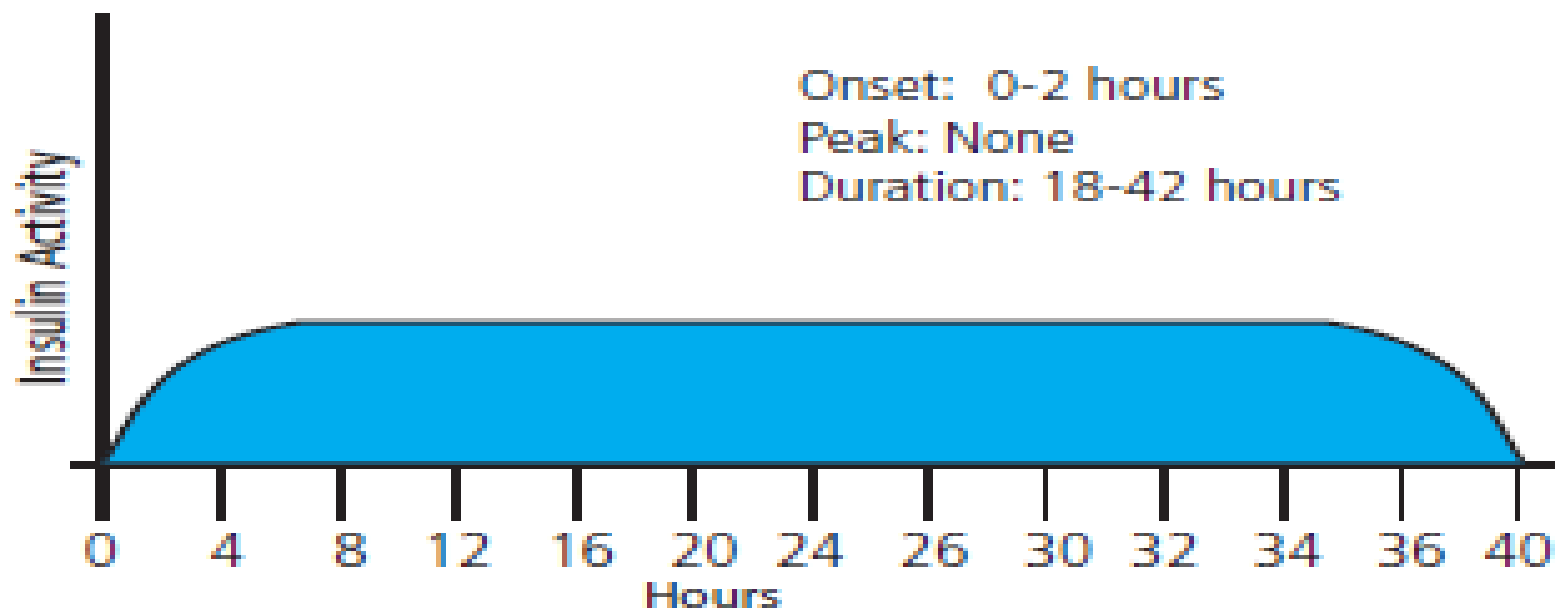
Tresiba



Toujeo

Long-acting insulin

Abasaglar, Lantus, Levemir, Semglee, Toujeo, Tresiba



Rapid Acting



Apidra



Humalog 100 units/ml



NovoRapid



Trurapi

Ultra Rapid



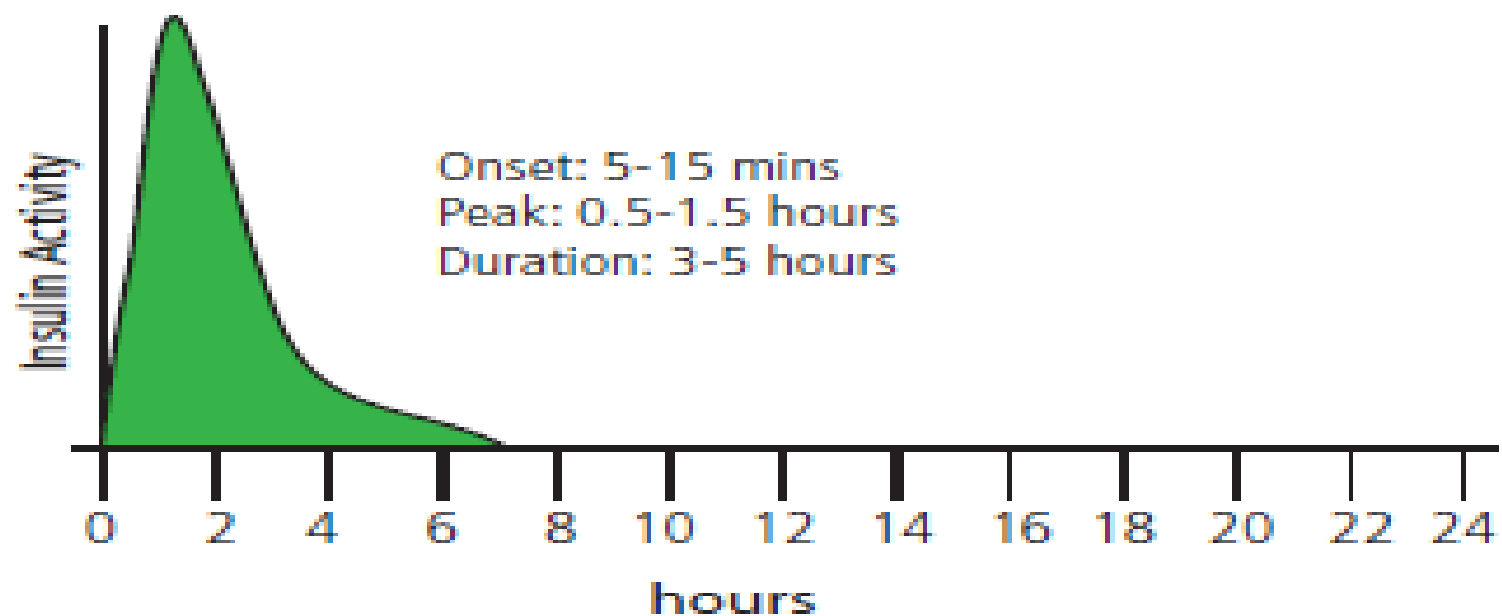
Lyumjev 100 units/ml



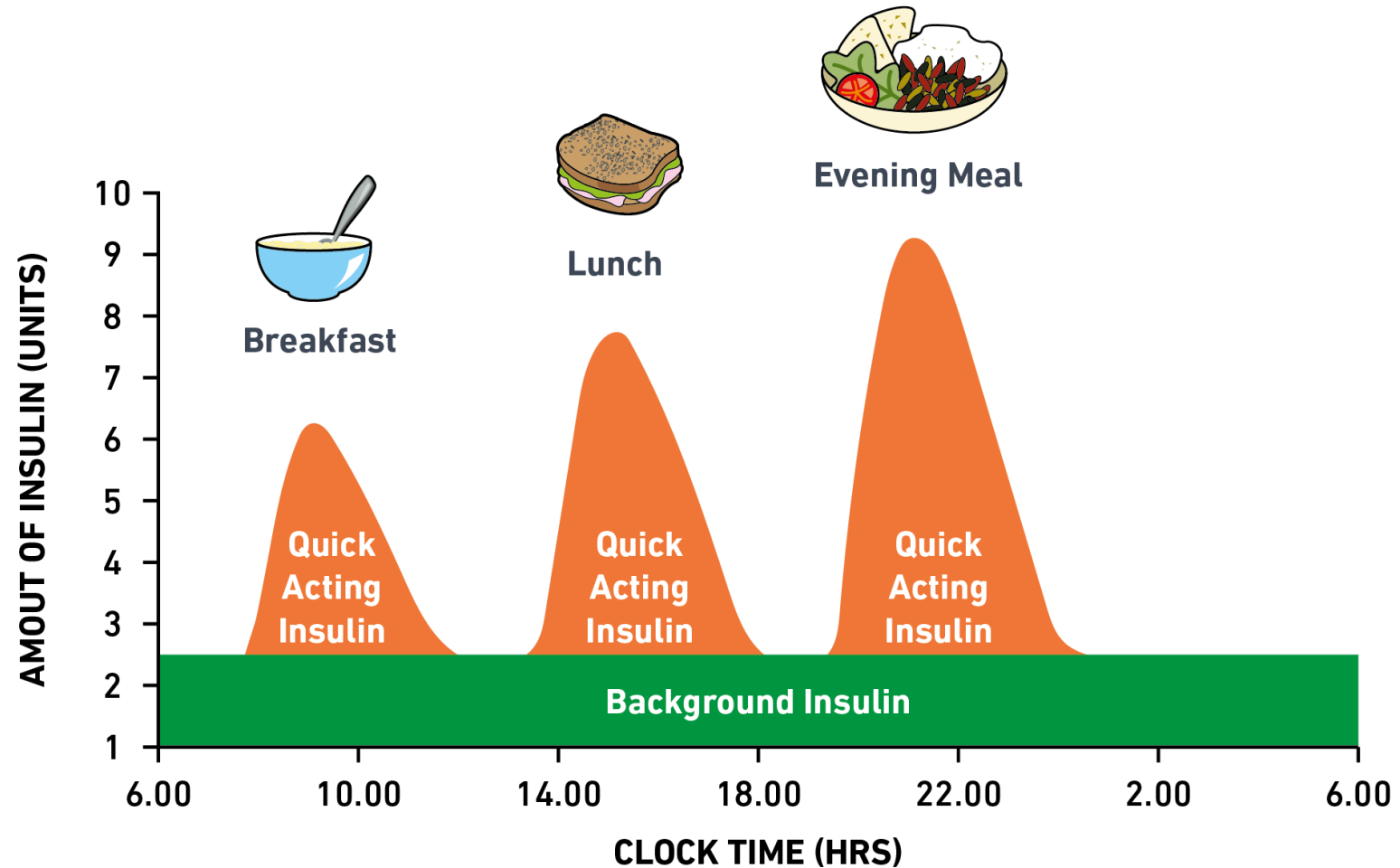
Fiasp

Rapid Acting insulin

Apidra, Admelog, Humalog, NovoRapid, Trurapi



Basal Bolus Regimen



Mixed (biphasic) Insulins

Human



Humulin M3

Analogues



NovoMix 30



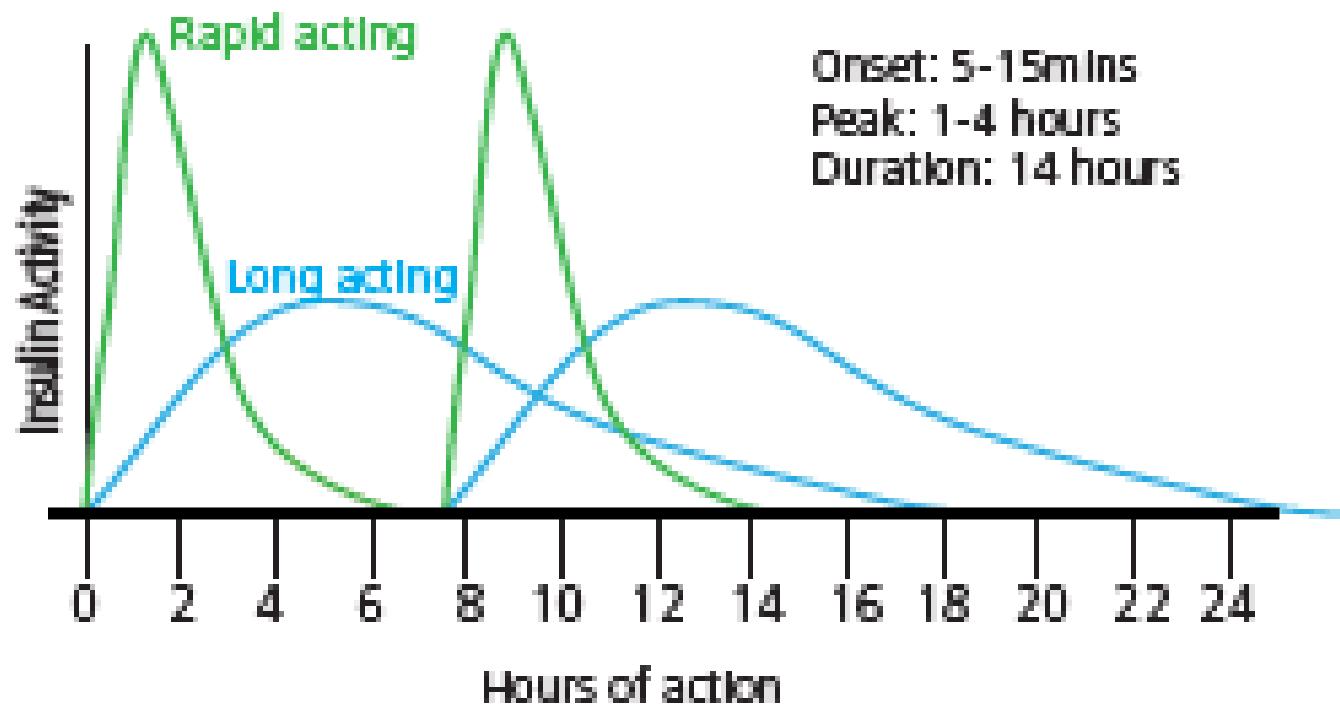
Humalog Mix 25



Humalog Mix 50

Pre Mixed analogues

Humalog Mix 25, NovoMix 30



Insulin types & available medicinal forms within the UK

Insulin action	Insulin brand name & manufacturer	Delivery device	*compatible re-usable cartridge pen device
Ultra-Rapid	Fiasp (aspart) Manufacturer: Novo Nordisk	FlexTouch Pen 3ml Penfill cartridge* 10ml vial	NovoPen 5/6 NovoPen echo/echo Plus
	Lyumjev 100 units/ml (lispro) Manufacturer: Eli Lilly	KwikPen Junior KwikPen 3ml cartridge* 10ml vial	HumaPen Savvio
	Lyumjev 200 units/ml (lispro) Manufacturer: Eli Lilly	KwikPen	N/A
Rapid	Admelog (lispro) Manufacturer: Sanofi	SoloStar Pen 3ml cartridge* 10ml vial	All Star PRO Junior STAR
	Apidra (glulisine) Manufacturer: Sanofi	SoloStar Pen 3ml cartridge* 10ml vial	All Star PRO Junior STAR
	Humalog 100units/ml (lispro) Manufacturer: Eli Lilly	KwikPen Junior KwikPen 3ml cartridge* 10ml vial	HumaPen Savvio
	Humalog 200 units/ml (lispro) Manufacturer: Eli Lilly	KwikPen	N/A
	NovoRapid (aspart) Manufacturer: Novo Nordisk	FlexPen FlexTouch Pen 3ml Penfill cartridge* 10ml vial 1.6ml PumpCart	NovoPen 5/6 NovoPen echo/echo Plus
	Trurapi (aspart) Manufacturer: Sanofi	SoloStar Pen 3ml cartridge* 10ml vial	All Star PRO Junior STAR
	Actrapid (insulin soluble human) Manufacturer: Novo Nordisk	10ml vial	N/A
Short	Humulin S (soluble human) Manufacturer: Eli Lilly	3ml cartridge* 10ml vial	HumaPen Savvio
	Hypurin Porcine Neutral (soluble porcine) Manufacturer: Wockhardt	3ml cartridge* 10ml vial	Autopen Classic

Insulin action	Insulin brand name & manufacturer	Delivery device	*compatible re-usable cartridge pen device
Intermediate	Humulin I (isophane human) Manufacturer: Eli Lilly	KwikPen 3ml cartridge* 10ml vial	HumaPen Savvio
	Insulatard (isophane human) Manufacturer: Novo Nordisk	InnoLet 3ml Penfill cartridge* 10ml vial	NovoPen 5/6 NovoPen echo/echo Plus
	Hypurin Porcine Isophane (isophane porcine) Manufacturer: Wockhardt	3ml cartridges 10ml vial	Autopen classic
Basal	Abasglar (glargine) Manufacturer: Eli Lilly	KwikPen 3ml cartridge*	HumaPen Savvio
	Lantus (glargine) Manufacturer: Sanofi	SoloStar pen 3ml cartridge* 10ml vial	All Star PRO Junior STAR
	Levemir (detemir) Manufacturer: Novo Nordisk	FlexPen InnoLet 3ml Penfill cartridge*	NovoPen 5/6 NovoPen echo/echo Plus
	Toujeo 300 units/ml (insulin glargine 300units/ml) Manufacturer: Sanofi	SoloStar DoubleStar	N/A
	Tresiba 100 units/ml (degludec) Manufacturer: Novo Nordisk	FlexTouch Pen 3ml Penfill cartridge*	NovoPen 5/6 NovoPen echo/echo Plus
	Tresiba 200 units/ml (degludec 200 units/ml) Manufacturer: Novo Nordisk	FlexTouch Pen	N/A
	Semglee (glargine) Manufacturer: Viatrix	Pre-filed pen	N/A
	Pre-mixed (biphasic)	NovoMix 30 (aspart protamine) Manufacturer: Novo Nordisk	FlexPen 3ml cartridge*
Humalog Mix 25 (lispro protamine) Manufacturer: Eli Lilly		KwikPen 3ml cartridge* 10ml vial	HumaPen Savvio
Humalog Mix 50 (lispro protamine) Manufacturer: Eli Lilly		KwikPen 3ml cartridge*	HumaPen Savvio
Humulin M3 (soluble/isophane human) Manufacturer: Eli Lilly		KwikPen 3ml cartridge* 10ml vial	HumaPen Savvio
Hypurin Porcine 30/70 Mix (soluble/isophane porcine) Manufacturer: Wockhardt		3ml cartridge* 10ml vial	Autopen Classic

* Re-usable cartridge pens can only be used with company specific insulin 3ml cartridges

Continuous Glucose Monitoring

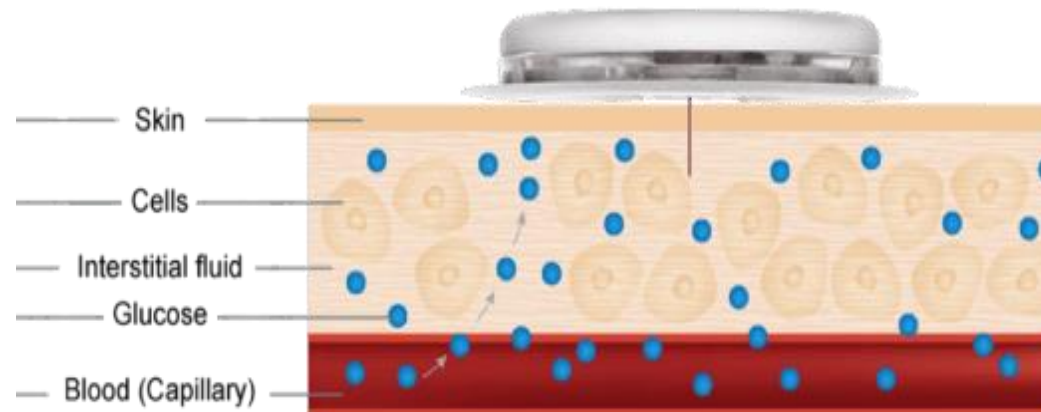
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1.6.10 Offer adults with type 1 diabetes a choice of real-time continuous glucose monitoring (rtCGM) or intermittently scanned continuous glucose monitoring (isCGM, commonly referred to as 'flash'), based on their individual preferences, needs, characteristics, and the functionality of the devices available. See box 1 for examples of factors to consider as part of this discussion. [2022]

Continuous glucose monitoring



dexcomone





Smart insulin pens



LibreLink



Glooko



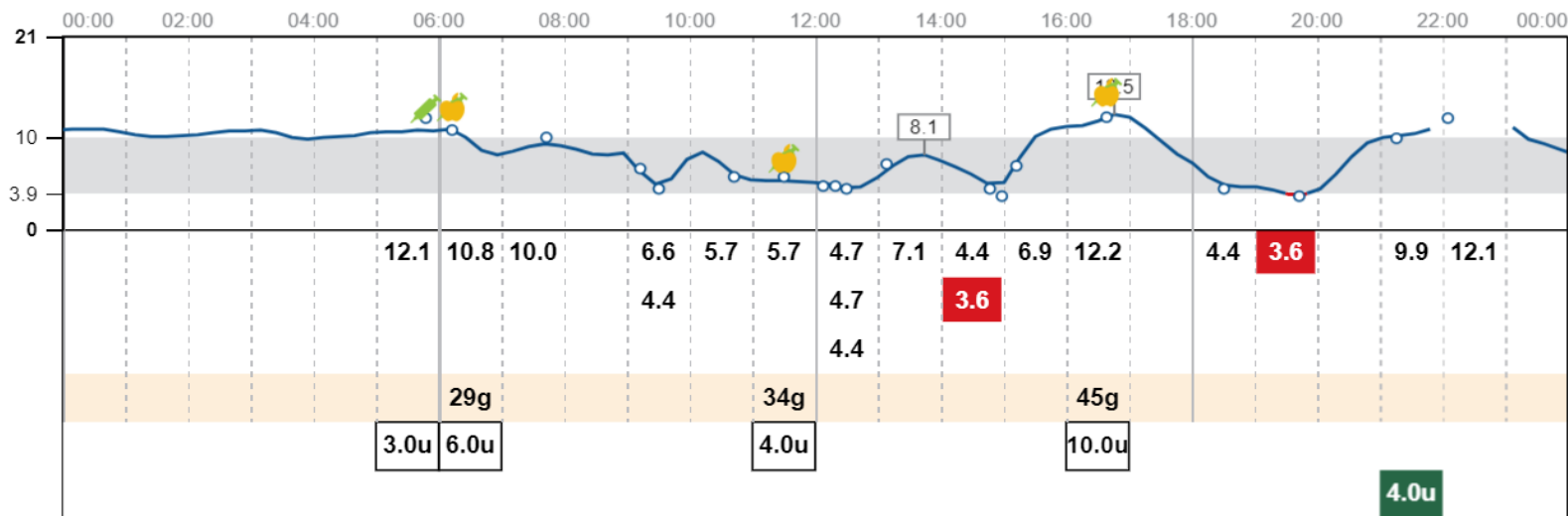
MySugr

CGM & Smart Pen Data

TUE 11 Jul

Glucose mmol/L

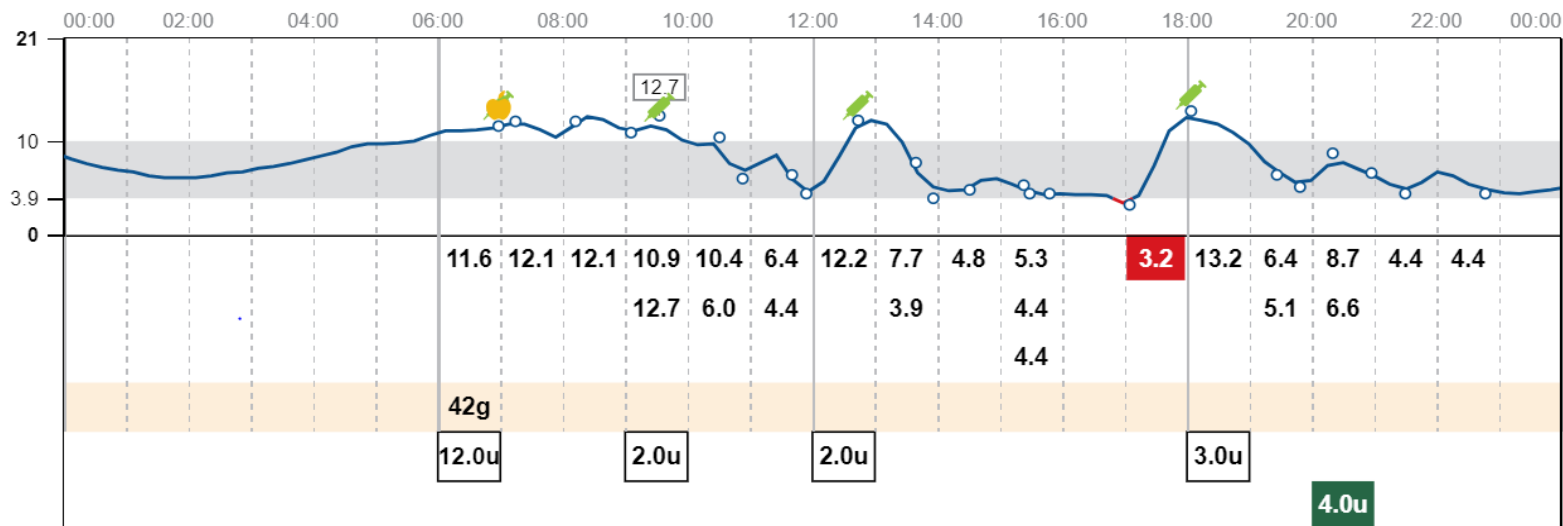
- Carbs grams
- Rapid-Acting Insulin
- Long-Acting Insulin



WED 12 Jul

Glucose mmol/L

- Carbs grams
- Rapid-Acting Insulin
- Long-Acting Insulin



Challenges of Type 3c Diabetes

- Misdiagnosis is common
- Awareness among HCPs needs raising
- Most require insulin therapy and regular/intensive glucose monitoring (6-10 times per day)
- Extra burden along with pancreatic cancer diagnosis
- Access to technology (CGM) is likely to help but access may be variable across the country
- Certain therapies not appropriate – SGLT2i, GLP-1 RA and DPP4i, therefore correct diagnosis and classification is important.

Challenges of Type 3c Diabetes

- Destruction of all islet cells & loss of all pancreatic hormones
 - *insulin, glucagon, somatostatin & pancreatic polypeptide (PP)*
- Hyperglycaemia
 - *Low insulin levels*
 - *Lack of PP → Hepatic insulin resistance → Unsuppressed glucose production*
 - *PEI → Reduced incretin secretion → Less insulin released*
- Hypoglycaemia common
 - *Glucagon deficiency*
 - *Alongside PEI, poor dietary intake due to pain, chemo, surgery*
- Glucose 'swings' from hypo to hyperglycaemia, erratic and unpredictable, difficult to manage
- Ongoing treatment/surgery for pancreatic cancer