

University of California, San Diego (UCSD)

At UCSD, computerized physician order entry and a very positive experience with the algorithm in the previous section led to an opportunity to attempt a very high degree of integration of the algorithm and policies into the “next generation” order set. The screen shots from the order set show how the algorithm with its suggested pathways can drive turning your order set into a more protocol-like approach. The UCSD order set can be seen as one extreme end of a more protocol-like approach to integrating guidance into the order set, whereas the basic order set represents the opposite end of the spectrum. (Special thanks to Josh Lee MD, UCSD hospitalist and informatics liaison extraordinaire, for assisting with creation of the CPOE order set.) Other examples show some varying degree of “protocolization.” You’ll have to decide what is most desirable and feasible at your own institution.

The first time subcutaneous insulin is ordered, there is a prompt to discontinue all oral hypoglycemic agents, a prompt to order an HbA1C if the patient hasn’t had one recently, and an actionable glycemic target. Actionable means that if the glucose readings are outside the desired range and no changes in insulin orders have occurred in 24 hours, the physician is called and a request to adjust insulin orders is made.

PCIS UCSD Healthcare Information Network

PINA, PAUL MR#: 16025330 MICU MICU04 02/23/06 1737
70001532 M 05/02/1963 Age: 42 SGS ORDERS DISPLAY

Insulin Subcutaneous Orders ALLERGY

Please discontinue all current hypoglycemics, such as sulfonylureas, glitazones and metformin containing formulations (no order)

Please select one of the Glycemic control targets:

- Glycemic Target is 80-130 mg/dL preprandial, no sugars > 180 mg/dL. (Best goal in patients who have achieved 80-150 mg/dL without difficulty)
- Glycemic Target is 90-150 mg/dL preprandial, no sugars > 180 mg/dL. (Good choice to start with in most patients)
- Glycemic Target is 100-200 mg/dL. (Less stringent goal more suitable for some patients with end stage disease or other issues that makes stringent control a less important factor)

LCH0445 rnt draw next av onc

If no Hemoglobin A1C (glycosylated hemoglobin) drawn in the past month, please order now.
Glycemic target for this patient is <100-200.>;contact first call provider if patient is outside of range 2 or more times in one shift. phm ongoing

Skip Insulin Help New Orders Hypoglycemia Protocol OK

PVISSMNA TRAINING MODE Ovr Field Help Suspend

On the next screen, all prior insulin orders are discontinued, and the ordering physician is asked to put in the information needed to calculate a reasonable starting estimate for the total daily dose of insulin required and to classify the patient’s nutritional intake. Clicking on the OK button leads to the next screen, where the total daily dose estimate under this method is auto-calculated (per UCSD algorithm an overweight patient who weighs 100 kg would have a suggested TDD of 50 units [100 kg x 0.5 units/kg/day = 50 units]). If desired, the physician can change this TDD and is also offered alternate ways to calculate it (including guidance on insulin dosing for the transition from insulin infusion to subcutaneous insulin).

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PINA, PAUL MR#: 16025330 MICU MICU04 02/23/06 1739
70001532 M 05/02/1963 Age: 42 SGS ORDERSSETS

Insulin Subcutaneous Orders ALLERGY Page 2

D/C All prior Insulin-related orders except Insulin drips

Dosing Weight: 100 Kg

== Insulin Sensitivity / Body Habitus: Please Select one ==

- Patient is standard, normal body habitus
- Patient is very lean, or has hypoglycemia risk factors (ESRD, on hemodialysis, or very sensitive to insulin)
- Patient is overweight
- Patient is obese, on steroids, or known to be insulin resistant

== Nutritional Intake: Please Select one ==

- Patient is eating/receiving bolus tube feedings
- Patient is receiving continuous infusions of tube feeds or parenteral nutrition as a primary calorie source
- Patient is NPO or on clear liquids

Skip Insulin Help New Orders Hypoglycemia Protocol OK

PVISSMNX TRAINING MODE Ovr Field Help Suspend

PCIS UCSD Healthcare Information Network

PINA, PAUL MR#: 16025330 MICU MICU04 02/23/06 1741
 70001532 M 05/02/1963 Age: 42 SGS ORDERSETS

Insulin Subcutaneous Orders ALLERGY -
 ===== Please Select One ===== Page 2

Suggested Total Daily Dose (TDD) of insulin
 This TDD suggestion is derived by patient's weight and body habitus / insulin sensitivity.

Other methods to calculate the TDD:
 - Transition from insulin infusion- Average hourly rate over last 6 hours, multiply by 20:
 - If TF, TPN, or meals, this is TDD.
 - If insignificant nutrition in last 6 hours, double the number to get TDD.
 - Total all insulins used at home (adjust up if poorly controlled)

Note: TDD estimate assumes good caloric intake, but you can adjust for poor or uncertain caloric intake later.

Skip New Orders Hypoglycemia Protocol OK

PVISSMNJ TRAINING MODE Ovr Field Help Suspend

The UCSD algorithm calls for glargine insulin as the basal insulin (40% of calculated TDD), regular insulin as the correction dose insulin (to be administered every 6 hours). For this overweight 100-kg NPO patient with a TDD of 50 units, the glargine dose is calculated as being approximately 20 units. Note the prompts for a dextrose-containing IV fluid for NPO patients, as well as the instructions to continue the full dose of basal glargine insulin when the patient is NPO. Correction-dose regular insulin looks like a traditional sliding scale, but the aggressiveness of the correction dose actually varies with the TDD estimate (the ordering physician sees only the scale most suited to the patient's insulin sensitivity).

PCIS UCSD Healthcare Information Network

PINA, PAUL MR#: 16025330 MICU MICU04 02/23/06 1743
 70001532 M 05/02/1963 Age: 42 SGS ORDERSETS

Insulin Subcutaneous Orders ALLERGY -
 ===== Please Select One ===== Page 2 of

Check Fingerstick q6h
 D5 + 1/2 NS @ mL/hr
 (generally recommended for Pt on NPO for Surgery)

===== Select One Basal Insulin =====

Glargine (Lantus) units qAM OR _____
 Glargine (Lantus) units qAC Lunch OR _____
 Glargine (Lantus) units qHS OR _____

NPH units in AM once (Pt has Surgery or Procedures)

Give full basal Lantus dose even if nutrition interrupted or patient is NPO More Info on basal Lantus/NPH

TDD *.5 *2/3 *1/2

Skip New Orders Hypoglycemia Protocol OK

PVISSMNP TRAINING MODE Ovr Field Help Suspend

Correction Dose Scales for regular Insulin TDD 40-60	
Glucose Range	q6h
70-150 mg/dL	0 Correction Dose
151-175 mg/dL	+ 2 units
176-200 mg/dL	+ 4 units
201-225 mg/dL	+ 6 units
226-250 mg/dL	+ 8 units
251-300 mg/dL	+ 10 Units
>300 mg/dL	+ 12 Units
<70 mg/dL	See Hypoglycemia Protocol

PCIS UCSD Healthcare Information Network
 PINA, PAUL MR#: 16025330 MICU MICU04 02/23/06 1745
 70001532 M 05/02/1963 Age: 42 SGS ORDERSETS ALLERGY -
 Insulin Subcutaneous Orders Page 5

Skip New Orders OK

PVISSRG2 TRAINING MODE Ovr Field Help Suspend

The next patient is an 80-g obese person who is eating regular meals. A TDD of 48 units of insulin is auto-calculated and accepted by the physician. Forty percent of the TDD (20 units) is distributed as basal glargine insulin as the preferred default, whereas 10 units of a rapid-acting analogue insulin (lispro at UCSD) is administered on a scheduled basis with each meal (see next page). Minimum glucose monitoring for the eating patient (q AC and HS) is automatically ordered.

PCIS UCSD Healthcare Information Network
 ALASKA, KELLY MR#: 19082841 CCU CCU10 02/23/06 1755
 70737374 F 01/15/1971 Age: 35 MGM ORDERSETS ALLERGY -
 Insulin Subcutaneous Orders Page 2

D/C All prior Insulin-related orders except Insulin drips
 Dosing Weight: 80 Kg

== Insulin Sensitivity / Body Habitus: Please Select one ==
 Patient is standard, normal body habitus
 Patient is very lean, or has hypoglycemia risk factors (ESRD, on hemodialysis, or very sensitive to insulin)
 Patient is overweight
 Patient is obese, on steroids, or known to be insulin resistant

== Nutritional Intake: Please Select one ==
 Patient is eating/receiving bolus tube feedings
 Patient is receiving continuous infusions of tube feeds or parenteral nutrition as a primary calorie source
 Patient is NPO or on clear liquids

Skip Insulin Help New Orders Hypoglycemia Protocol OK

PVISSMNX TRAINING MODE Ovr Field Help Suspend

PCIS UCSD Healthcare Information Network

ALASKA ,KELLY MR#: 19082841 CCU CCU10 02/23/06 1756
 70737374 F 01/15/1971 Age: 35 MGM ORDERSETS ALLERGY -

Insulin Subcutaneous Orders Page 3

Total Daily Dose: 48
 Check Fingerstick qAC and qHS

===== Select One Basal Insulin =====

Glargine (Lantus) 20 units qAM _____ OR _____
 Glargine (Lantus) 20 units AC Lunch _____ OR _____
 Glargine (Lantus) 20 units qHS _____ OR _____

NPH 16 units qAM and 8 units qHS

Give full basal Lantus/NPH dose even if nutrition interrupted or patient is NPO More Info

Skip New Orders Hypoglycemia Protocol OK

PVISSMNK TRAINING MODE Ovr Field Help Suspend

Note the reminder to reduce the nutritional insulin amount if the patient is eating < 100% of the expected nutritional intake. The medication administration record (MAR) contains instructions to hold this nutritional insulin should the nutrition be withheld or declined by the patient. Note also that the timing of the insulin administration in relation to the meal is repeated here and on the MAR. The correction-dose scale is different for the eating patient than it is for the NPO patient, in that the q HS correction scale is less aggressive. Note again that the aggressiveness of the scale varies to match the patient's sensitivity to insulin, as reflected by the TDD.

PCIS UCSD Healthcare Information Network

ALASKA ,KELLY MR#: 19082841 CCU CCU10 02/23/06 1846
 70737374 F 01/15/1971 Age: 35 MGM ORDERSETS ALLERGY -

Insulin Subcutaneous Orders Page 4

Nutritional Insulin	Breakfast	Lunch	Dinner
<input checked="" type="checkbox"/> Lispro (Humalog) w/first bite of each meal	10	10	10

Doses above assume the patient is eating 100% of meal, if this is not the case, click More Info on how to adjust for partial intake of meals: More Info

===== Correction or Adjustment Insulin =====

Dose Adjustment Insulin (w/first bite of each meal) Lispro Sliding Sca
 No Adjustment Insulin (No Sliding Scale)

Skip New Orders OK

PVISSMNL TRAINING MODE Ovr Field Help Suspend

PCIS UCSD Healthcare Information Network

ALASKA ,KELLY MR#: 19082841 CCU CCU10 02/23/06 1758
 70737374 F 01/15/1971 Age: 35 MGM ORDERSETS

Insulin Subcutaneous Orders ALLERGY -

Correction Dose Scale for Humalog(Lispro) TDD 40-60 Page 5

Glucose Range	qAC	qHS
70-150 mg/dL	0 Correction Dose	0 Correction Dose
151-175 mg/dL	+ 2 units	0 Correction Dose
176-200 mg/dL	+ 4 units	0 Correction Dose
201-225 mg/dL	+ 6 units	+ 3 units
226-250 mg/dL	+ 8 units	+ 4 units
251-300 mg/dL	+ 10 Units	+ 5 Units
>300 mg/dL	+ 12 Units	+ 6 Units
<70 mg/dL	See Hypoglycemia Protocol	

Skip New Orders OK

PVISSLS5 TRAINING MODE Ovr Field Help Suspend

PCIS UCSD Healthcare Information Network

ALASKA ,KELLY MR#: 19082841 CCU CCU10 02/23/06 1759
 70737374 F 01/15/1971 Age: 35 MGM ORDER DISPLAY

Insulin Subcutaneous Medications ALLERGY

Description	Start D/T	Sched Stop
***** THERE ARE NO orders approaching expiration *****		
<input type="checkbox"/> INSULIN LISPRO (HUMALOG) 10. UNITS SQ ACDIN	02/24 17:30	03/25
<input type="checkbox"/> INSULIN LISPRO (HUMALOG) 10. UNITS SQ ACLUN	02/24 11:30	03/25
<input type="checkbox"/> INSULIN LISPRO (HUMALOG) 10. UNITS SQ ACBRK	02/24 07:30	03/25
<input type="checkbox"/> CORRECTION LISPRO AC SQ DAILY	02/24 07:00	03/25
<input type="checkbox"/> INSULIN GLARGINE (HUMAN) 20. UNITS SQ HS	02/23 21:00	03/24
<input type="checkbox"/> FINGERSSTICK MONITORING AC+HS	02/23 21:00	03/25
<input type="checkbox"/> CORRECTION LISPRO HS SQ DAILY	02/23 21:00	03/24

Orders Skip Detail Adjust All Insulins Revise Individual Insulins Renew D/C Individual Insulin

PVORMED2 TRAINING MODE Ovr Field Help Suspend

The next time you enter the subcutaneous insulin orders, the regimen currently in place is displayed. The glycemic target and the hypoglycemia protocol orders are still present in the background.

Note that you can now discontinue or revise any individual insulin, or you can **adjust all insulins** if nutritional status changes or glycemic control is suboptimal.