

Insulin Administration: What You Don't Know May Hurt Your Patient

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From Science To Practice

Insulin Injection Education?

- 1. I do it myself**
- 2. I have a diabetes educator, she/he does it**
- 3. I send the patient to the pharmacist**
- 4. A patient on insulin that has been doing it for a long time**
- 5. The insulin company**

Your Rx for Insulin includes syringe specifics?

- 1. Yes**
- 2. No**

What needle size do you recommend for prandial insulin?

- 1. 12 mm (approx 0.6 inches)**
- 2. 10 mm (approx ½ inch)**
- 3. 8 mm (approx 1/3 inch)**
- 4. 6 mm**
- 5. 5 mm (approx ¼ inch)**
- 6. 4 mm (approx 1/6 inch)**
- 7. Don't recommend**

When insulin is injected SC, the absorption is faster with longer needles than with shorter ones

- 1. True**
- 2. False**

How many of your patients have noticed nodules (lipohypertrophy) in the injection sites?

- 1. Half of the patients**
- 2. One quarter**
- 3. 10%**
- 4. Less than 10%**

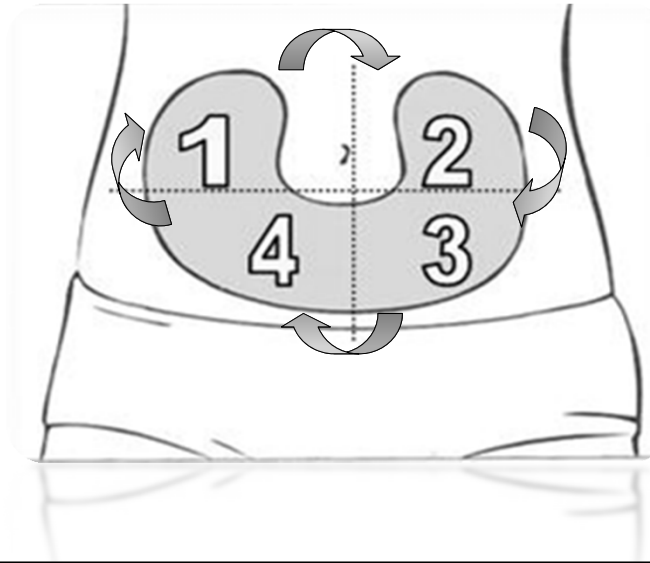
44.6	E.E.U.U.
44.6	RUSIA
45.6	PAÍSES BAJOS
54.2	BÉLGICA
50.4	FRANCIA
51.7	ESPAÑA
44.6	ITALIA
73.3	SUIZA
54.2	Reino Unido e Irlanda
56.6	DINAMARCA
60.0	SUECIA
52.2	ALEMANIA
31.1	CHINA
33.1	TURQUÍA
30.0	PORTUGAL
88.0	FINLANDIA

48%
Lipohypertrophy

Visible Lipodistrophies



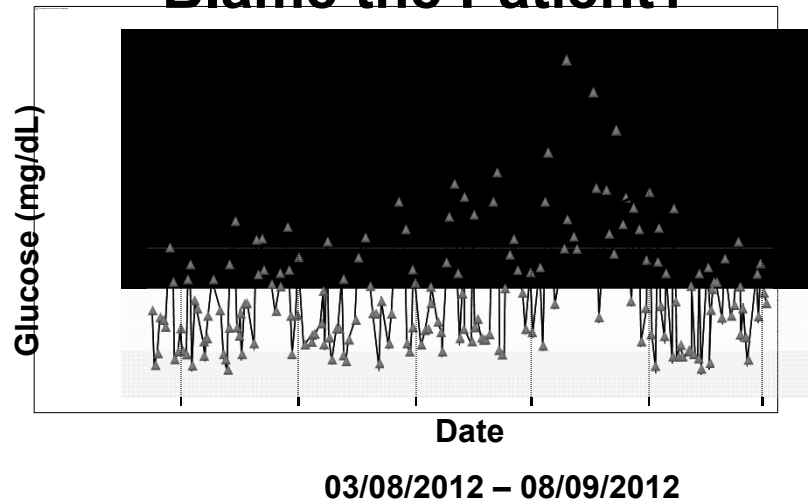
Insulin Injection Rotation



Palpable Lipodistrophies



Glucose Control Blame the Patient?



Lipodistrophies

Best strategies is prevention:

- **Rotation of injection sites**
- **No reutilization of needles**

Skin thickness in adults with diabetes

- 1. Is thicker in Whites than Asians**
- 2. Increases as the BMI goes up**
- 3. Is thicker in men than women**
- 4. It gets thinner with age**
- 5. All of the above**
- 6. None of the above**

When an injection goes IM instead of SC the main reason is:

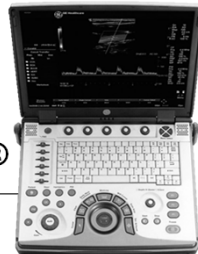
- 1. Low BMI**
- 2. Angle of injection**
- 3. Needle is too long**
- 4. All of the above**
- 5. None of the above**

Methodology: ultrasound



Cortex DermaScan[®] C

GE Logiq e[®]



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SPECIAL FOCUS >

Skin and subcutaneous adipose layer thickness in adults with diabetes at sites used for insulin injections: implications for needle length recommendations

M. Gibney, C. Arce, K. Byron, L. Hirsch
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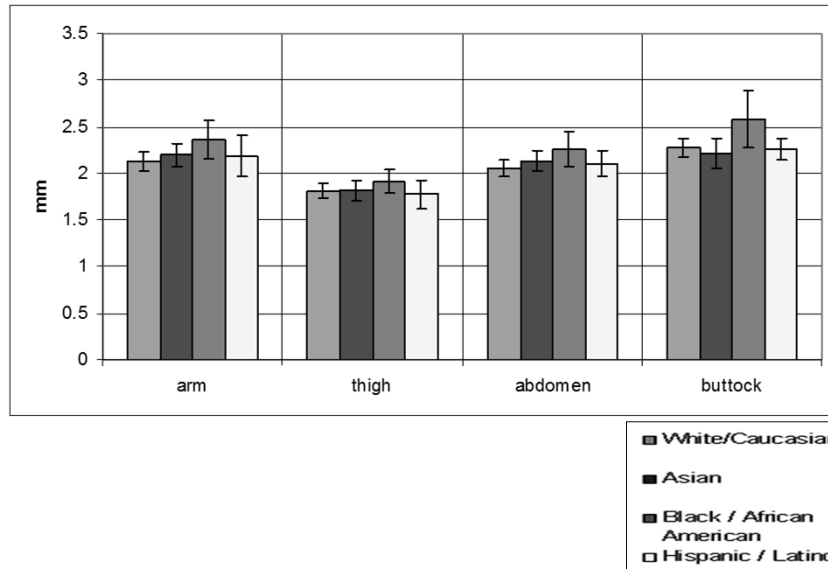
Comparative glycaemic control, safety and patient ratings for a new 4 mm × 32 G insulin pen needle in adults with diabetes
L. Hirsch, M. Gibney, John Albanese, S. Ou, K. Kassler-Taub, L. Klaff and T. Bailey
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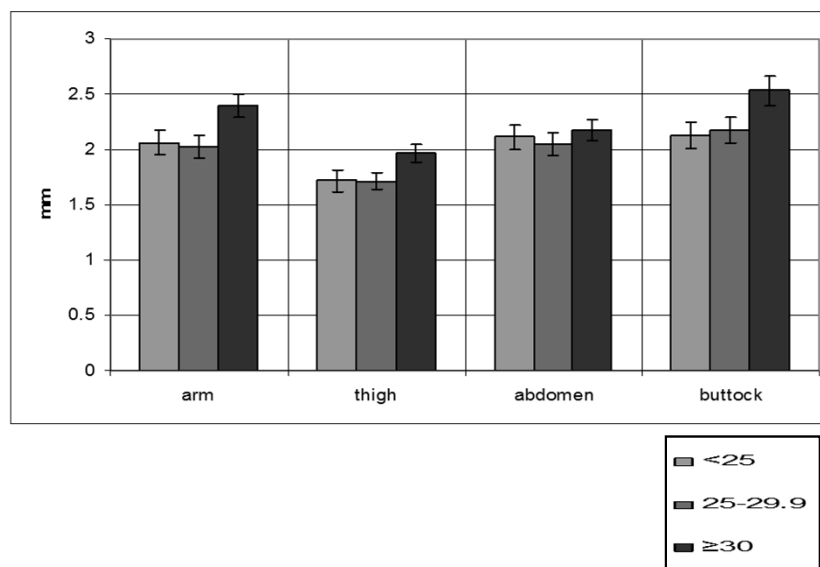
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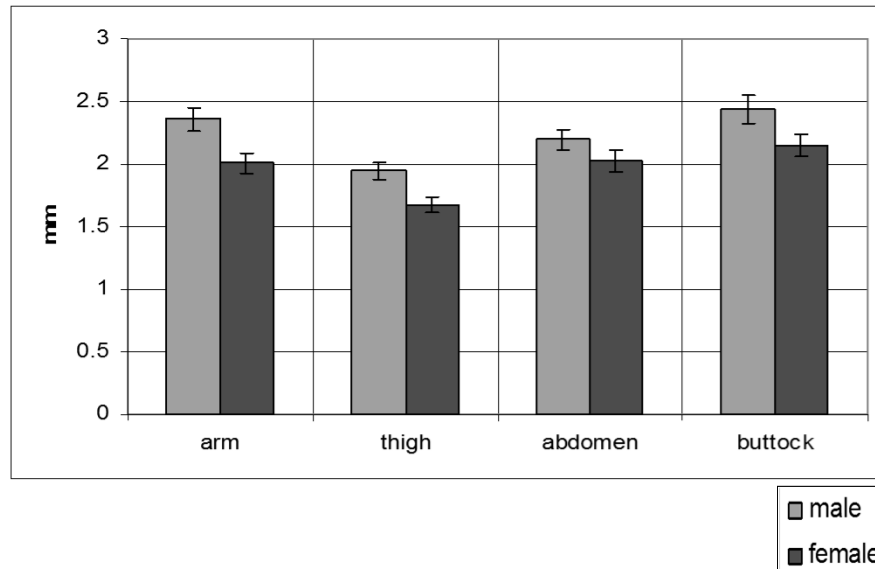
1. Skin Thickness by Race/Ethnicity



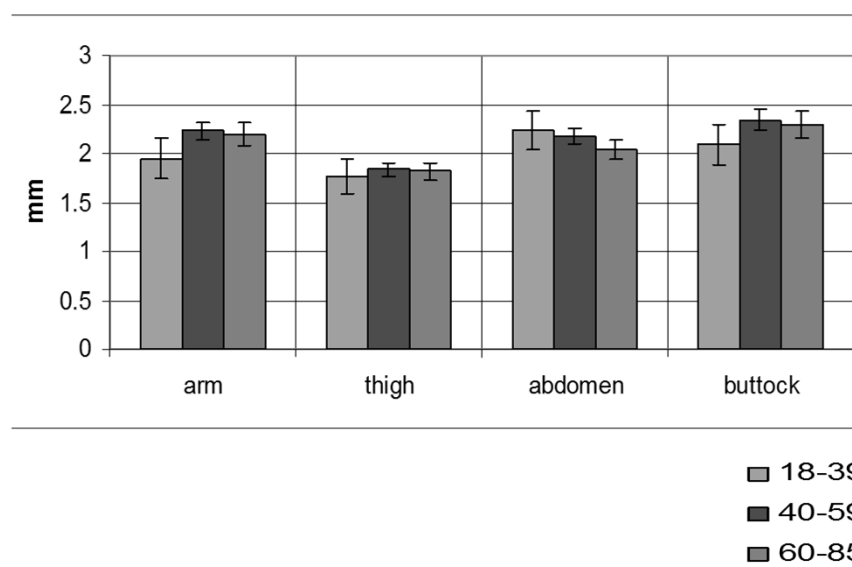
2. Skin Thickness by BMI



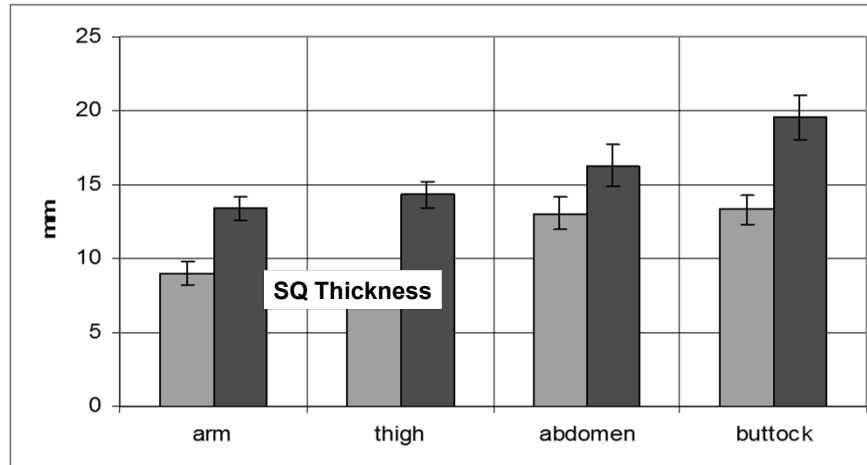
3. Skin Thickness by Sex



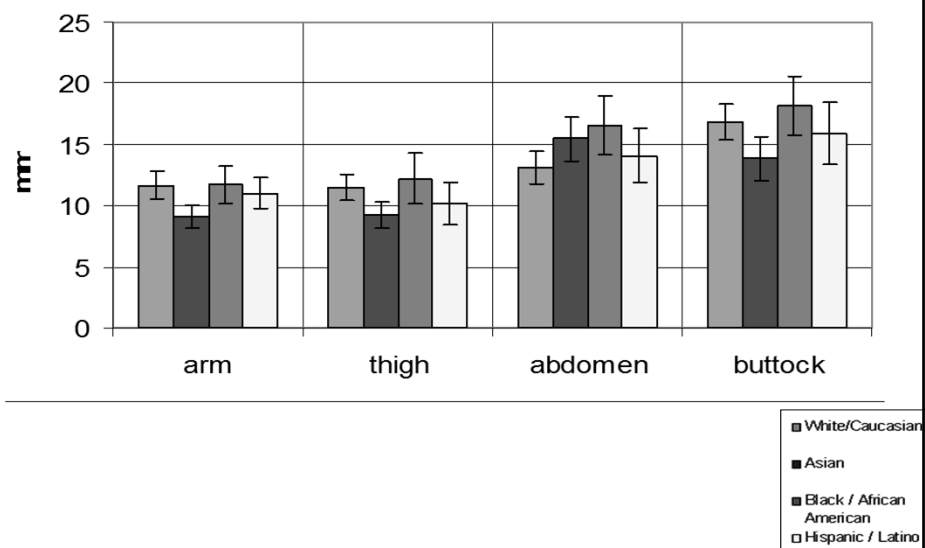
4. Skin Thickness by Age



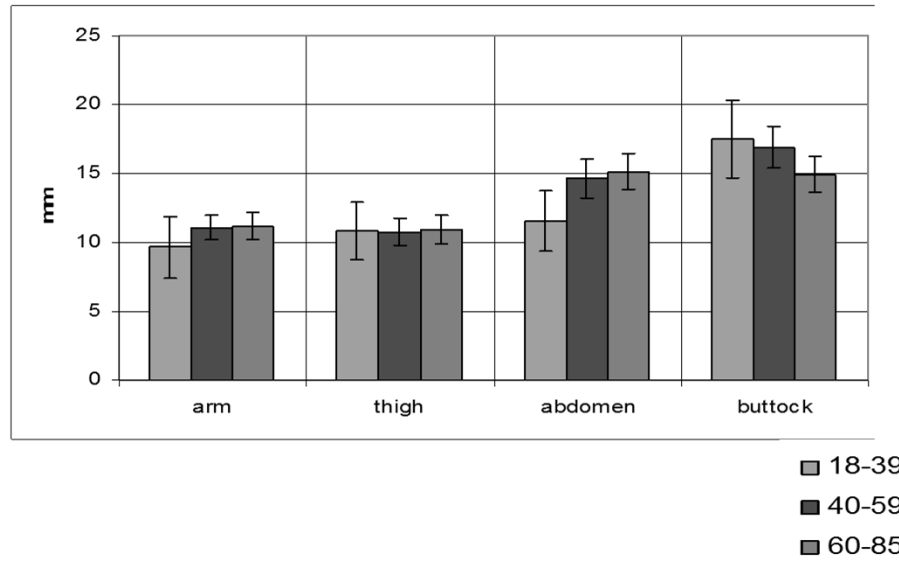
Adipose Tissue Thickness by Sex



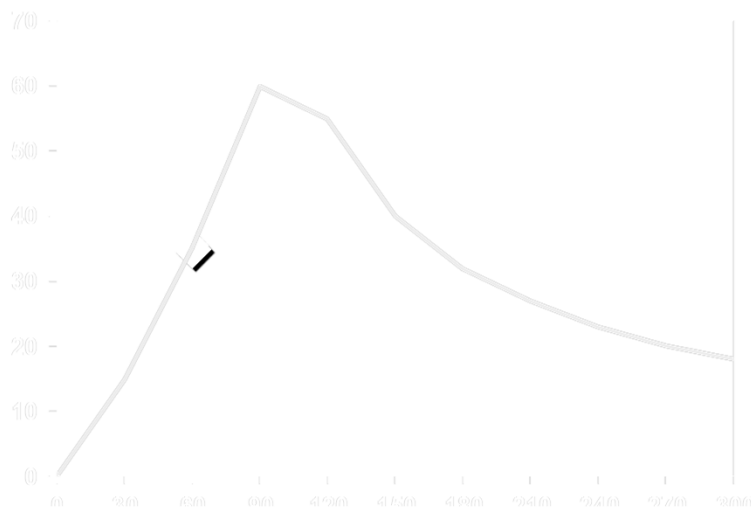
Adipose Tissue Thickness by Race



Adipose Tissue Thickness by Age



Regular Human Insulin SC



Regular Human Insulin IM

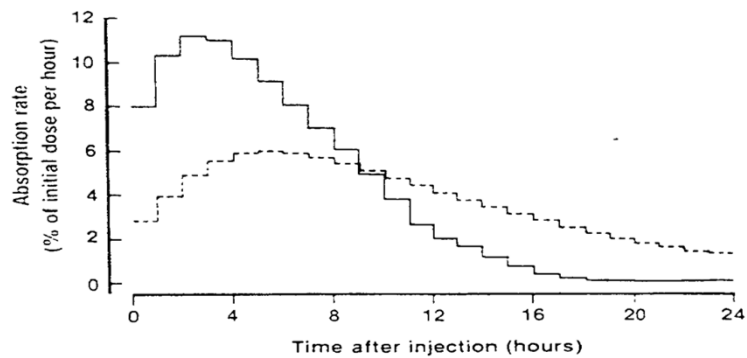
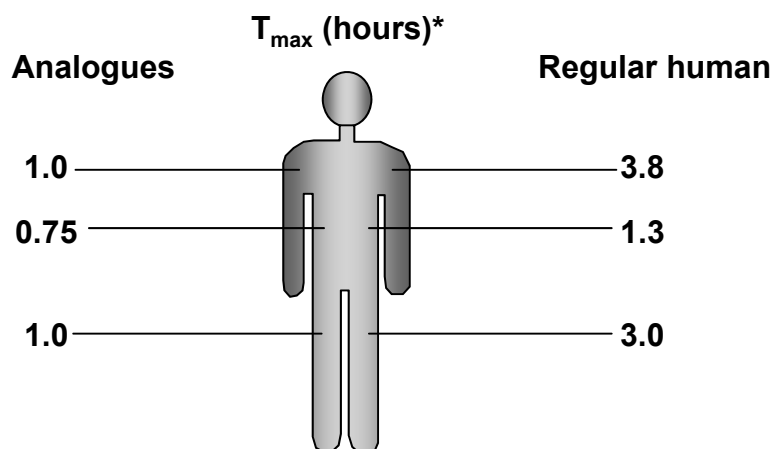


FIG. 2. Mean absorption rates of 10 U NPH insulin during consecutive 60-min periods from subcutaneous (*dashed line*) and intramuscular (*solid line*) injection sites of 11 insulin-dependent diabetic patients (calculated from data in Fig. 1).

Insulin Administration

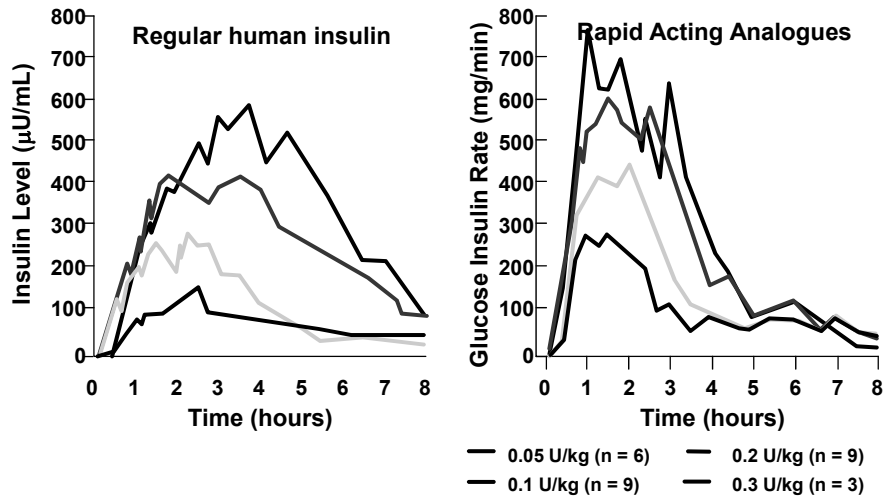
What do we teach?
What should we teach?

Rapid Analogues vs Regular Human Insulin



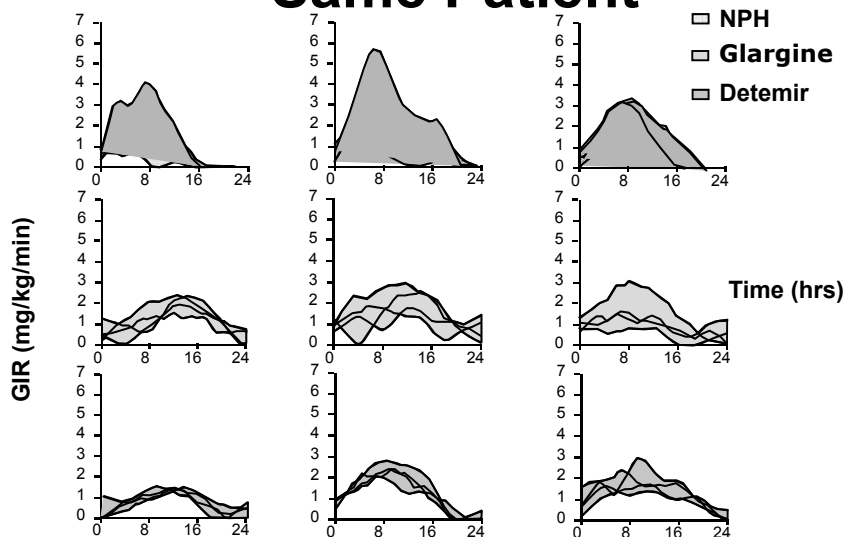
* 0.2 U/kg SC.
Diabetes Care. 1996;19:1437.

Rapid Acting Analogues vs Regular Human Insulin



Woodworth, et al. *Diabetes*. 1993;42(suppl 1):54A.

Insulin Variability of Basal Insulin Same Patient



Heise T et al. *Diabetes* 2004;53:1614-20.

Editorial



The majority of our time, which is limited, we spend educating our patients regarding:

- INSULIN doses
- Being sure patients see numbers well
- When to administer the insulin

2. Davidson JA, *Diabetes & Metabolism*. 2010;36 (suppl.): S2.

Need to Remember²

“ *patients get their supplies from many sources: the hospital, the local pharmacy, doctor’s offices, mail order firms, Internet suppliers, etc.*”

- Patients are provided whatever needles are available OR
- Patient chooses the least expensive one

QUESTION:

1. “*How many times do we ask ourselves whether glucose fluctuations might be due to inconsistencies in injection technique*”
 - Changing needle sizes
 - Using a needle that is too long
2. “*how many times do we wave our finger at the patient, blaming them for not taking the insulin correctly*”

“*Rarely do we as professionals explain to them the importance of using a needle length appropriate for their subcutaneous tissue depth, nor do we write this into their prescriptions.*”

2. Davidson JA, *Diabetes & Metabolism*. 2010;36 (suppl.): S2.

Pediatric Patients

Children and adolescents

- Higher risk of IM injection ¹²
- There is NO medical reason for us to recommend needles longer than >4 mm⁹

12. Seidenari S, et al. *Dermatology*. 2000;201:218-22.

9. Frid A, et al., *Diabetes & Metabolism*. 2010;36 (suppl.): S9.

Pregnancy

Recommendations

- “Pregnant women with *diabetes must inject insulin pinching the skin*”
- **AVOID the peri-umbilical area in the last trimester.**¹³”

13. Frid A, et al., *Diabetes & Metabolism*. 2010;36 (suppl.): S11.

14. Engström L, et al. IDF Meeting, Mexico City. 2000.



The V-Go® Poor men pump



Humalog is a registered trademark of Eli Lilly and Company. NovoLog is a registered trademark of Novo Nordisk A/S.
V-Go Instructions for Patient Use, Valeritas, Inc., 2011.

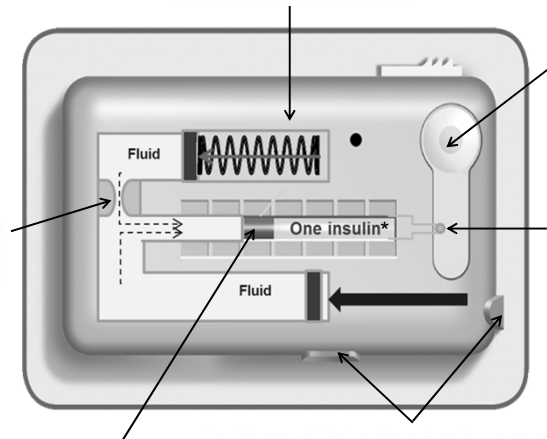
About V-Go®

- **The V-Go Disposable Insulin Delivery Device**
 - Provides continuous subcutaneous delivery of insulin at a preset basal rate and on-demand bolus dosing for adult patients requiring insulin
- **V-Go is**
 - Easy-to-fill, use and apply every 24 hours
 - Fully disposable with no batteries, infusion sets or electronics
 - Convenient and comfortable
 - Engineered to simplify basal-bolus insulin therapy
- **V-Go was developed for patients with T2DM in mind**
 - Requires only one insulin* type (Lispro or Aspart®)

*A U-100 fast-acting insulin should be used with the V-Go. Humalog is a registered trademark of Eli Lilly and Company.
NovoLog is a registered trademark of Novo Nordisk A/S. Humalog and Novolog have been tested by Valeritas, Inc.
& found to be safe for use in the V-Go Disposable Insulin Delivery Device.
V-Go Instructions for Patient Use, Valeritas, Inc., 2011.

How the V-Go[®] Works

The V-Go covers basal-bolus therapy for 24 hours



*Fast Acting Insulin
Data on File, Valeritas, Inc.

V-Go[®] Indications

- **V-Go 20**
 - 20 Units/24 hr (0.83 U/hr) basal rate and up to 36 Units of on-demand bolus dosing in 2-Unit increments* in adult patients requiring insulin
- **V-Go 30**
 - 30 Units/24 hr (1.25 U/hr) basal rate and up to 36 Units of on-demand bolus dosing in 2-Unit increments* in adult patients requiring insulin
- **V-Go 40**
 - 40 Units/24 hr (1.67 U/hr) basal rate and up to 36 Units of on-demand bolus dosing in 2-Unit increments* in adult patients requiring insulin

*36 Units of insulin are available for on-demand bolus in all V-Go options, in 2-Unit increments. You can push the bolus delivery button 18 times in every 24-hour period. Each push delivers 2 Units of insulin (1 push=2 Units).

V-Go Instructions for Patient Use, Valeritas, Inc.; 2011.

V-Go[®] Considerations

- **Dosing considerations**
 - Understand the total daily dose of insulin your patient is actually taking vs. what is being prescribed.
 - Selecting the correct V-Go option may lessen the risk of hypoglycemia
- **Other prescribing considerations**
 - A separate prescription is required for use with the V-Go. A U100 fast-acting insulin should be used to fill the V-Go.
 - V-Go 20 requires two (2) vials of insulin
 - V-Go 30 & 40 require three (3) vials of insulin
 - **Lispro[®] and Aspart[®] have been tested by Valeritas, Inc. and found to be safe for V-Go.**
 - Before using different insulin with the V-Go, you should check the insulin label to make sure it can be used with this device.




Humalog is a registered trademark of Eli Lilly and Company. NovoLog is a registered trademark of Novo Nordisk A/S. V-Go Instructions for Patient Use, Valeritas, Inc.; 2011.

Important Risk Information for the V-Go[®]

- **Insulin Requirements**
 - If regular adjustments or modifications to the basal rate of insulin are required in a 24-hour period, or if the amount of insulin used at meals requires adjustments of less than 2-Unit increments, use of the V-Go Disposable Insulin Delivery Device may result in hypoglycemia.
- **The following conditions may occur during insulin therapy with the V-Go:**
 - Hypoglycemia (low blood glucose) or Hyperglycemia (high blood glucose)
 - Skin irritation from the adhesive pad or infections at the infusion site
- **The V-Go should be removed before any magnetic resonance imaging (MRI) testing.**

V-Go Instructions for Patient Use, Valeritas, Inc.; 2011.

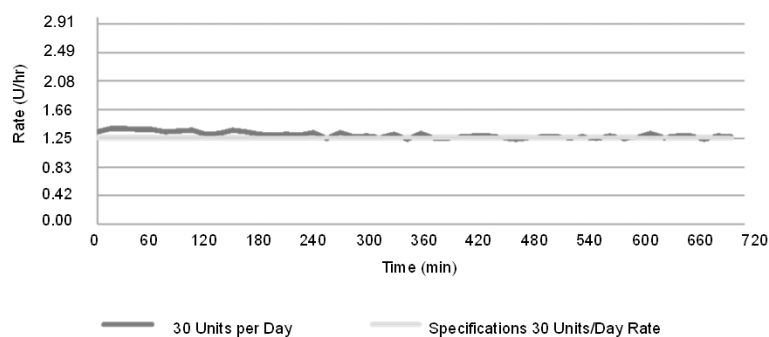
Three Dosing Options Are Available for the V-Go®

V-Go Option	Preset Basal Rate	+	On-Demand Bolus Dosing	=	Total Available Insulin
 20 Units/24 hr (0.83 U/hr)		+	Up to 36 Units of insulin in 2-Unit increments for on-demand bolus dosing at meals (1 push = 2 Units)	=	56 Units
 30 Units/24 hr (1.25 U/hr)		+		=	66 Units
 40 Units/24 hr (1.67 U/hr)		+		=	76 Units

*You can push the Bolus Delivery Button only 18 times in every 24-hour period. Each push of the Bolus Delivery Button delivers 2 Units of insulin (1 push = 2 Units).
V-Go Instructions for Patient Use. Valeritas, Inc., 2011.

V-Go® Consistently Delivers a Continuous Basal Rate

V-Go® 30 Units/Day - Start-up Graph



Similar basal flow rate accuracy has been demonstrated for all 3 V-Go options (20/30/40) for the given time periods.

V-Go Instructions for Patient Use. Valeritas, Inc., 2011.

The V-Go® Is Easy to Fill and Is Filled at the Point of Care

- **The V-Go EZ Fill filling accessory**
 - Point-of-care filling accessory specific to each V-Go option
 - A new EZ Fill is provided in each V-Go commercial kit
 - A separate prescription for a fast-acting insulin is required for use with the V-Go



Humalog is a registered trademark of Eli Lilly and Company. NovoLog is a registered trademark of Novo Nordisk A/S. V-Go Instructions for Patient Use. Valeritas, Inc., 2011.

New Recommendations

The 4 mm needle is probably the best for all patients with diabetes

- **1. Children and adolescents**
- **2. Adults and elderly**
- **3. Low, high or normal BMI**
- **4. Any race or ethnicity**
- **5. No different for sex**

Conclusions

- **How patients inject insulin is as important as the insulin they are using**