Coalition for Care
IHA's Hospital Engagement Network

Indiana Hospital Association
INDIANA PATIENT SAFETY CENTER

Enhancing the Safety of Insulin Use in the Inpatient Setting

September 30, 2014

Indiana Hospital Association

Indiana Hospital Association

Webinar Agenda

- Welcome & Introductions

  Carolyn Konfirst, Indiana Hospital Association, Patient Safety/Quality Advisor

- Enhancing Safety of Insulin Use in the Inpatient Setting

  John Hertig, Pharm.D., Associate Director, Purdue University College of Pharmacy, Center for Medication Safety Advancement (CMSA)

  Katelyn Brown, Pharm.D., Pharmacy Resident, Purdue University College of Pharmacy, CMSA

- Wrap-up/Questions

PURDUE PHARMACY

CENTER FOR MEDICATION SAFETY ADVANCEMENT

Enhancing Safety of Insulin Use in the Inpatient Setting

Katelyn E. Brown, Pharm.D.
Medication Safety Fellow
Purdue University / Eli Lilly and Company / FDA

Disclosure

- No conflicts to disclose

Objectives

- Identify safety risks associated with insulin
- Implement evidence-based best practices and measure their progress of reducing harm associated with insulin
- Identify the benefits and risks of insulin pen utilization within the hospital setting

Diabetes in the Hospital

- Discharged diagnosis of DM increased from 2.8 million to 5.5 million from 1998-2009
- 38% of hospitalized patients experience hyperglycemia
- Hyperglycemia leads to increased morbidity and mortality

Diabetes Care. 2006;29:1955–1962.
Centers for Disease Control and Prevention. *National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014*. Atlanta, GA: US Department of Health and Human Services; 2014.
Diabetes Care 2013;36:1033-46.
Am J Health-Syst Pharm 2013;70:e18-27.

Insulin

- Preferred treatment of hyperglycemia
- IV insulin for critically ill patients
- SC for non-critically ill patients
- Sliding scale is NOT recommended

Diabetes Care. 2006;29:1955–1962.
J Clin Endocrinol Metab 2012;97:16-38.

Which medication is most commonly implicated in adverse events requiring treatment in a hospital emergency department?

A. Anticoagulants
B. Insulin
C. Aspirin
D. Amoxicillin

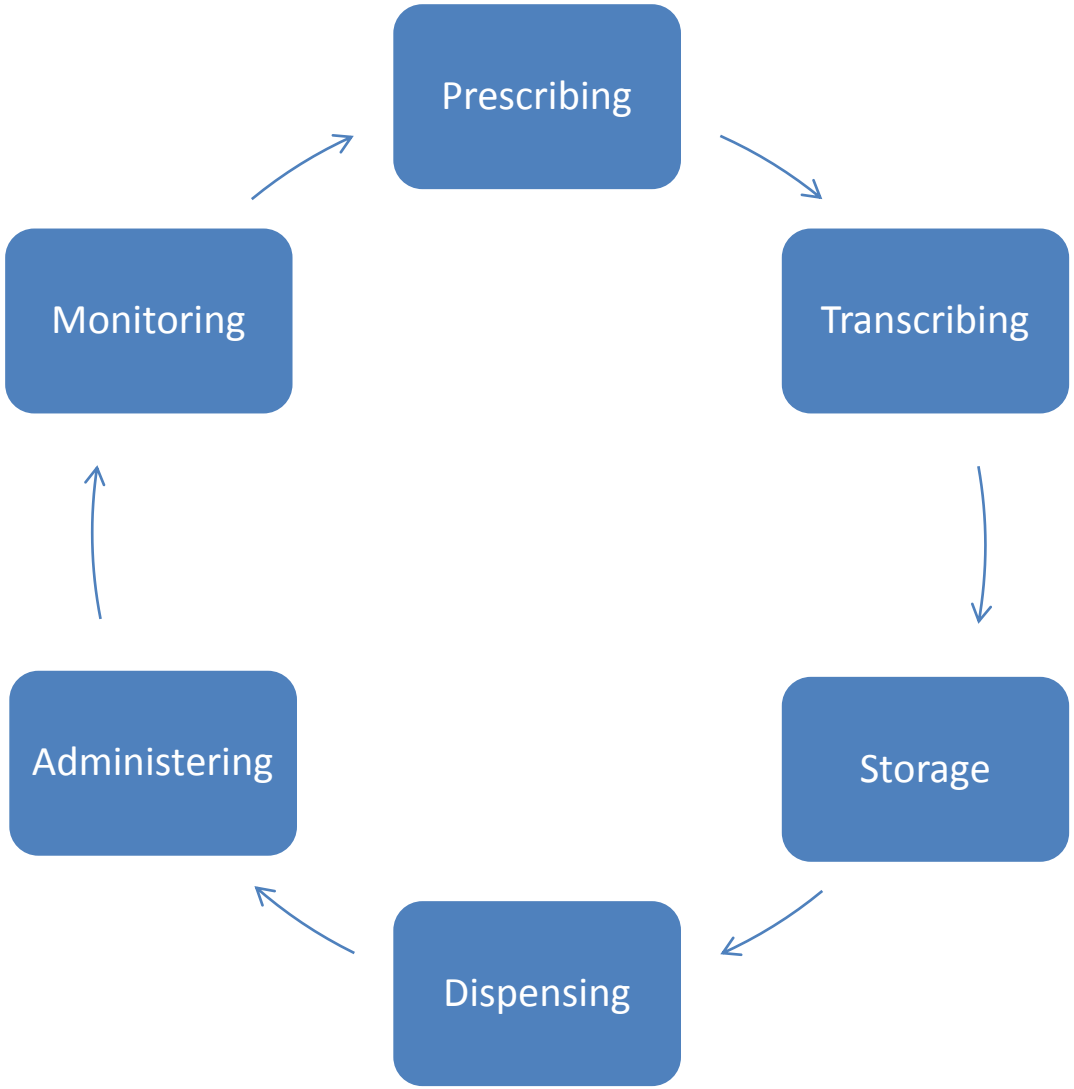
JAMA. 2006;296:1858-1866
Endocr Pract. 2004; 10(suppl 2):100-8.

Insulin

- High-alert medication
- Life-saving, but life threatening
- Represents 16.2% of all harmful medication error reports
- Insulin med errors occur in all hospital settings and during each step of the medication-use process

Arch Intern Med 2007; 167:1752-9
Institute for Safe Medication Practices. ISMP's List of high-alert medications. Available at:www.ismp.org/tools/institutionalhgihalert.asp. Accessed May 20, 2014.
Am J Health Sys Pharm. 2010;67(8):S17-21.

Safety Risks with Insulin



Prescribing and Transcribing

- Abbreviations
  - "U" instead of "units"
  - "cc" instead of "mL"
- Unintended formulation
  - Humulin® N, Humulin® 70/30, Humulin® R (U-500 and U-100), etc.
- Illegible handwriting
- Missing or unplaced zeros and decimal points

Prescrire Int 2014 Jan;23(145):14-7.
Am J Health Sys Pharm. 2010;67(8):S17-21.

Storage and Dispensing

- Look-alike/ Sound-alike
- Incorrect preparation of injectable doses

Administration

- Wrong dose
  - Lack of a double check
  - Wrong syringe
- Improper timing
- Wrong route
- Re-use of needle/pen
- Infusion rate

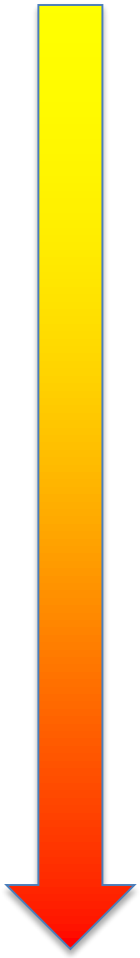
Am J Health Sys Pharm. 2010;67(8):S17-21.

Monitoring

- Improper timing of BG
- Nutritional status was not evaluated

Am J Health Sys Pharm. 2010;67(8):S17-21.

Hypoglycemia



- 70 mg/ dL
  - Palpitations, tremor, arousal, sweating and hunger
- 55 mg/dL
  - Autonomic symptoms exacerbated, behavioral response
- <50 mg/dL
  - dizziness, confusion, tiredness, seizure and/or coma

Journal of Diabetes and Its Complications. 2014;28:565–572.

Hypoglycemia

BG ≤ 50 mg/dL

Numerator: Hypoglycemia in inpatients receiving insulin or other hypoglycemic agents

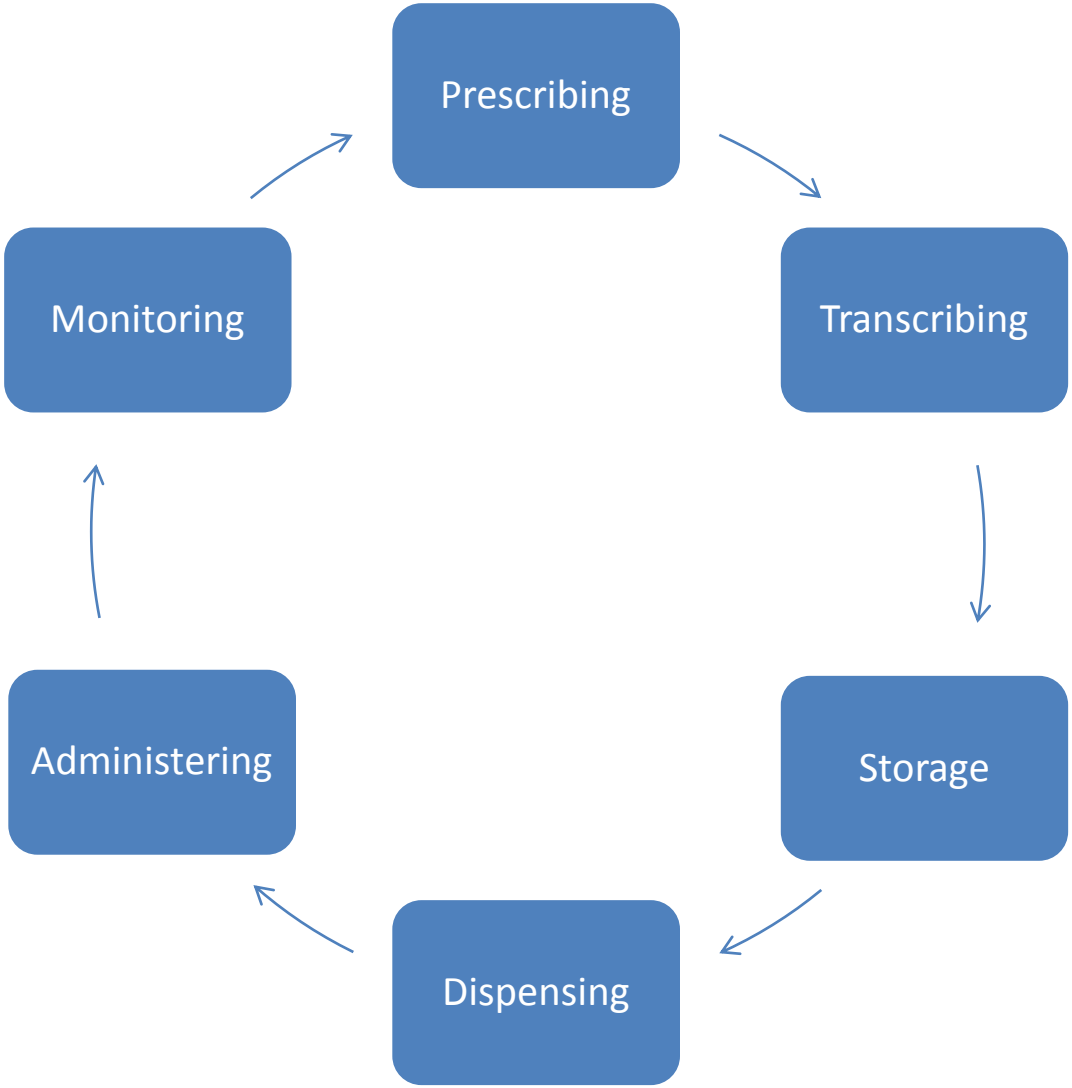
Denominator: Inpatients receiving insulin or other hypoglycemic agents

What is the prevalence of hypoglycemia (BG <60mg/dL) in hospitalized patients?

A. 30%
B. 12%
C. 77%
D. 26%

Diabetes Care 2007;30:367-369

Enhancing Safety with Insulin



Prescribing and Transcribing

- Develop protocol-driven and evidence-based order sets
- Eliminate “free text” insulin orders
- Prohibit orders with unapproved abbreviations
- Limit oral and telephone orders for emergency situations
- Diagnosis and indication should be part of the order

Am J Health-Syst Pharm 2013;79:e18-27.
Am J Healh-Syst Pharm. 2010; 67(Suppl 8):S17-2.

Storage and Dispensing

- Store only U-100 concentration in patient areas
- All insulin infusions should be prepared in the pharmacy
- Standardize insulin infusion concentrations hospital wide
- Pharmacists should prepare and dispense pre-filled syringes for long-acting insulin
- NICU should have differentiation – i.e. “NICU only” label
- Use TALL man lettering (HumALOG vs HumULIN)
- Insulin vial should be labeled with the patient’s name and vial expiration time per institutional guidelines

Am J Health-Syst Pharm 2013;79:e18-27.
Am J Healh-Syst Pharm. 2010; 67(Suppl 8):S17-2.

Administration

- Double-check systems
- Limit types of syringes in patient care areas (tuberculin vs insulin)
- Insulin infusions should be administered via smart pump technology
- Pre-printed guides to appropriate settings of IV pumps

Am J Health-Syst Pharm 2013;79:e18-27.
Am J Healh-Syst Pharm. 2010; 67(Suppl 8):S17-2.

Monitoring

- Coordinate and standardize meals, BG testing, and insulin administration
- Alert staff when diabetic patients with insulin orders have their feedings held or discontinued
- Educate family/caregivers to request mealtime insulin

Am J Health-Syst Pharm 2013;79:e18-27.
Am J Healh-Syst Pharm. 2010; 67(Suppl 8):S17-2.

What percentage of hospitals are no longer using insulin pens due to safety concerns?

A. 45%
B. 75%
C. 15%
D. 20%

Insulin Pen Medication Errors

- Risks
  - Hemoglobin was detected in 6 out of 146 cartridges (4.1%) used by diabetic patients
  - In 120 patients, non-inert material, including squamous cells and other epithelial cells, was found in 58% of the cartridges
- Community hospital, NY 2014
  - 4,000 patients were sent a letter about possible exposure
- VA hospital, NY 2010-2012
  - 700 patients exposed to HIV, hepatitis B or hepatitis C due to reused insulin pens

Diabetes Care. 2001; 24(3):603-4 *Diabetes Care*. 1998; 21(9):1502-4.

Institute for Safe Medication Practices. ISMP Medication Safety Alert. Available at: http://www.ismp.org/newsletters/acutecare/showarticle.aspx?id=41. Accessed March 6, 2014.

Long Island Newsday. NY Hospital warns of possible blood contamination. Available at: http://www.newsday.com/news/region-state/ny-hospital-warns-of-possible-blood-contamination-1.7362149. Accessed March 20, 2014.

Insulin Pens

- NovoPen® first insulin pen introduce in 1985 to:
  - Increase adherence
  - Improve ease of use for patients
- Advantages
  - Medication Safety
  - Patient
  - Hospital

Diabetes Educ. 2002; 28(1):52-6,59-60

Current Recommendations

Institute for Safe Medication Practices (ISMP)

- Insulin pens should not be used in acute care setting unless used in specific situations and procedures should be in place to make sure each patient has his/her own pen

American Society of Health-Systems Pharmacists (ASHP)

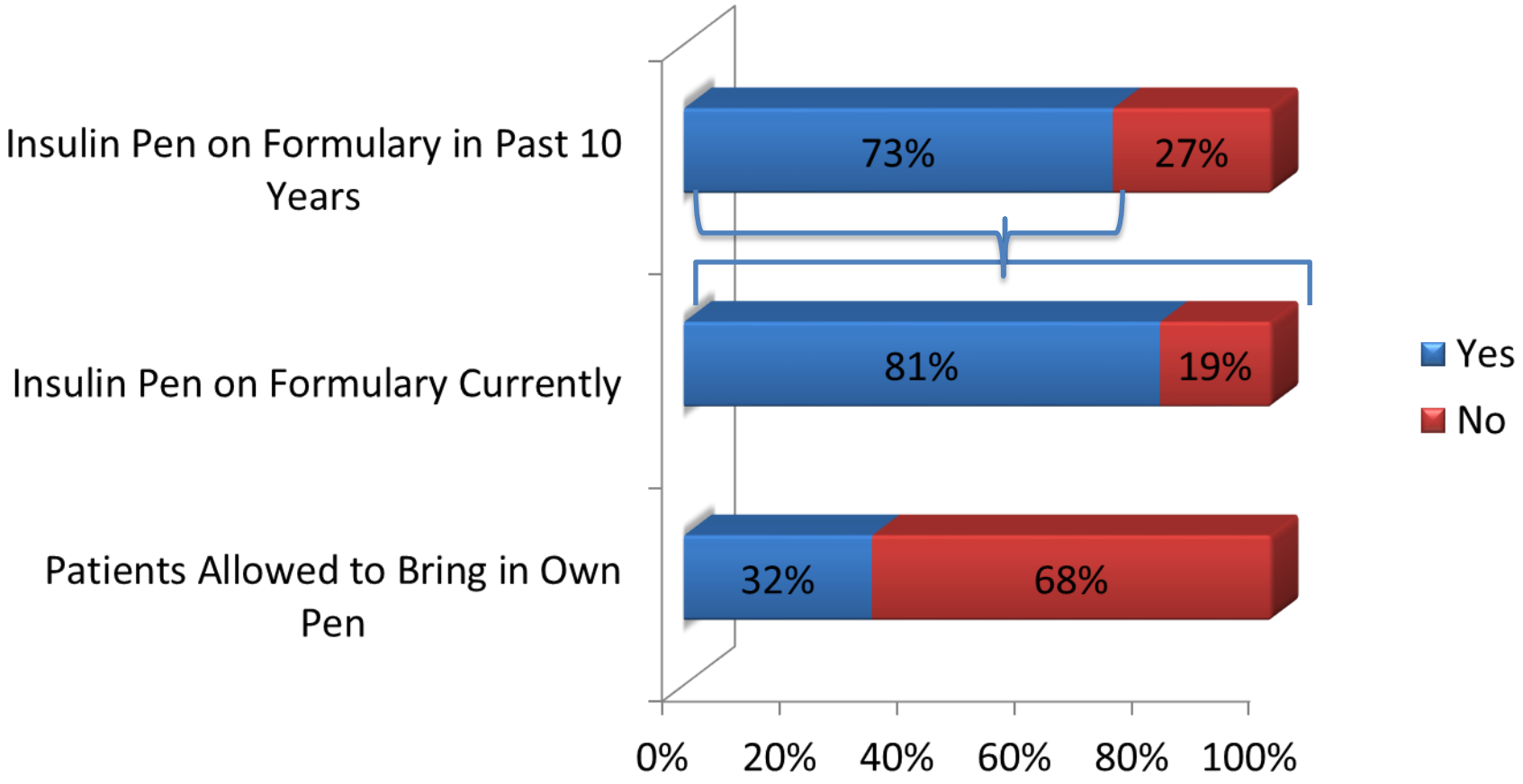
- Store only U-100 concentration insulin and U-100 administration devices (e.g. syringe, pens)
- Develop policies and procedures that ensure insulin pens are used for individual patients only
- Establish policies and educational programs to ensure the safe use of insulin pens and disposable needle tips

Institute for Safe Medication Practices. Hospitals Should Reconsider Insulin Pen Use. Available at: ismp.org/pressroom/PR20130207.pdf. Accessed February 27, 2014.
Am J Health-Syst Pharm 2013; 70:e18-27.

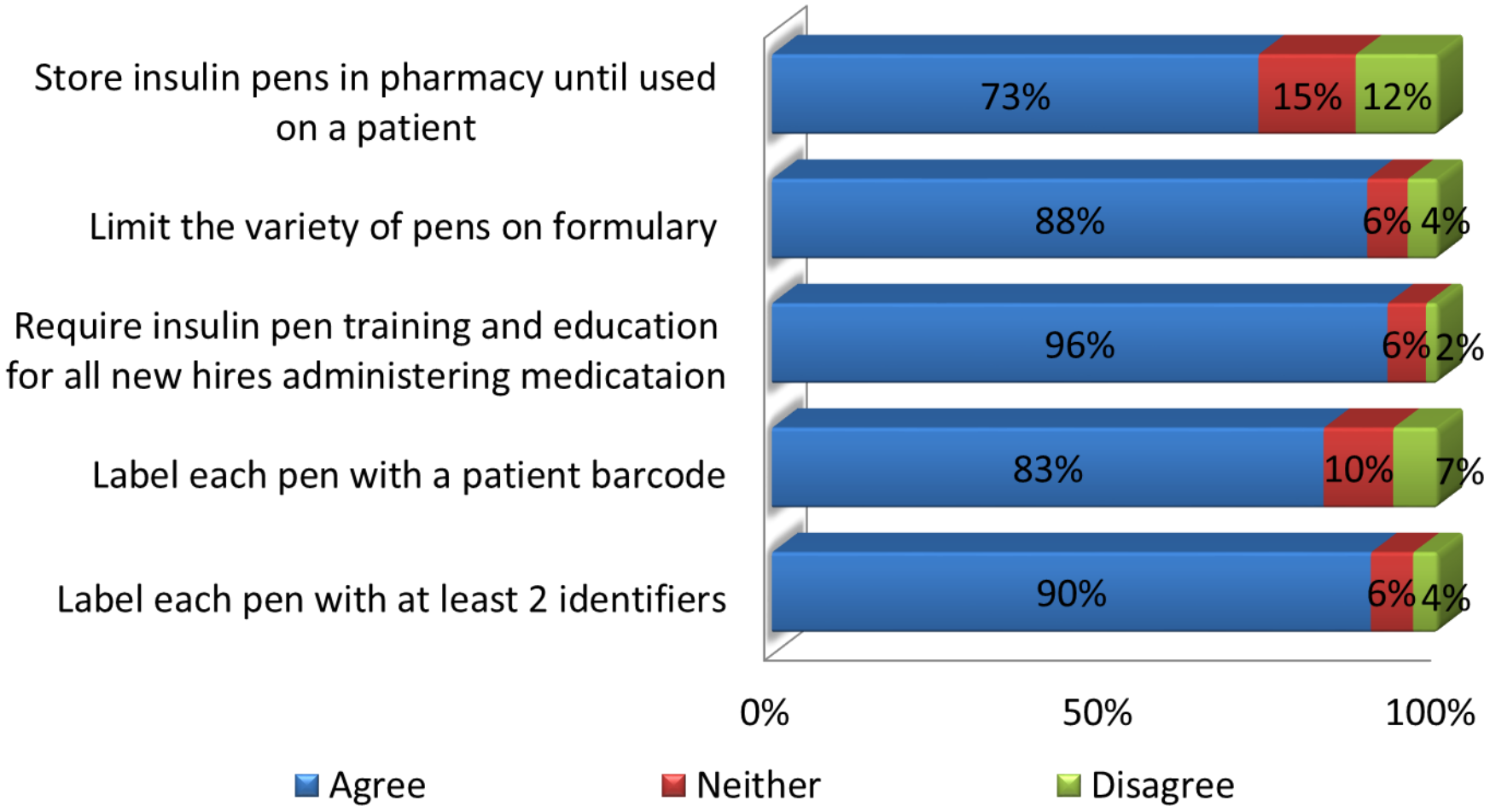
The purpose

The goal of this study is to assess current inpatient utilization trends of insulin pens and share best practices to improve the safety of insulin pens.

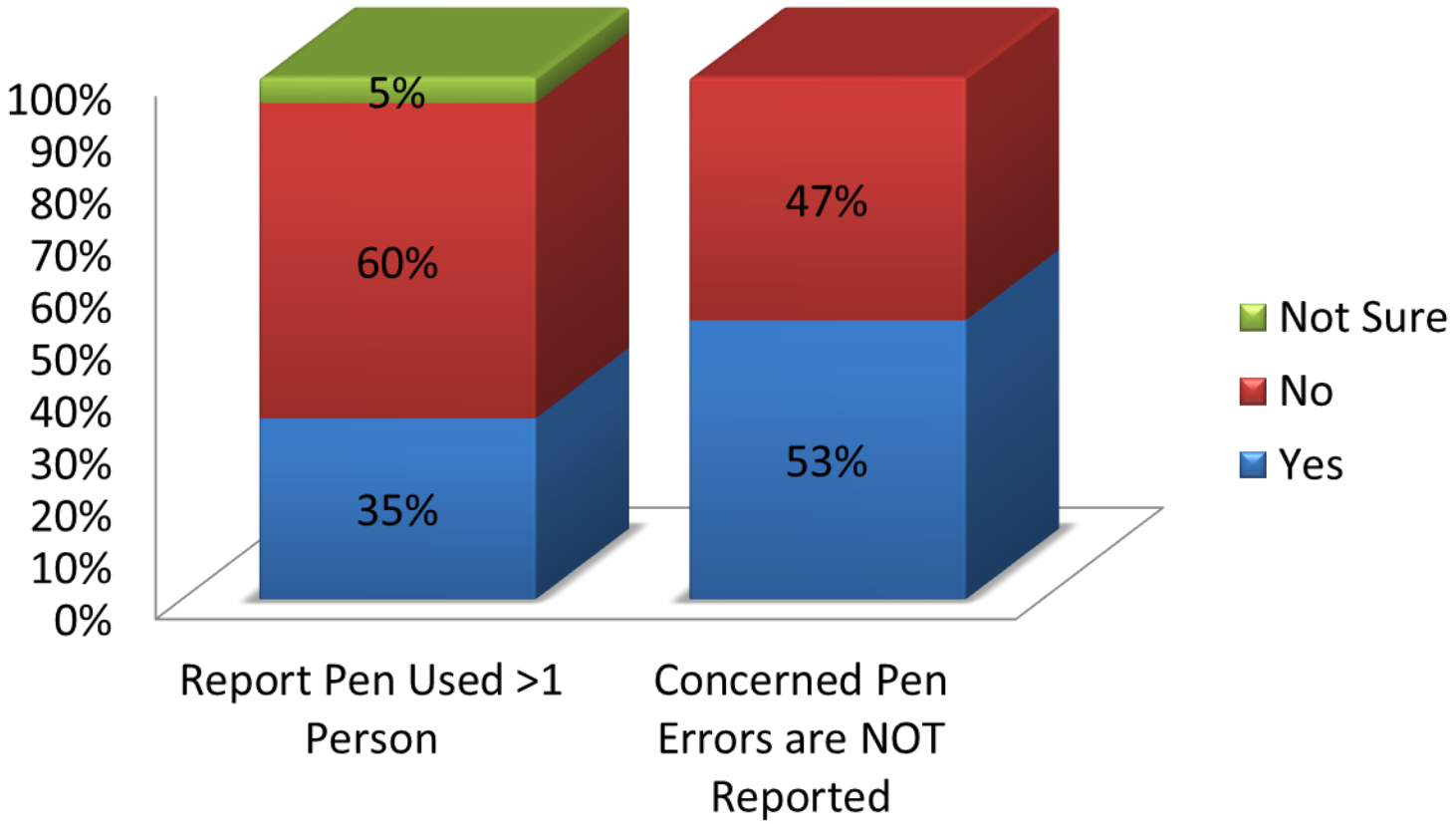
Insulin Pen Prevalence



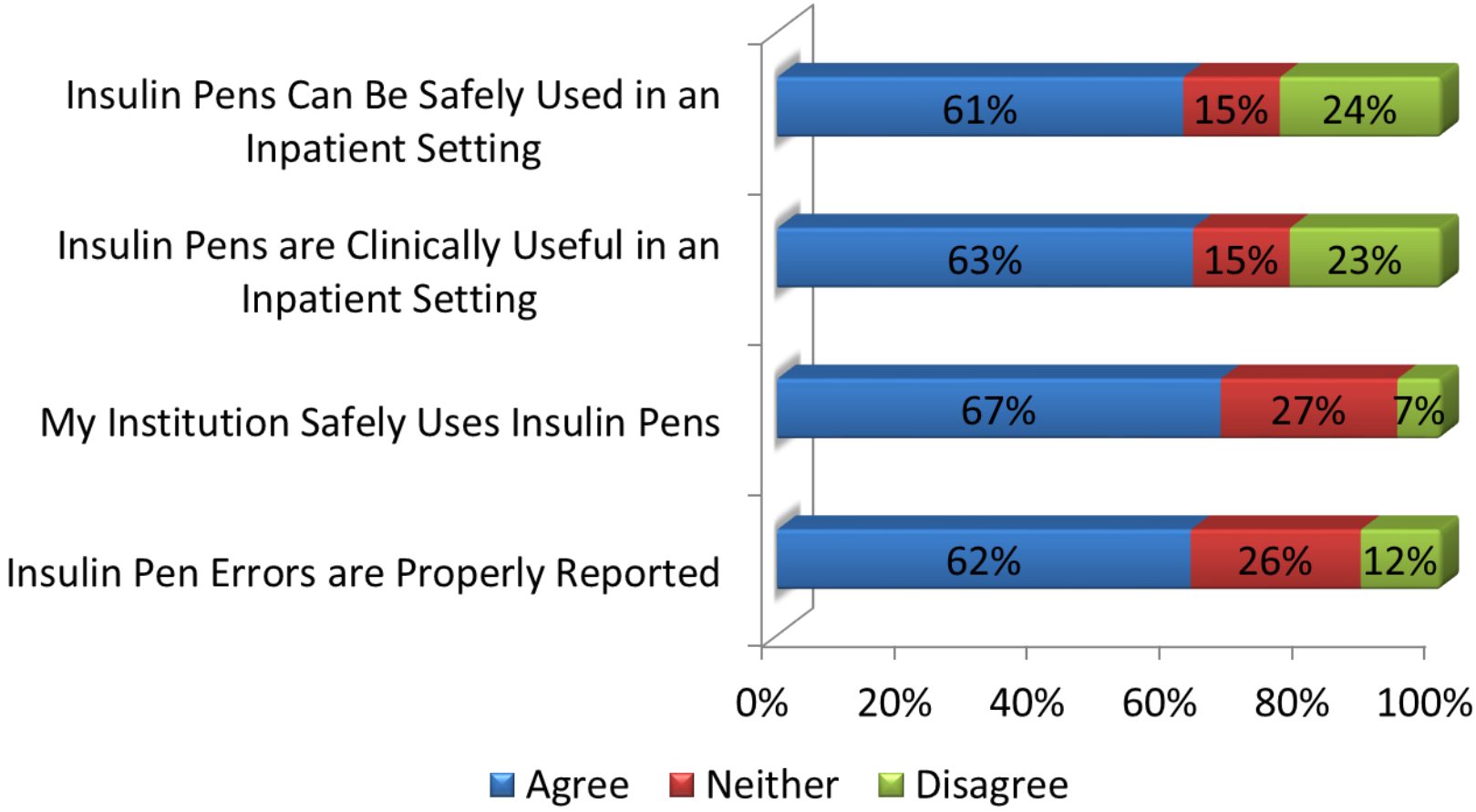
Insulin Pen Risk Mitigation Strategies



Insulin Pen Errors



Insulin Pen Errors



Discussion

- 20% drop in institutions using insulin pens mostly due to ISMP recommendation
- 60% of participants report an insulin pen has not been used on more than one patient
  - 53% are concerned errors are not being reported
  - Only 27% of participants strongly agree that their institution uses insulin pens safely
- Less than 50% are implementing risk mitigation strategies such as a prescribing protocol
- Lack of knowledge on the education and training of insulin pen administration

Discussion

- Over 75% of participants are using insulin pens in the inpatient setting
- Over 50% agree insulin pens can be safely used in the inpatient setting and are clinically useful in an inpatient setting
- 35% of participants report an insulin pen has been used on more than one patient
- 53% are concerned insulin pen errors are not being reported

Insulin Pen Recommendations

- Limit types of pens available
- Label pen with 2 patient identifiers (not on the removable cap)
- Place tamper-evident seal vertically on the pen
- Policies and procedures for storage of pens
- Education of staff on proper administration
- Patient and caregiver education
- Constant monitoring via a risk-management function

Am J Health Syst Pharm 2013;79:e18-27.
Am J Health-Syst Pharm. 2010; 67(Suppl 8):S17-21

Questions

Take Home Points

- Education of staff
- Chose one practice to improve upon
  - PharmD: Check indication and diagnosis
  - RN: Take the time for double-check
  - Risk Manager: Update policy/procedure
  - MD, PA, NP: Reduce oral/telephone orders
- Measure, Analyze, Report

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Evaluation & Follow-up

- Webinar funded by CMS through the *Partnership for Patients*
- CMS reviews results and wants 80% of participants to evaluate educational sessions
- Please complete the simple three question evaluation by Oct. 9, 2014:
  - https://www.surveymonkey.com/s/2014_09_30_ADEInsulinWebinar
- Link to evaluation and webinar recording will be distributed to participants within one week

THANK YOU FOR YOUR PARTICIPATION!

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