



Concentrated Insulin & Patient Management

THE QUALITY CENTER PATIENT SAFETY ORGANIZATION

FEBRUARY 27, 2018



Today's Agenda

1. Introduction to concentrated insulin
2. Best practices for management of concentrated insulin
3. Transitions of care and role of referrals
4. Formulary considerations
5. Product and dose conversions
6. Provider and patient education

Our Presenters

Lauren McKnight, PharmD, CPP, BCACP

Lead Clinical Pharmacist, UNC Medical Center
Department of Pharmacy Ambulatory Care
Clinical Services

UNC Hospitals Diabetes and Endocrinology Clinic
at Meadowmont



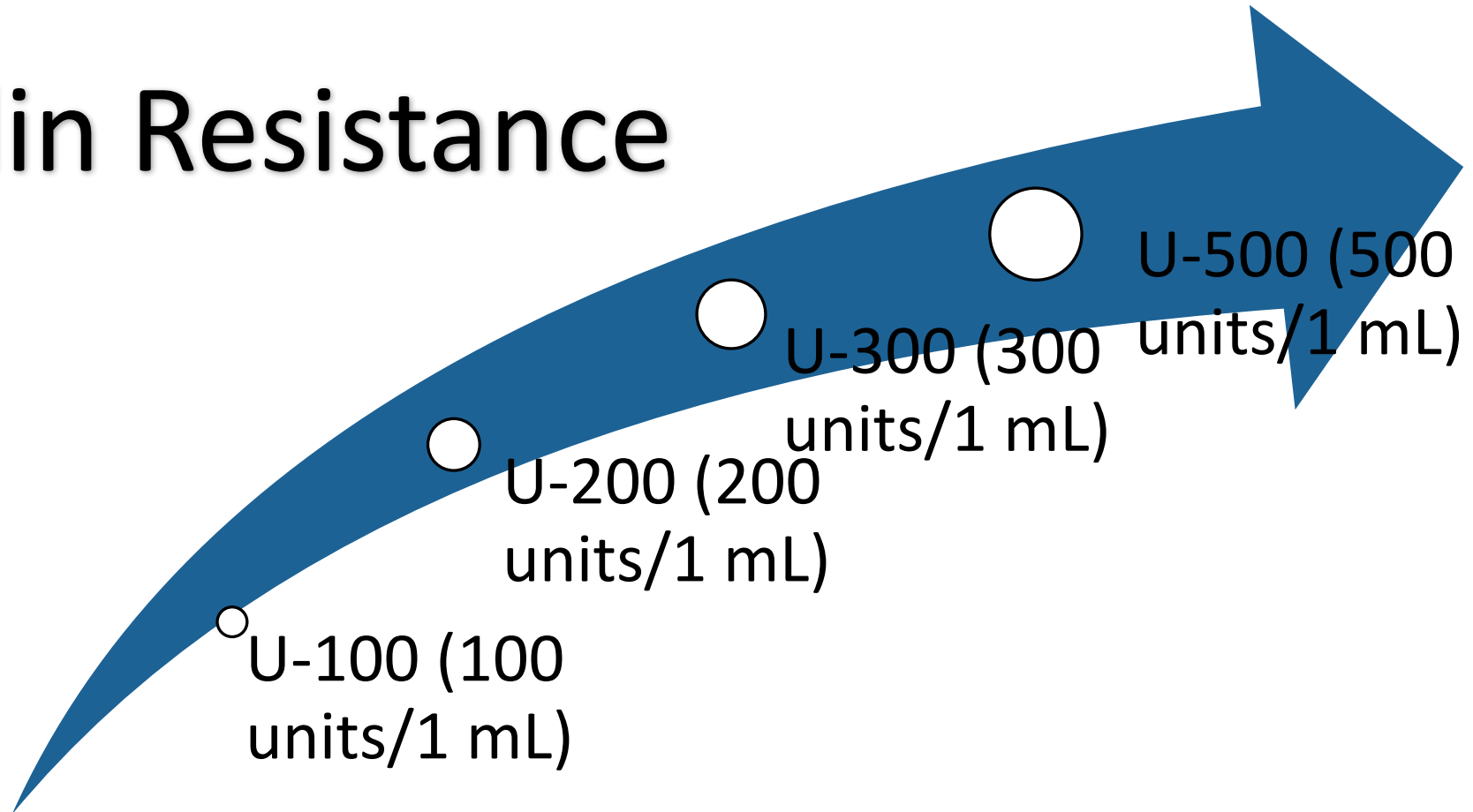
Jamie Warren, PharmD, BCPS, CPP

Clinical Pharmacy Specialist, Internal Medicine
Novant Health Rowan Medical Center



Concentrated Insulin

Insulin Resistance



Polling Question #1

1. Do you have concentrated insulin products on your formulary?
 - a. Yes
 - b. No

Concentrated Insulin



<https://www.humalog.com/hcp/humalog-u200>



U-500 KwikPen[®]

U-500 Vial

BD™ U-500 Syringe

<https://www.humulin.com/about-U-500.aspx>



www.diabetesdaily.com



www.diabetesdaily.com

Polling Question #2

If you are using U500 insulin, are you using pens, vials, or both?

- a. Pens
- b. Vials
- c. Both

Humulin[®] R U-500 (regular insulin 500 units/mL)

- Previously, U-500 regular has only been available in vials which presented dose/administration challenges
 - Dose as “marks” using U-100 insulin syringe or tuberculin syringe
 - 1 mark U-500 insulin =
 - 0.01 mL U-500 insulin
 - 5 units U-100 insulin
- New options simplify dosing- no dose conversion required
 - U-500 pen formulation (dose window shows number of units to be injected)
 - U-500 specific syringe (measures in exact units)

Polling Question #3

If your institution utilizes U500 vials, what type of syringe is issued to administer U500 insulin?

- a. TB
- b. Insulin
- c. U 500

Humulin[®] R U-500 Syringe

The U-500 syringe can dose up to 250 units (0.5 mL) of U-500 insulin per injection. Each line on the syringe corresponds to 5 units of U-500 insulin.

The green collar carries an identifying U-500 symbol.



The U-500 syringe has a green needle shield.

Humulin[®] R U-500 QwikPen



Aqua-blue color to distinguish from other insulin pens

Displays the number of units on the window

Toujeo[®] (insulin glargine 300 units/1 mL)

- Only available as a pen
- Same generic name as Lantus (insulin glargine), increased likelihood of confusion
- Conversion: **0.8 units Lantus= 1 unit Toujeo**
 - **Home doses of Toujeo need to be decreased when using Lantus in the hospital**



www.diabetesdaily.com

Tresiba[®] (insulin degludec 200 units/1 mL)

- Only available as a pen
- Tresiba available in U-100 and U-200 concentrations
- Ultra-long acting (42 hour duration)
- Conversion to other long-acting insulin products: **1 unit Tresiba= 1 unit long-acting insulin (glargine, detemir)**



Humalog[®] U-200 QuikPen (insulin lispro 200 units/1 mL)

- Only available as a pen
- Humalog QwikPen available in U-100 and U-200 concentrations
- Only concentrated rapid-acting insulin
- Conversion: **1 units Humalog U-200= 1 unit Humalog U-100**

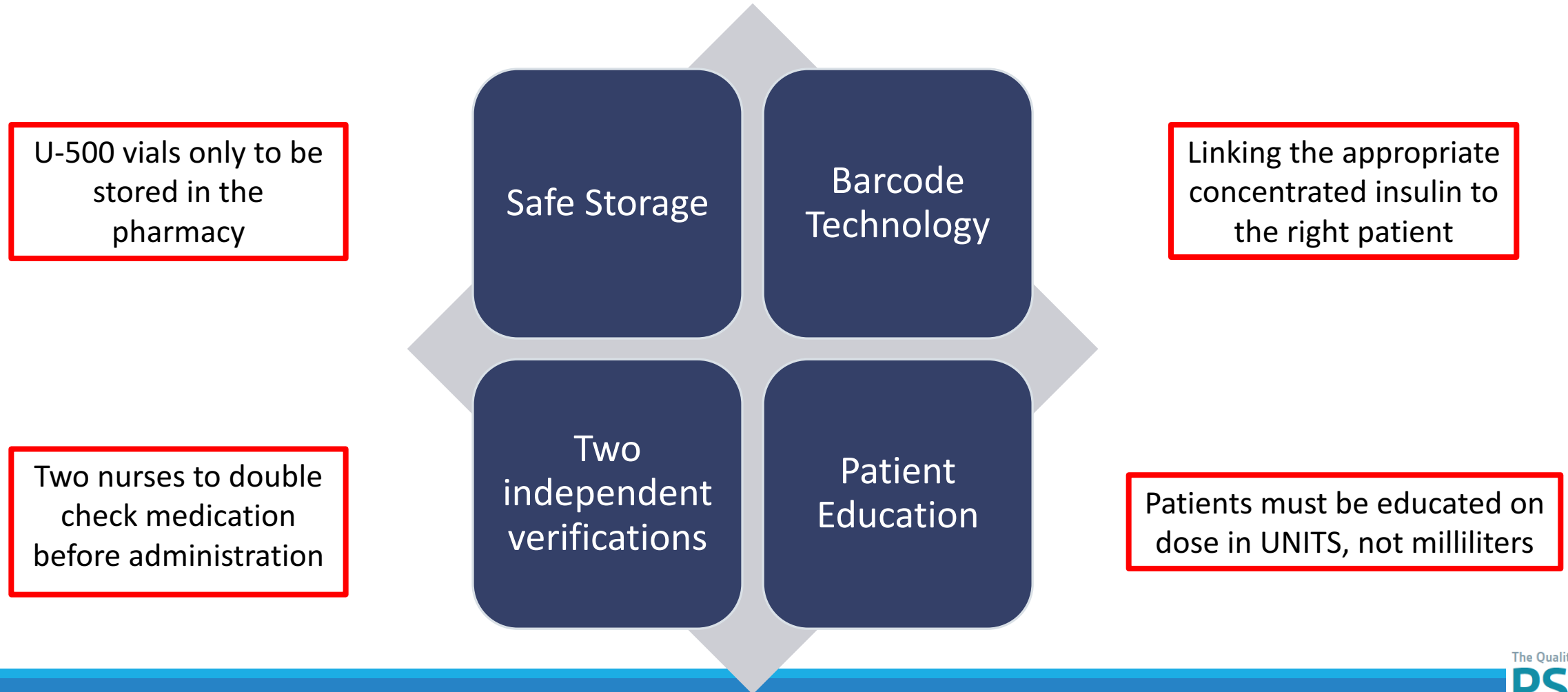


www.humalog.com

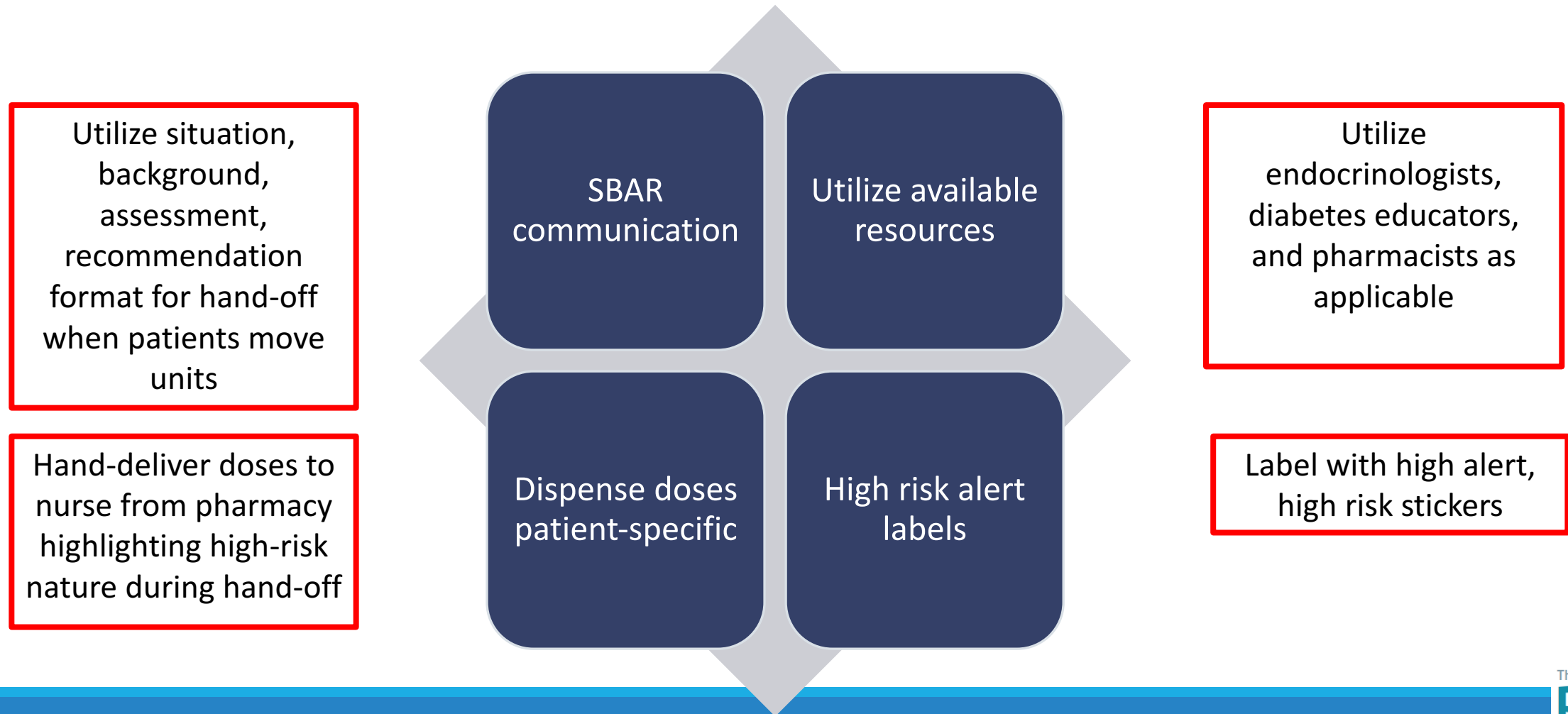
Concentrated Insulin: Patient Management

BEST PRACTICES

Best Practices: Concentrated Insulin



Best Practices: Concentrated Insulin





Concentrated Insulin: A Closer Look

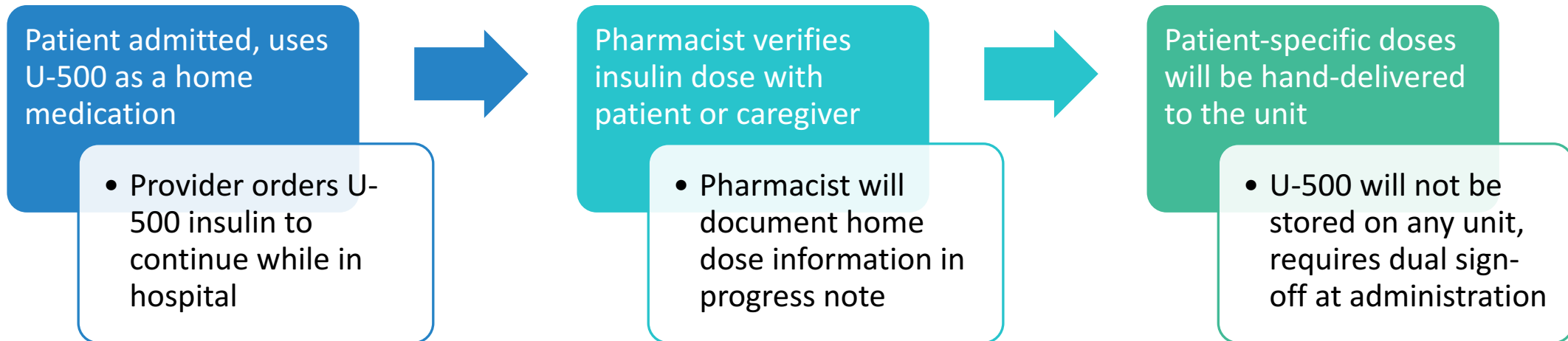
TRANSITIONS OF CARE

Polling Question #4

Does your organization utilize a medication listing assistant or similar position to review patient medications on admission?

- a. Yes
- b. No

Example Transition Process on Admission: Pharmacist Verification



Key Point: Pharmacist will verify home dose in a face-to-face encounter with patient/caregiver and have designated person demonstrate home dose on same device patient uses at home (i.e. syringe or pen)



Polling Question #5

Are patients on U500 automatically referred to Endocrinology or a Diabetes Educator?

- a. Yes
- b. No

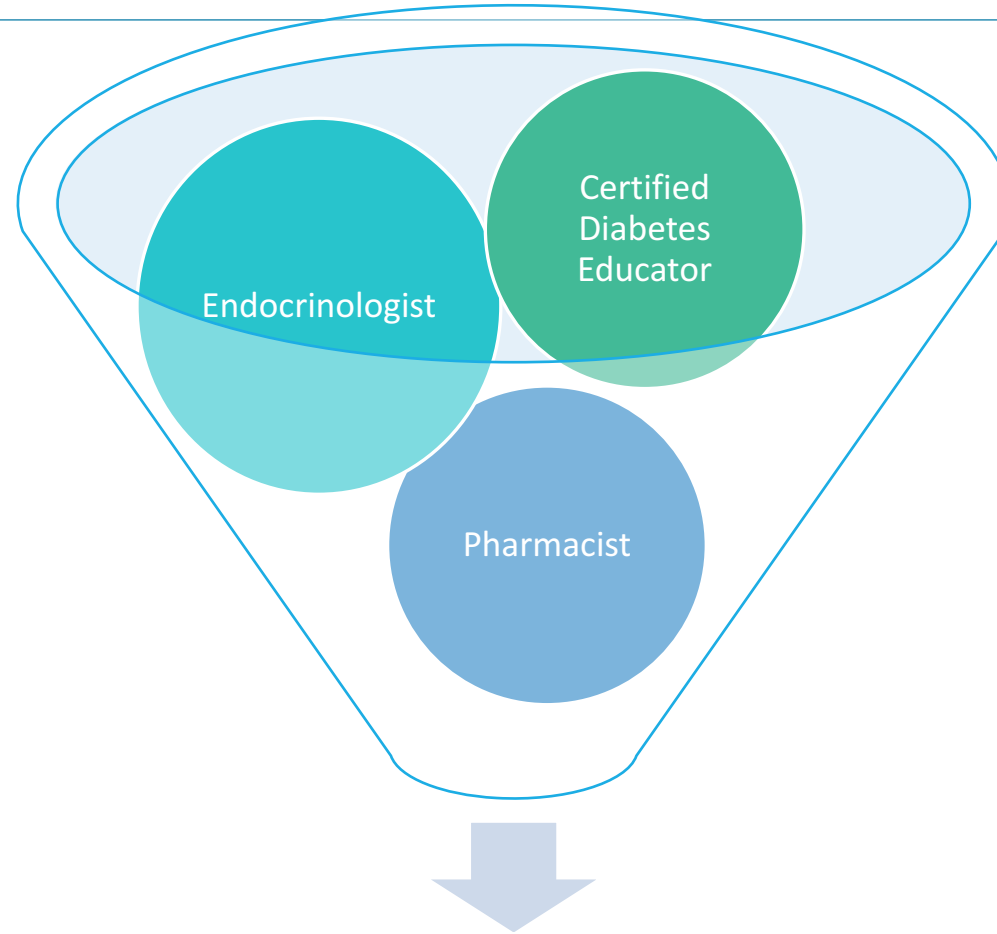
Unit Transitions: SBAR Communication



Discharge Patient Counseling

- Difference between U-100 and U-500 insulin syringes
- Communicate dose in name, units, and concentration
- Teach patient to use U-500 syringe or U-500 pen
- Importance of maintaining appointments and ensuring continuity of care after discharge

Referrals



Continuity of care

Concentrated Insulin: A Closer Look

FORMULARY
CONSIDERATIONS

Formulary Considerations: Pen Vs. Vial

PENS



Advantages	Disadvantages
Labeled with product name & barcode	Inappropriate injection technique
Can be individually labeled for each patient	Improper sharing of needles & pens
Less nursing time for prep & administration	Wrong patient administration

VIALS



Advantages	Disadvantages
Less likely to share needles/syringes	Incorrectly measuring dose (units vs. mL)
Mixing insulin for a single injection	Look alike vials for various types of insulin
Less costly & less waste	Less likely to be labeled

U-500: Pen vs. Syringe?

Familiarity

Storage

Cost

Consistency

Waste

Number of patients on U-500

Inpatient Formulary Recommendation

**Eliminate all concentrated insulin products
from formulary except U-500**



Example Inpatient Formulary: Concentrated Insulins

Medication Ordered	Medication Dispensed	Dose Conversion
Humulin R U-500	Humulin R U-500	n/a
Toujeo (insulin glargine)	Lantus (insulin glargine)	1:0.8
Tresiba (insulin degludec)	Lantus (insulin glargine)	1:1
Humalog U-200 KwikPen	Humalog U-100	1:1

Concentrated Insulin: A Closer Look

EXAMPLE DOSE CONVERSIONS:
AVOIDING ERRORS

Toujeo: Avoiding Errors

PATIENT CASE

AB is a 76 year old AAF admitted to the hospital with pneumonia

- Home dose Toujeo 20 units with breakfast, 30 units before bed
- To maintain her current dose, what dose of Lantus should be ordered while AB is in the hospital?

ANSWER

$20 \times 0.8 = 16$ units Lantus with breakfast

$30 \times 0.8 = 24$ units Lantus before bed

Humalog U-200: Avoiding Errors

PATIENT CASE

CX is a 65 year old WM admitted to the hospital with atrial fibrillation

- Home insulin regimen
 - Lantus 30 units daily
 - Humalog U-200 10 units before meals
- To maintain his current regimen, Lantus 30 units daily is continued. The provider calls and asks what dose of Humalog U-100 should be ordered?

ANSWER

10 x 1 = 10 units of Humalog U-100 with meals

U-500: Avoiding errors

Patient/care provider verbalized and demonstrated measuring to the marks described for each dose below:			
Dose measured using an Insulin Syringe	Patient uses an INSULIN SYRINGE at home (report unit marking as measured on an U-100 insulin syringe)	Dose measured using a Tuberculin Syringe	Patient uses a TUBERCULIN SYRINGE at home (reports measuring dose in volume- mL)
	☞ Breakfast Dose: units Insulin U-500		☞ Breakfast Dose: units Insulin U-500
	5 X _____ unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered		500 X _____ mL = _____ units U-500 insulin administered
	☞ Lunch Dose: units Insulin U-500		☞ Lunch Dose: units Insulin U-500
	5 X _____ unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered		500 X _____ mL = _____ units U-500 insulin administered
☞ Dinner Dose: units Insulin U-500	☞ Dinner Dose: units Insulin U-500		
5 X _____ unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered.	500 X _____ mL = _____ units U-500 insulin administered		

U-500: Avoiding Errors

PATIENT CASE

JB is 64 year old WM, admitted to the hospital for lower extremity cellulitis

- His wife, a retired RN, demonstrates she draws up 20 unit markings of U-500 on an U-100 insulin syringe with breakfast and 35 units markings of U-500 on a U-100 insulin syringe with dinner
- How many units of U-500 should be ordered to maintain JB's home insulin regimen?

Patient/care provider verbalized and demonstrated measuring to the marks described for each dose below:			
Dose measured using an Insulin Syringe	Patient uses an INSULIN SYRINGE at home (report unit marking as measured on an U-100 insulin syringe)	Dose measured using a Tuberculin Syringe	Patient uses a TUBERCULIN SYRINGE at home (reports measuring dose in volume-mL)
	☑ Breakfast Dose: units Insulin U-500		☑ Breakfast Dose: units Insulin U-500
	5 X 20 unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered 100 units U-500		500 X _____ mL = _____ units U-500 insulin administered
	☑ Lunch Dose: units Insulin U-500		☑ Lunch Dose: units Insulin U-500
5 X _____ unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered	500 X _____ mL = _____ units U-500 insulin administered	☑ Dinner Dose: units Insulin U-500	☑ Dinner Dose: units Insulin U-500
5 X 35 unit marking on an INSULIN SYRINGE = _____ units U-500 insulin administered. 175 units U-500	500 X _____ mL = _____ units U-500 insulin administered		



Concentrated Insulin: A Closer Look

CLINICAL STAFF AND PATIENT
EDUCATION



Clinical Staff Education

- Ongoing education regarding formulary additions/deletions/therapeutic interchanges
- Education provided to increase awareness of facility-specific measures to prevent errors associated with concentrated insulin products
- Diabetes management courses
 - Offer continuing education sessions to clinical staff
 - Presenters include dietary, nursing, certified diabetes educator, pharmacy

Patient Education: U-500 Insulin Patient Safety Contract

- Example patient safety contract provided by American Association of Diabetes Educators
- Important counseling points provided including action to take if hypoglycemia occurs
- Personalize with patient's name, individualized dose, and phone number to call with questions or concerns
- Includes area for patient signature expressing understanding of instructions and agreement to maintain follow-up

U-500 Insulin Patient Safety Contract: Counseling Points

- Your U-500 CONCENTRATED Humulin R insulin dose is:
 - Using a (circle one) U-500 KwikPen or U-500 syringe:
 - ___ unit marks 30 minutes before breakfast
 - ___ unit marks 30 minutes before lunch
 - ___ units marks 30 minutes before dinner
- U-500 is 5 times stronger than Regular U-100 insulin.
- Keep this insulin separate and DO NOT SHARE.
- Once you start the U-500 insulin, you should stop taking all your other insulin.

Conclusions

- Newer, more concentrated insulin products are becoming commercially available, thus opening up possibility for confusion and errors
- Despite many efforts and advances focusing on reducing errors associated with concentrated insulin products, errors still persist
- Innovative methods and strategies to reduce errors are needed
- Focus and diligence must be emphasized whenever dispensing and administering concentrated insulin products

Questions and Discussion



Upcoming PSO Education

March	April	May	June
<p>Webinar: Handoffs & Transitions of Care Thursday, 3/8/18, 2-3p</p> <p>A sampling of strategies and successful improvement projects to enhance handoff communications, including the IPASS Handoff Bundle presented by Dr. Amy Starmer of Boston Children's Hospital and Harvard Medical School.</p> <hr/> <p>Safe Table: Handoffs & Transitions of Care Tuesday 3/20/18 9:45am- 1:30pm Goldsboro, NC</p> <p>Thursday 3/29/18 9:45am-1:30pm Rocky Mount, NC Handoff communications occur frequently, are often crucial to safe patient transitions, and remain a challenge throughout the continuum of care. Let's talk about it!</p>	<p>Webinar: Member Spotlight on National Patient Safety Awareness Week Activities Thursday, 4/5/18, 2-3p Seeking presenters!</p> <hr/> <p>1-Day Workshop: Caring for Behavioral Health Patients in Non-Behavioral Health Settings: A Primer for Professionals (Clinical & Non-Clinical) Wednesday, 4/11/18 NCHA, Cary, NC</p> <p>An interactive workshop on common behavioral health presentations, communication techniques, physical safety considerations, and unique NC challenges.</p> <hr/> <p>Safe Table: Patient-Staff Violence Thurs 4/26/18 9:45am 1:30pm Cary, NC</p>	<p>Safe Table: Patient-Staff Violence Seeking Host Site!</p> <p>Disruptive patient behavior is increasingly common but not always reported. Have you experienced physical violence (hitting, biting, scratching) or verbal violence (insults, threats, cursing) from a patient? Join us as we discuss patient-staff violence and present suggestions to promote safety and support staff members.</p>	<p>1-Day Workshop: RCA²: Foundations & Implementation Thursday, 6/14/18 NCHA, Cary, NC</p> <p>Jessica Behrhorst, System Director of Quality & Patient Safety at Oshner Health System, will review the foundational tools used in RCA² and share her implementation experience.</p>