### WHAT ARE GLP-1s AND HOW DO THEY WORK?

- GLP-1s are injected to stimulate the insulin response to glucose and prevent glucagon release after meals.
- The incretin effect is described by the fact that an oral load of glucose induces a greater insulin response than when glucose is administered by IV. This is due to the effect on gut hormones, particularly glucagon-like peptide-1 (GLP-1).
- Their effect includes stimulating glucose dependent insulin secretion, increasing satiety and slowing gastric emptying. These actions can lead to reduction in HbA1c with a low risk of hypoglycaemia (unless used with sulphonylureas). This action is often accompanied by weight loss.
- GLP-1 injections can be used to improve glucose control in adults with Type 2 Diabetes by reducing fasting and post prandial glucose levels. They can be used with metformin, a sulphonylurea, or both.
- In very obese patients and those intolerant of metformin and sulphonylureas, GLP-1s can be used in combination with a single oral agent.

See [glycaemic management algorithm](#) for recommendations as to where GLP-1s fit with other glycaemic treatments.

### QUESTIONS FREQUENTLY ASKED BY PATIENTS

- What happens if a dose is missed?
- If a dose is missed, the next dose should be injected at the usual time. An extra dose should not be taken to make up for the missed dose.
- How long should there be between injections?
- At least 6 hours.
- What happens if they forget to inject before a meal?
- They should not inject after a meal. If they forget to inject before wait until the next scheduled dose.

See next sheet for specific GLP-1 drug information.

### PRECAUTIONS

- GLP-1s are not substitutes for insulin in insulin-dependent patients and are not licensed for use with Type 1 Diabetes.
- Persistent and severe abdominal pain with or without vomiting may be a sign of acute pancreatitis. If this is suspected, the GLP-1 should be stopped, and if confirmed, not be resumed.
- Not recommended for use in patients with severe renal failure.
- GLP-1 should be stopped, and if confirmed, not be resumed.
- Not recommended for patients with severe gastrointestinal problems. Patients receiving a GLP-1 in combination with sulphonylurea may be at increased risk of hypoglycaemia, therefore consider a reduction in the dose of sulphonylurea.
- There are no specific restrictions for drivers with class 1 licences (cars and motorcycles) when being treated with a GLP-1. Normal precautions to avoid low blood glucose when driving apply. Drivers holding Class 2 (LGV or PCV) licences need to inform the DVLA if they are being treated with a GLP-1 and a sulphonylurea and individual assessments will be made.
- Not recommended during pregnancy or where pregnancy is planned, or for nursing mothers.

### PATIENT INFORMATION

- Patients will need to understand the following:
  - That GLP-1s are injectable treatments but not insulin
  - Storage of GLP-1s — see below
  - Injection techniques - Subcutaneous injection arm, thigh, abdomen
  - Timing of dose - 60 minute before morning and evening meal.
  - Glucose monitoring - regular daily monitoring required to identify any risk of hypoglycaemia
  - Pen needles use/supply - a variety of pen needles are available, HCP should discuss which needle is best for them. A new one should be used for each injection.

### WHO SHOULD USE GLP-1s?

Treatment with GLP-1s is associated with the prevention of weight gain and possible promotion of weight loss

- GLP-1s should be considered in people with a body mass index of 35 kg/m 2 or in those with a body mass index of less than 35 kg/m 2 where:
  - insulin treatment would be unacceptable for occupational reasons or where weight loss would benefit other significant obesity related comorbidities.

### INDICATIONS FOR CONTINUED USE

NICE recommends that treatment with GLP-1s is continued only if HbA1c has reduced by 1% and a weight loss of 3% is achieved within 6 months of commencing treatment.

### STORAGE OF GLP-1 PEN DEVICES

- Unopened GLP-1 pre-filled pens should be stored in the refrigerator 2-8°C (36-46°F). Do not freeze.
- The GLP-1 pen in use can be kept at room temperature but away from direct light.
- It should be discarded after 30 days from first use even if there is still some liquid in the pen.
**TYPE 2 DIABETES – GLP-1 MEDICINES INFORMATION**

**LIXISENATIDE (LYXUMIA)**

*Can be used in combination with Metformin, a sulphonylurea or insulin.*

**Dosage**
- Starting dose: dosing is initiated at 10 mcg Lyxumia once daily for 14 days.
- Maintenance dose: a fixed maintenance dose of 20 mcg Lyxumia once daily is started on Day 15.
- It is administered once daily, within the hour prior to the first meal of the day or the evening meal. If a dose of Lyxumia is missed, it should be injected within the hour prior to the next meal.
- When Lyxumia is added to existing metformin therapy, the current metformin dose can be continued unchanged.
- When added to existing therapy of a sulphonylurea or a basal insulin, an initial 50% reduction in the dose of the sulphonylurea or the basal insulin should be considered to reduce the risk of hypoglycaemia. Lyxumia should not be given in combination with basal insulin and sulphonylurea due to increased risk of hypoglycaemia.
- Its use does not require specific blood glucose monitoring. However, when used in combination with a sulphonylurea or a basal insulin, blood glucose monitoring or blood glucose self-monitoring may become necessary to adjust the doses of the sulphonylurea or the basal insulin.

**EXENATIDE (BYETTA)**

*Byetta can be used in combination with:*
- Metformin
- Basal Insulin*
- Metformin and sulphonylurea
- Sulphonylurea
- Metformin and pioglitazone
- Pioglitazone

**Dosage:**
- There are 2 strengths, 5 microgram and 10 microgram pre-filled pens with 60 doses in each (30 days supply).
- The pen gives same dose each time it is used.
- A separate prescription is needed for pen needles.
- Initiate with the 5-microgram dose.
- Inject subcutaneously into either the thigh abdomen or arm.
- Inject within a 60-minute period before the morning and evening meal.
- Injections should be given more than 6 hours apart.
- After one month the dose can be increased to 10 micrograms twice daily.

**EXENATIDE SUSTAINED RELEASE (BYDUREON)**

*Comes in a powder and solvent for prolonged-release suspension for injection - 2mgs per dose in packs of 4.*

**The Bydureon vial and syringe is being replaced by a pen**

**Bydureon can be used in combination with:**
- Metformin (+/- sulphonylurea)
- Sulphonylurea
- Pioglitazone
- Metformin and pioglitazone

In adults who have not achieved adequate glycaemic control on maximally tolerated doses of these oral therapies.

**Dosage**
- The recommended dose is 2 mg once weekly.
- Patients switching from exenatide twice daily (Byetta) to Bydureon may experience transient elevations in blood glucose concentrations, which generally improve within the first two weeks after initiation of therapy.
- When Bydureon is added to existing metformin and/or thiazolidinedione therapy. The current dose of metformin and/or thiazolidinedione can be continued.

**LIRAGLUTIDE (VICTOZA)**

*Comes in a pre-filled pen - 6mgs per ml. The pen can be adjusted to give either 0.6mgs, 1.2mgs or 1.8mg. NICE does not recommend the higher dose on cost grounds as they did not see any additional benefit over the 1.2mg dose.*

**Dosage**
- Starting dose is 0.6mg daily to improve gastrointestinal tolerability. Increase to 1.2mg after at least 1 week. Some patients may benefit from an increase to 1.8mg daily. Doses higher than 1.8mg are not recommended.
- Dose adjustment is not required based on age. No dosage adjustment is required for mild renal impairment.
- Liraglutide is administered once daily, at any time, independent of meals, as a subcutaneous injection into the abdomen, thigh or upper arm.
- Liraglutide is now licensed for use in combination with basal insulin
- Self-monitoring of blood glucose is not needed in order to adjust the dose of liraglutide. However, when initiating treatment with liraglutide in combination with a sulphonylurea, blood glucose self-monitoring may become necessary to adjust the dose of the sulphonylurea.

**EXENATIDE SUSTAINED RELEASE**

*When bydureon is added to sulphonylurea therapy, a reduction in the dose of sulphonylurea should be considered to reduce the risk of hypoglycaemia*

*Bydureon should be administered once a week on the same day each week.*

*The day of weekly administration can be changed if necessary as long as the next dose is administered at least one day (24 hours) later. Bydureon can be administered at any time of day, with or without meals.*

*If a dose is missed, it should be administered as soon as practical. Thereafter, patients can resume their once weekly dosing schedule.*

*Two injections should not be given on the same day.*

*Blood glucose self-monitoring may be necessary to adjust the dose of sulphonylurea.*

*If a different antidiabetic treatment is started after the discontinuation of Bydureon consideration should be given to the prolonged release of Bydureon.*