

How to calculate the amount of Insulin to prescribe per month

How much insulin needs to be prescribed per month?

It is difficult to determine how much insulin will be required for an individual at insulin initiation. Typically, insulin will be commenced at a modest starting dose of around 5 to 10 units/day and the dose up-titrated over several weeks until the target blood glucose levels are achieved. With support, many individuals are able to self-titrate according to their home blood glucose monitoring results. Insulin requirements will usually increase in the weeks following initiation.

For those individuals who adjust the amount of insulin they administer according to what they eat or their varying activity levels, it can be more difficult to predict how much insulin will be needed each month.

Table 1 (see below) is a guide for prescribers to help calculate how much insulin to prescribe each month **for people whose glycaemic control has stabilised**. Note, however, that it should not override the individual prescriber's own clinical judgement, and regular review of medication and dose is essential.

Most insulin cartridges and pre-filled pens hold 300 units of insulin in 3 ml (i.e. an insulin concentration of 100 units/ml), and five cartridges or pre-filled pens are supplied in one box. However, higher concentrations of certain types of insulin are now available containing multiples of 100units per ml (i.e. 200 units/ml, 300 units/ml and 500 units/ml). It is essential that the strength of the insulin is checked and correct prior to administering a dose to avoid **fatal consequences for the resident**.

Splitting packs

Some pharmacies are willing to split packs of cartridges and pre-filled pens, although some people prefer their insulin to be in its original box. Where packs are split, the expiry date on every cartridge or pen should be clear and a patient information leaflet supplied.

Remember to take account of the additional insulin required to allow for priming (see page 2)

This will vary depending on the frequency of injections:

- Once daily (OD): add **56 units** for 28 days
- Twice daily (BD): add **112 units** for 28 days
- Three times daily (TDS): add **168 units** for 28 days

Table 1. Chart for calculating amount of insulin required per month according to daily dose.

Total daily dose (units)	If splitting packs: Number of pens needed for 28-day supply				If prescribing complete packs: Number of boxes (containing five pens) needed for 28-days supply
	OD	BD	TDS	Rounded up	
10	1.1	1.3	1.5	2	1
20	2.1	2.2	2.4	3	1
30	3.0	3.2	3.4	4	1
40	3.9	4.1	4.3	5	1
50	4.9	5.0	5.2	6	2
60	5.8	6.0	6.2	7	2
70	6.7	6.9	7.1	8	2
80	7.7	7.8	8.1	9	2
90	8.6	8.8	9.0	9	2
100	9.5	9.7	9.9	10	2
110	10.5	10.6	10.8	11	3
120	11.4	11.6	11.8	12	3
130	12.3	12.5	12.7	13	3
140	13.3	13.4	13.6	14	3
150	14.2	14.4	14.6	15	3

Quick glance

Total daily dose (units)	Number of boxes needed for 28-day supply
1-40	1 box
40-100	2 boxes
100-150	3 boxes

What and why

People requiring insulin therapy should be discouraged from over-ordering and stockpiling insulin in their fridge.

The shelf-life of most unopened insulin vials, cartridges and pre-filled pens is 3 years but there may be a delay from date of manufacture to the date the insulin is dispensed.

Therefore, users **MUST ALWAYS** check the expiry date on each preparation before use.



Once opened, or after first use, any insulin remaining in a vial, cartridge or prefilled pen should be discarded after 28 days. (Once opened label with the date opened)

Priming the insulin pen (performing an “air shot”)

Insulin pens should be primed (observing at least a drop of insulin at the needle's tip) according to the manufacturer's instructions* before each injection to ensure there is unobstructed flow and to clear needle dead space (Forum for Injection Technique, 2016).

How to perform an “air shot”

- Turn the dose selector to 2 units
- Hold the pen with the needle pointing up and tap the pen **gently** a few times, which will move any air bubbles to the top
- Fully depress the delivery push button. A drop of insulin should appear at the tip of the needle. If a droplet is not seen, repeat the priming process. If a droplet is still not seen, then **DO NOT** use the pen

* Most manufactures recommend performing a 2-units “air shot”. For Toujeo, the manufacturer recommends turning the dose selector until the dose pointer is at the mark between 2 and 4 (i.e. 3 units). Always check leaflet for manufacturer's instructions.

Pen needles



DON'T FORGET: Pen needles are not supplied with the cartridges or pens and need to be prescribed separately.

- A 4mm pen needle inserted perpendicularly (at 90 degrees) is long enough to penetrate the skin and enter the subcutaneous tissue with little risk of intramuscular (or intradermal) injection. This is the safest option for adults and children regardless of age, gender and BMI. Although this is the needle of choice for obese patients, a 5mm needle may be acceptable. (Forum for Injection Technique, 2016)
- Assessment of injection technique and examination of injection sites should be part of a regular face-to-face review.

For the latest guidance on injection technique, refer to the 4th edition of *The UK Injection and Infusion Technique Recommendations* (Forum for Injection Technique, 2016)



INSULIN IS A HIGH-RISK MEDICATION!

Many insulins have very similar sounding names but completely different time–action profiles

ALWAYS PRESCRIBE INSULIN BY BRAND NAME

References

Forum for Injection Technique (2016) *The UK Injection and Infusion Technique Recommendations* (4th edition). Available at: www.fit4diabetes.com

Diggle J (2017) How to calculate the amount of insulin to prescribe per month, *Diabetes & Primary Care* Vol 19 No 5 pp.197-198.

Diabetes Policy Wirral Care Homes 2018. Available at < <https://www.wuth.nhs.uk/media/8835/diabetes-policy-with-nice-approval-wirral-care-homes-70618-locked.pdf> > [Accessed 26 March 2020 and permission granted by Karen Leong, Diabetes Specialist Nurse, to adapt]

Providers should use this guidance in conjunction with Medicine Patient Information Leaflets, NICE Guidance 'Managing Medicines in Care Homes' SC1 and should check the CQC website for recent updates.

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