**Safe Use of Insulin Pens – Nurse Knowledge Assessment**

**Level 3A/3B Outcomes (Declarative and Procedural Knowledge)**

Administer this brief questionnaire to all nursing personnel (full and part-time) at the hospital during the baseline and post-intervention periods. In addition to collecting general demographic information regarding each respondent’s role and responsibilities related to medication use, the questionnaire is intended to assess declarative and procedure knowledge regarding:

1. Insulin pharmacokinetic profiles
2. Identify situations when a patient is placed at greatest risk for developing hypoglycemia
3. Potential advantages and risks of insulin pen device use in hospitals.
4. Determine whether or not an insulin pen device is appropriately used to administer insulin according to the manufacturer’s recommendations
5. Determine whether or not an insulin pen device is stored in an appropriate location

The questionnaire also asks about potentially unsafe medication use practices that the respondent may have witnessed in the preceding 3 months.

Implementation Notes:

1. This questionnaire was developed with the intent to input it into an online survey tool and distribute the link via email to all nursing staff. This makes data collection and analysis more efficient, plus questions 8-10 include a link to videos of injection techniques.
2. Questions 5 and 6 should be customized to reflect the most commonly used basal insulin [replace glargine (Lantus)] and most commonly used rapid-acting insulin [replace lispro (Humalog)] in the hospital.
3. Correct answers to questions 5-10 are noted on the last page.
4. Descriptive statistics (e.g., % of nurses who correctly answered the question, % who selected distractors) should suffice for data analysis. Comparing sub-groups may also be worthwhile (e.g., day shift nursing staff vs. evening/night nursing staff, full-time vs. part-time or per diem nursing staff, nurses from medical vs. surgical wards) in order to determine if an educational intervention needs to be targeted to specific nursing staff or units.

**Suggested language to include in the email accompanying the link to this survey:**

This brief survey is intended to gather information about the use of insulin pen devices at our institution. Our nursing staff is critically important to the medication use process. Your beliefs and opinions on ways to ensure the safe and effective use of insulin pen devices will help us make process improvements. This survey should take 5-10 minutes to complete. Thank you!

**General Demographics**

Q1) Which of the following best describes your position / primary responsibilities? (Select only one)

* Staff nurse – responsible for direct patient care
* Clinical nurse specialist – responsible for nursing support and education
* Nurse practitioner – responsible for managing patient care
* Nurse manager/director – responsible for overseeing the activities of other nurses and/or hospital operations

Q2) Which of the following best describes your responsibilities related to the medication use process? (Select all that apply)

* I monitor the response to medications (e.g., interview patient, take vital signs, blood draws)
* I administer medications (e.g., oral, eye and ear drops, rectal, parenteral, etc.) and document in the medication administration record (MAR)
* I input and adjust intravenous (IV) pump settings
* I review medication orders for accuracy and completeness
* I write/input telephone medication orders from authorized prescribers
* I have independent prescribing authority
* None of the above; I assist others but I am not directly responsible

Q3) On average, how many hours per week do you work at this institution?

(Select only one)

* 32 or more hours per week
* 16-31 hours per week
* less than 16 hours per week

Q4) What shift do you primarily work?

* Day (time frame: 7am – 7pm)
* Evening (time frame: 1pm – 1am)
* Night (time frame: 7pm – 7am)
* Mix of shifts (days, evenings, and nights)

**Q5 and Q6 relate to this case study**

Ms. Jones is a 81-year-old patient admitted to our hospital. She has a standing order to receive insulin glargine (Lantus) 30 units QPM. In addition, the patient has an order for insulin lispro (Humalog) per sliding scale based on blood glucose (BG) measurements as follows:

BG measurement (mg/dL) Insulin lispro (Humalog) dose (units)

Less than 70 No insulin

70 – 119 6

120 – 159 8

160 – 199 10

200 – 249 12

250 – 299 14

more than 300 16 and call prescriber

BG measurements have been ordered “four times a day prior to meals and bedtime.”

Q5) If the insulin glargine (Lantus) dose is given at 10pm, Ms. Jones would be at greatest risk for hypoglycemia during which of the following time frames? (Select only one)

* 11pm to 3am
* 4am to 8am
* 9am to 1pm
* 11pm to 1pm

Q6) Which of the following scenarios would place Ms. Jones at greatest risk of a hypoglycemic event in the 6 hours following insulin administration? (Select only one)

* The patient’s BG measurement at 10pm is 109 mg/dL. It's a very busy evening and the administration of medications falls behind schedule. The insulin glargine (Lantus) dose is given 2 hours late.
* The patient’s actual BG reading is 148 mg/dL but the nurse misreads the flow chart. Believing the measurement is 184 mg/dL, the nurse gives insulin lispro (Humalog) according to the scale 4 minutes before the patient starts eating lunch.
* The patient’s BG measurement at 7:30am is 162 mg/dL. The nurse administers insulin lispro (Humalog) according to the scale at 8:07am. The patient is taken to get an MRI at 8:20am. Breakfast arrives at 8:34am.
* The patient’s BG measurement is 217 mg/dL at 5:06pm. The dinner meal is delivered at 5:12pm. The patient eats half of the meal before the nurse can administer insulin lispro (Humalog) according to the scale at 5:21pm. The patient eats the rest of the meal except for the sugar-free Jello®.

**Insulin Pen Questions**

Q7) Which of the following is/are **TRUE/CORRECT** statement(s) regarding the use of insulin pen devices? (Select all that apply)

* Insulin pen devices should be “primed” (e.g., give an “air shot”) such that a drop appears at the end of the needle prior to each and every use.
* After injecting insulin into the patient, the pen should be held against the skin for at least 5 or 6 seconds before withdrawing the needle.
* After administration, a drop of fluid on the skin indicates that a portion of the dose has leaked from the injection site.
* The routine use of insulin pen devices significantly reduces the transmission of infections in hospitals.
* Studies have shown that using insulin pen devices leads to more dosing errors when compared with the traditional insulin vial and syringe method.

Q8) Please watch **Insulin Pen Video 1** in its entirety before answering the following question. The video depicts a nurse preparing to administer insulin using a pen device to a patient. The video concludes as the nurse is about to attach a pen needle to the device.

Note: link to <http://onepenonepatient.org/docs/test-your-knowledge-q1.mp4>

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* Hand hygiene
* Reviewing medication administration record
* Identifying patient
* Preparing device and needle for needle attachment
* All steps were correctly preformed

Q9) Please watch **Insulin Pen Video 2** in its entirety before answering the following question. The video depicts a nurse preparing the insulin pen device including the dose to be administered. The video concludes as the nurse selects the insulin dose.

Note: link to <http://onepenonepatient.org/docs/test-your-knowledge-q2.mp4>

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* Attaching needle to device
* Priming pen device
* Checking the dose
* Selecting the correct dose
* All steps were correctly performed

Q10) Please watch **Insulin Pen Video 3** in its entirety before answering the following question. The video depicts a nurse administering insulin to a patient using an insulin pen device. The video concludes as the nurse is disposing of the needle.

Note: link to <http://onepenonepatient.org/docs/test-your-knowledge-q3.mp4>

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* Selecting an appropriate injection site
* Inserting the needle at appropriate depth and angle
* Administering the insulin dose
* Disposing the pen needle
* All steps were correctly performed

Q11) In the past 3 months, which of the following have you seen or witnessed at our institution? (Select all that apply)

* An insulin pen device with a defective dosing dial.
* An insulin pen device used on more than one patient.
* An insulin pen device without a patient-specific label attached to it.
* An insulin pen device stored in an “unapproved” location (e.g., patient’s bedside, nursing station drawer).
* Insulin withdrawn from an insulin pen device or cartridge with a syringe (i.e., using the pen device/cartridge like a multiple dose vial).

**Knowledge and Skill Development Needs**

Q12) In your opinion, which of the following is the **greatest** knowledge or skill gap that nurses have with regard to the safe use of subcutaneous insulin in hospitals? (Select only one)

* Subcutaneous injection technique
* Hypoglycemia – who’s at risk and how to manage it
* Insulin pen devices - unique features and precautions
* Accurately interpreting sliding scale and administering correct insulin dose
* Time action profiles of the different insulin products (e.g. time to onset, peak, and duration of each insulin product) and timing of injections

Q13) Are there any comments or concerns you have about insulin and pen device use in our hospital that you think should be addressed?

**Correct answers to Questions 5-10**

Q5) If the insulin glargine (Lantus) dose is given at 10pm, Ms. Jones would be at greatest risk for hypoglycemia during which of the following time frames? (Select only one)

* **11pm to 1pm**

Q6) Which of the following scenarios would place Ms. Jones at greatest risk of a hypoglycemic event in the 6 hours following insulin administration? (Select only one)

* **The patient’s BG measurement at 7:30am is 162 mg/dL. The nurse administers insulin lispro (Humalog) according to the scale at 8:07am. The patient is taken to get an MRI at 8:20am. Breakfast arrives at 8:34am.**

Q7) Which of the following is/are **TRUE/CORRECT** statement(s) regarding the use of insulin pen devices? (Select all that apply)

* **Insulin pen devices should be “primed” (e.g., give an “air shot”) such that a drop appears at the end of the needle prior to each and every use.**
* **After injecting insulin into the patient, the pen should be held against the skin for at least 6 seconds before withdrawing the needle.**

Q8) Please watch **Insulin Pen Video 1** in its entirety before answering the following question. The video depicts a nurse preparing to administer insulin using a pen device to a patient. The video concludes as the nurse is about to attach a pen needle to the device.

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* **Preparing device and needle for needle attachment**

Q9) Please watch **Insulin Pen Video 2** in its entirety before answering the following question. The video depicts a nurse preparing the insulin pen device including the dose to be administered. The video concludes as the nurse selects the insulin dose.

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* **Priming pen device**

Q10) Please watch **Insulin Pen Video 3** in its entirety before answering the following question. The video depicts a nurse administering insulin to a patient using an insulin pen device. The video concludes as the nurse is disposing of the needle.

Listed below are the steps performed by the nurse during the video. Which of the steps, if any, were **NOT** correctly performed? (Select all that apply)

* **Administering the insulin dose**