



One pen.  
One patient.

*Strategies for Ensuring the*

# Safe Use of Insulin Pens IN THE HOSPITAL

## Quality Improvement Impact Activity for Insulin Pen Safety

Kosair Children's Hospital  
Louisville, Kentucky

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One patient.

## Team Members

- Tristan Murray, Pharm.D., BCPS
  - Medical/Surgical Clinical Pharmacy Specialist, Kosair Children's Hospital
- Kupper Wintergerst, M.D., FAAP
  - Director, Wendy L. Novak Diabetes Care Center, University of Louisville and Kosair Children's Hospital
  - Chief, Pediatric Endocrinology, University of Louisville
- Jaime Walker, RN, BSN, LDE, CDE, CPN
  - Diabetes Nurse Clinician, Kosair Children's Hospital, Wendy L. Novak Diabetes Care Center
- Stephanie Jensen, RN, BSN, CDE
  - Diabetes Nurse Clinician, Kosair Children's Hospital, Wendy L. Novak Diabetes Care Center
- Brian Yarberry, Pharm.D.
  - Director of Pharmacy Services, Kosair Children's Hospital



## Kosair Children's Hospital (KCH)

- Kentucky's only full-service, free-standing pediatric care facility
  - Community hospital associated with the University of Louisville Medical School
  - 267 beds
  - Wendy L. Novak Diabetes Care Center
    - 4-bed inpatient unit within Kosair Children's Hospital
    - Education and treatment of type 1 diabetes

## Background and Description

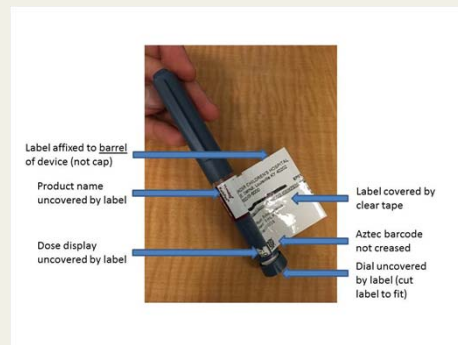
- All patients at KCH requiring rapid-acting insulin product will receive Humalog® KwikPen™
  - Only insulin product dispensed as pen device
  - Lantus® prepared in pharmacy as patient-specific dose
- Rationale for applying for the Quality Improvement Impact Activity
  - Identify areas for improvement in our insulin pen device dispensing, storage, and administration process
  - Identify insulin knowledge deficits and create educational material that would address these deficits

## Background and Description

Opportunity for Improvement	Baseline Values
Appropriate device labeling	Properly labeled devices = 56%
Preparation of device for insulin administration	Swabs rubber stopper with alcohol swab = 56% Primes device properly prior to injection = 81%
Continuity of device knowledge across patient care areas	Percentage of administration steps completed correctly: Surgery and Oncology = 58% 5 East = 99% PICU = 71%

## Process Improvements

- Resource binders placed on each hospital unit that may take care of patients with diabetes
- Email sent to pharmacy staff describing how to properly label insulin pen devices
- Picture of properly labeled device placed in refrigerator pocket that contains insulin pen devices
- Pictorial administration card dispensed with each insulin pen device



# Process Improvements

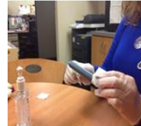
## Giving an Injection using the Humalog Kwikpen® and the BD Autosshield® Duo Pen Needle



1. Gather your supplies. You will need gloves, alcohol preps, insulin pen from refrigerator or medication bin, and one BD Autosshield Duo pen needle.  
Note: pens are only refrigerated when they are first received from pharmacy. Storage after first use should be the patient's medication bin.



2. Perform hand hygiene and don gloves.



3. Remove the cap from the insulin pen.



4. With alcohol prep, scrub the hub of the insulin pen for a full 15 seconds.



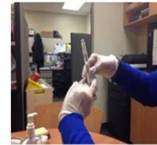
5. Remove the paper seal from the bottom of the pen needle.



6. Holding the insulin pen needle in one hand and the insulin pen in the other, apply the pen needle to the pen, first pressing the pen needle and then screwing the pen needle until secure.



7. Remove outer clear cap from the insulin pen needle. At the end of the pen, dial up 2 units. This is the insulin you will prime your needle with.

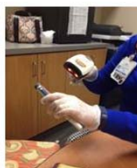


8. Holding the insulin pen upright, depress the 2 units, allowing for the needle to be fully primed for injections. Your dial should return to 0 after the priming insulin has been depressed.

# Process Improvements



9. Before dialing the insulin you will need to calculate the insulin dose with a second nurse. Scan the patient's armband with your handheld scanner.



10. After scanning the patient's armband, scan the barcode square, located on the label on the insulin pen. Chart the amount of insulin with second nurse.



11. Dial the calculated insulin dose. Even number units will be indicated with a number, odd number units will have a line after the number 1. Verify with second nurse.



11. Choose an area of skin to give the injection. This will be a subcutaneous injection. Prepare the area with an alcohol prep to cleanse the skin.



11. Hold the pen at 90 degrees, with the thumb selected as the digit which will depress the button/dose knob.



12. Brace the skin. Press the insulin pen firmly to skin before depressing the button/dose knob. You will notice the clear tip of the insulin pen will disappear as the pen is pressed down.



13. Press the button/dose knob down until the dial shows 0. Once the unit dial reflects 0, hold insulin pen in place for a SLOW count of 5.



14. Remove the insulin pen away from the skin. Unscrew the insulin pen needle and dispose in sharps container. Replace insulin pen cap and return the pen to the patient's medication bin (NOT refrigerator).

## Selected Results: Insulin Injection Observations

### Continuity of device knowledge across patient care areas

Baseline	Post-implementation
Percentage of administration steps completed correctly:  Surgery and Oncology = 58% 5 East = 99% PICU = 71%  Standard deviation = <b>21%</b>	Percentage of administration steps completed correctly:  Surgery and Oncology = 90% 5 East = 95% PICU = 77%  Standard deviation = <b>9%</b>

## Selected Results: Insulin Injection Observations

### Patient identification performance

	Baseline	Post-implementation	Percent Change
Performs patient identification according to hospital policy	62% (n = 16)	71% (n = 14)	+9%
Checks medication label	75% (n = 16)	100% (n = 19)	+25%
Scans patient's identification band and device prior to administration	81% (n = 16)	95% (n = 19)	+14%

## Selected Results: Insulin Injection Observations

### Device preparation for insulin administration

	Baseline	Post-implementation	Percent Change
Swabs rubber stopper with alcohol swab	56% (n = 16)	76% (n = 17)	+20%
Primes device properly prior to injection	81% (n = 16)	74% (n = 19)	-7%

## Selected Results: Insulin Injection Observations

### Awareness of administration technique

	Baseline	Post-implementation	Percent Change
Keeps plunger pressed and holds device against skin for at least 5 seconds after injection is given	71% (n = 17)	89% (n = 19)	+18%
Nursing survey average (insulin pen questions)	58% (n = 22)	62% (n = 19)	+4%

## Selected Results: Pen Storage and Labeling Audit

<b>Proper labeling and storage</b>			
	Baseline (n = 26)	Post- implementation (n = 22)	Percent Change
Properly labeled devices	56%	95%	+39%
Properly stored devices	76%	50%	-26%

Properly labeled = pen labeled, label attached to barrel, and expiration date on label.  
Properly stored = active order and storage per policy.

## Selected Results: Nurse Survey

<b>Percent Answered Correctly</b>			
	Baseline (n = 22)	Post- implementation (n = 19)	Percent Change
Insulin time action profile (Questions 5 – 6)	35%	32%	-3%
Administration technique (Questions 7 – 10)	58%	62%	+4%

## Lessons Learned

- Small patient population made it difficult to achieve goal number of observations
- Pictorial administration card could have been made larger and hung on wall in each unit's medication room
  - Positive feedback from nurses on surgical and intensive care units
- Misunderstanding of proper device storage
  - 50% of insulin pen devices stored inappropriately
    - Commonly stored in patient's room or nurses pocket
  - No nurses reported finding insulin pen device stored in "unapproved" location on nurse survey
- Visual learners may benefit further from travel education cart than pictorial administration card

## Next Steps

- Grand Rounds presentation to be placed on electronic learning management system with continuing education credit
  - Will help bridge knowledge deficits (insulin time-action profiles) identified on nurse survey
- Traveling education cart
  - Will reinforce appropriate administration technique
- Nurse on orientation to spend 4 hours with diabetes educators





## Mentored Quality Improvement Activity: A Broad View

- Awareness of educational barriers within the institution
- Cohesion of the interprofessional diabetes care team
- Increased departmental knowledge of insulin pen devices
- Informed revision of Insulin Administration Policy