A Report of Participation in a Mentored Quality Improvement Activity for Insulin Pen Safety

St. Joseph’s/Candler Health System
Savannah, Georgia

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Team Members

• Team leader
  – Tyler Prieskorn, Pharm.D.
• Team members
  – Carolyn Williams, B.S.Pharm. – Medication Safety Specialist
  – Kimberly Tackett, Pharm.D.
  – Marianne Fields, RN, MSN – Director of Nursing Med/Surg
  – Mary Robinson, RN – Nurse Manager
  – Stacey Peacock, RN – Nurse Manager
St. Joseph’s/Candler Health System

- St. Joseph’s/Candler Health System
  - 636-bed, community-based, regional-referral, tertiary-teaching, comprehensive health delivery system

Background and Description

- Insulin pens at St. Joseph’s/Candler
  - Insulin aspart (Novolog), insulin aspart/insulin aspart protamine mix (Novolog 70/30), and insulin detemir (Levemir) formulary insulin products
  - Available in refrigerators attached to automated medication dispensing machines (Pyxis®)
  - Doses verified by two nurses prior to administration

- Participation in Mentored Quality Improvement Impact Activity
  - Evaluate current use of insulin pens in an objective manner to identify areas where improvements can be made
  - Assess the nursing staff’s knowledge of insulin and insulin pens
  - Collaborating with experienced mentors
Baseline Observations

• Insulin pen storage
  – 66 pens from 3 patient care wards
  – 2% of pens properly stored and labeled*

• Insulin pen administration
  – 15 observations on 3 patient care wards (n = 45)
  – Areas noted for improvement
    • Swabbing insulin pen with alcohol
      – Ward 1 = 47%, Ward 2 = 53%, Ward 3 = 53%
    • Priming insulin pen device
      – Ward 1 = 54%, Ward 2 = 20%, Ward 3 = 60%

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

Baseline Observations

• Nursing survey
  – n = 17
  – Two questions evaluating knowledge of insulin pharmacokinetics
    • Respondents asked to determine what timeframe a patient is at risk for hypoglycemia following administration of long-acting insulin
      – 12% of respondents answered correctly
    • Respondents asked to determine which situation from 4 choices is likely to lead to a hypoglycemic event
      – 53% of respondents answered correctly
  – One question evaluating knowledge of insulin pen devices
    • Respondents asked to evaluate 5 statements pertaining to insulin pen devices and determine which statements were true (2 of 5 statements were true)
      – 94% of respondents picked true statement # 1
      – 82% of respondents picked true statement # 2
Process Improvements

- Initiate nursing education
  - Handouts
    - Insulin action-time profiles
    - Proper use of insulin pen devices
  - In-service
  - Posters at Pyxis®
    - Expiration calendar
- Reinforce and develop storage areas
  - Consult with nursing management to store insulin pens according to system policy
  - Conduct random audits as part of floor stock inspections
- Develop policy regarding use of insulin pens (in progress)*
  - Address correct use of insulin pens
  - Address correct storage and labeling

*Not completed before post-implementation observations

Selected Results: Insulin Injection Observations

- Post-implementation observations
  - Swabbing insulin pen with alcohol
    - Ward 1 = 67%, Ward 2 = 85%, Ward 3 = 71%
  - Priming insulin pen device
    - Ward 1 = 73%, Ward 2 = 92%, Ward 3 = 92%
- Change from baseline
  - Swabbing insulin pen with alcohol
    - Ward 1 = 20%, Ward 2 = 32%, Ward 3 = 18%
  - Priming insulin pen device
    - Ward 1 = 19%, Ward 2 = 72%, Ward 3 = 32%
Selected Results: Pen Storage and Labeling Audit

• Post-implementation observations
  – 67 pens from 3 patient care wards
  – 64% of pens properly labeled and stored

• Change from baseline
  – 62% 

Selected Results: Nursing Survey

• Nursing survey
  – n = 11
  – Two questions evaluating knowledge of insulin pharmacokinetics
    • Respondents asked to determine what timeframe a patient is at risk for hypoglycemia following administration of long acting insulin
      – 64% of respondents answered correctly (52% change from baseline)
    • Respondents asked to determine which situation from 4 choices is likely to lead to a hypoglycemic event
      – 82% of respondents answered correctly (29% change from baseline)
  – One question evaluating knowledge of insulin pen devices
    • Respondents asked to evaluate 5 statements pertaining to insulin pen devices and determine which statements were true (2 of 5 statements were true)
      – 91% of respondents picked true statement # 1 (-3% change from baseline)
      – 55% of respondents picked true statement # 2 (-27% change from baseline)
Lessons Learned

• Changing established behaviors
  – Difficult if done without explanation
  – Incentivize change
  – How will change improve patient care and safety?
• Never assume
• Provide resources to assist with change
  – Physical resources
  – Electronic resources
  – Personnel
• Maintaining change
  – Reinforce education
  – Periodic reminders
  – Random audits

Next Steps

• Continue with the development of insulin pen device policy

• Adjust insulin pen label comments with time profiles and expiration dates

• Continue to make pharmacists available on patient care wards
Mentored Quality Improvement Activity: A Broad View

• Impact of process improvements
  – More consistent storage of insulin pen devices throughout the health system
  – Reduced potential for errors and medication misadventures
  – Increased awareness of the importance of using insulin pen devices correctly
  – Improved knowledge of insulin pharmacology and pharmacokinetics

• Impact of participation in mentored quality improvement activity
  – Eventual development of insulin pen policy
  – Exposure to different ideas to help ensure the safe use of insulin pen devices