

Problem Statement

Peripheral intravenous catheter (PIVC) associated phlebitis can lead to increased healthcare costs, prolonged length of stay, additional medical treatment, and increased mortality & morbidity.

In 2021, a Neurotrauma Critical Care (NTCC) unit identified 68 cases of PIVC associated phlebitis. The cases were identified by the nursing staff (RN). Emergently placed PIVC and vesicant agents are identified as high-risk factors for phlebitis

- Emergently placed PIVC accounted for 35% (n=24) of cases
- Vesicant-associated intravenous medications (hypertonic saline, vancomycin, or potassium chloride) accounted for 71% (n=48) of cases

Purpose of Project

Implementation and evaluation of an evidence-based Phlebitis Prevention Bundle (PPB) through a practice change:

- Removal of emergently placed PIVCs within 24 hours of admission
- Nursing education
 - Importance of Phlebitis assessment and documentation
 - Education of common vesicant medications

Outcome Goal:

- Reduction in the monthly mean of phlebitis cases

Methods

Setting:

- A 12 bed NTCC in an urban academic medical center

Participants:

- All Nursing staff on NTCC unit
- All patients admitted from the trauma and operating room except those with ultrasound placed PIVC or end of life patients (N=74)

Intervention:

- Create PPB, RN staff education, PPB practice change, adherence and PIVC-phlebitis tracking

Implementation Strategies:

- Education, use of unit champions, incentives

Data Collection:

- RN education tracking, adherence audits, and nurse-reported phlebitis audits
- Total PIVCs removed for phlebitis: 40

Figures

Figure 1

Phlebitis Prevention Bundle Education Handout

STEP 1: PRACTICE PREVENTION
Remove any peripheral IV placed in the Trauma Resuscitation Unit/ field/ outside hospital within 24 hours of admission on new patients to Neurotrauma Critical Care

STEP 2: ASSESS
Reminder to assess PIV every 4 hours using the following grading scale:

Phlebitis Grade	Presentation
0	No complications/signs of phlebitis; observe cannula
1+	Early stage of phlebitis: Pain with flushing
2+	Moderate stage of phlebitis: Streak formation-redness above the IV site
3+	Advanced stage of phlebitis: Palpable cord-hard vessel on palpation

Note: Phlebitis Grade Scale provided by EHR in MyPortfolio/EPIC.

STEP 3: DOCUMENT
Upon removal of PIV document correlating assessment:

Post Removal Assessment

<input type="checkbox"/> No Complications	<input type="checkbox"/> Bleeding at site	<input type="checkbox"/> Bruising at site	<input type="checkbox"/> Catheter intact
<input type="checkbox"/> Catheter not intact	<input type="checkbox"/> Drainage	<input type="checkbox"/> Infiltrated 1+swelling at end of catheter	
<input type="checkbox"/> Infiltrated 2+swelling	<input type="checkbox"/> Infiltrated 3+ large area of swelling	<input type="checkbox"/> Leaking	
<input type="checkbox"/> Pain	<input type="checkbox"/> Phlebitis 1+Pain	<input type="checkbox"/> Phlebitis 2+Streak formation	<input type="checkbox"/> Phlebitis 3+ Palpable cord
<input type="checkbox"/> Redness at site	<input type="checkbox"/> Swelling	<input type="checkbox"/> Warm to touch	<input type="checkbox"/> Other (add comment)

Note: Image from EHR documentation available in MyPortfolio/EPIC.

Figure 2

STEP 4: KNOW

NONCYTOTOXIC VESICANT LIST

The first step in reducing the risk of extravasation is to identify and recognize medications and solutions that are associated with tissue damage when the solution escapes from the vascular pathway

Well-recognized vesicants with multiple citations and reports of tissue damage upon extravasation	Vesicants associated with fewer published reports of extravasation; published drug information and infusate characteristics indicate caution and potential for tissue damage
Calcium chloride	Acyclovir
Calcium gluconate	Amiodarone
Contrast media	Amphotericin
Dextrose concentration $\geq 12.5\%$	Arginine
Diazepam	Dantrolene
Digoxin	Dextrose concentration $\geq 10-12.5\%$
Dobutamine	Doxycycline
Dopamine	Esmolol
Epinephrine	Gentamicin
Etomidate	Mannitol $\geq 20\%$
Lorazepam	Metronidazole
Norepinephrine	Nafcillin
Parenteral nutrition solutions	Pentamidine
Phenyphrine	Pentobarbital sodium
Phenytoin	Phenobarbital sodium
Promethazine	Potassium ≥ 20 mEq/L
Sodium bicarbonate	Vancomycin hydrochloride
Sodium chloride $\geq 3\%$	Valproate
Vasopressin	

Figure 3

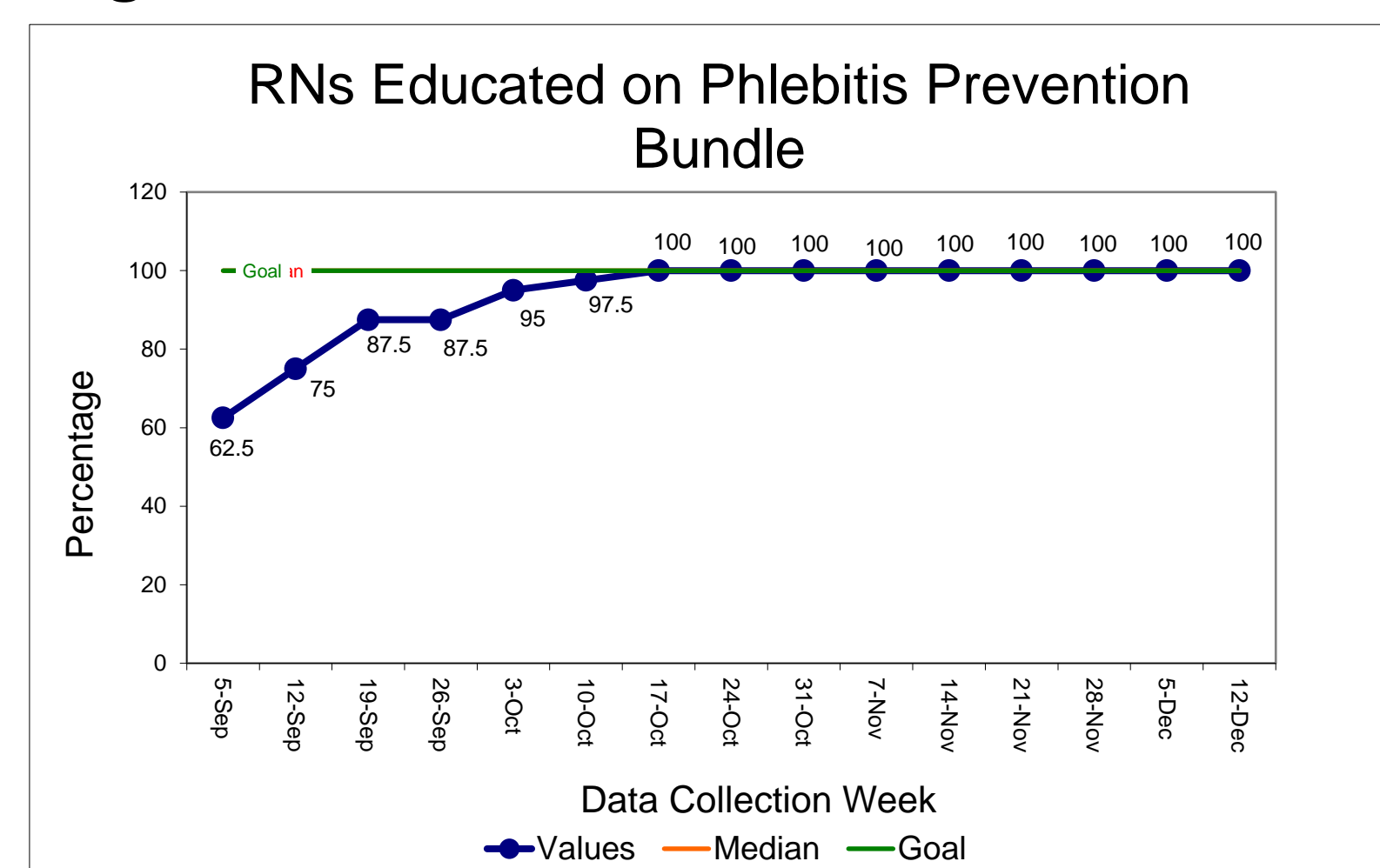


Figure 4

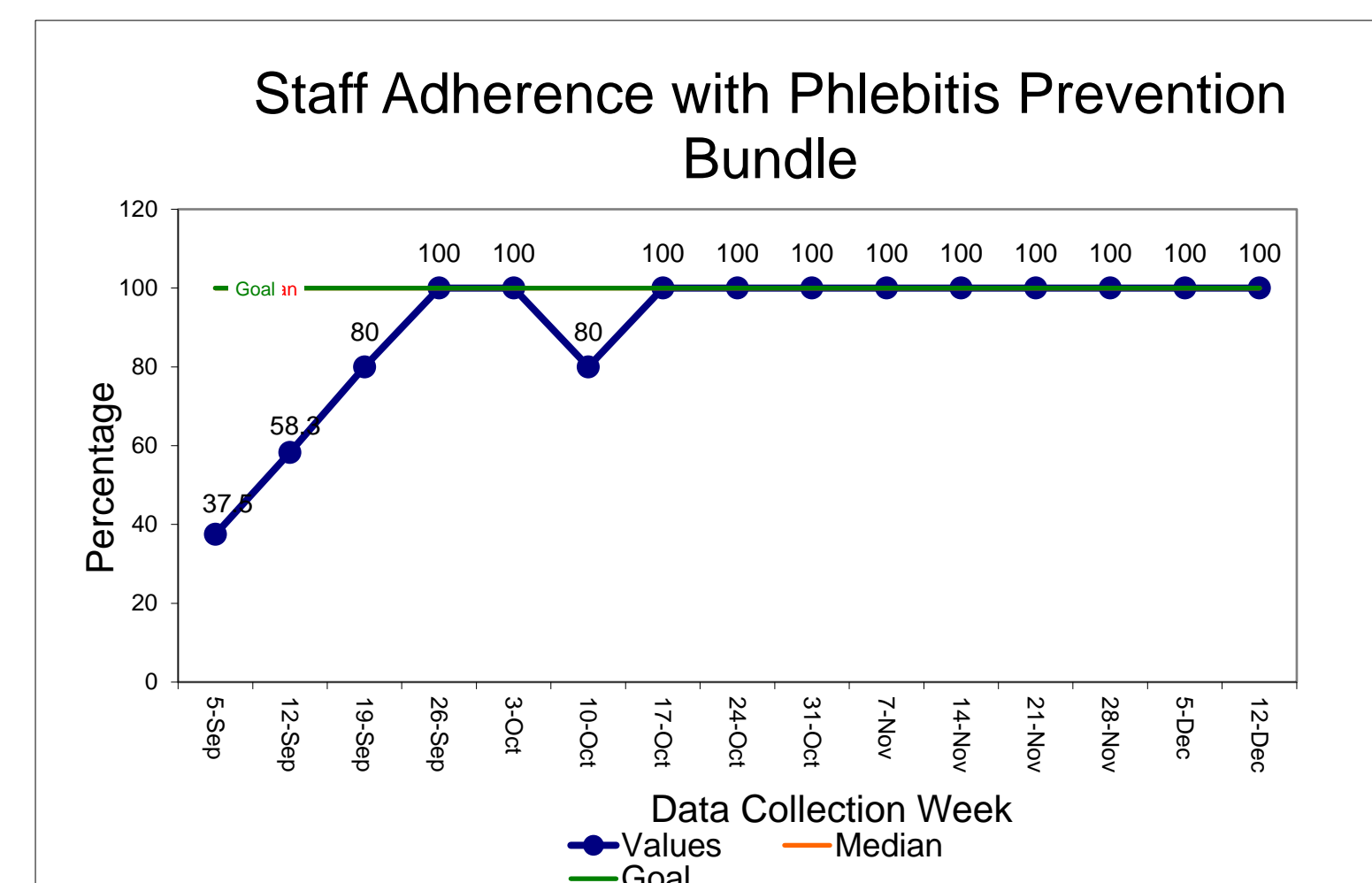


Figure 5

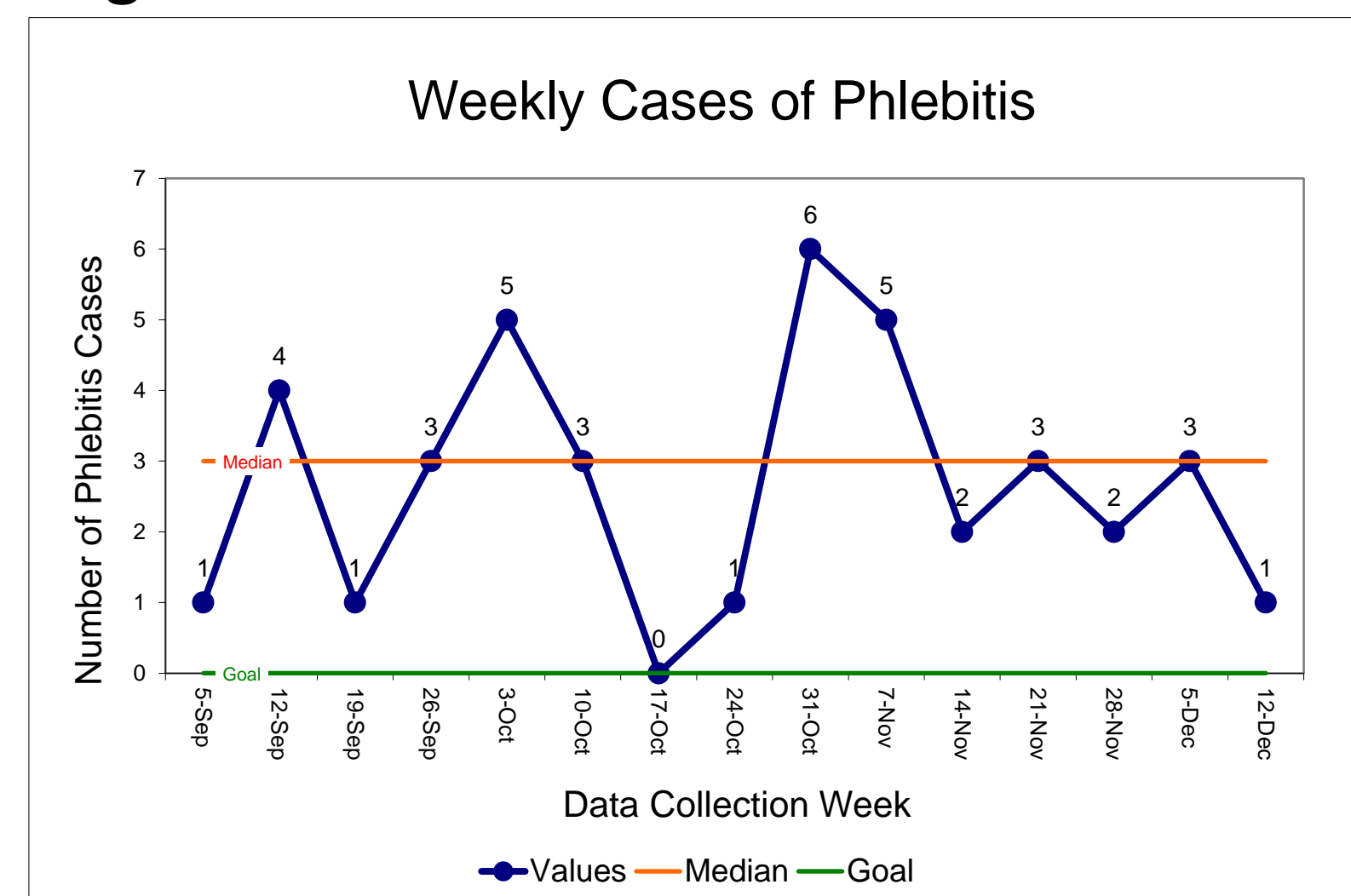
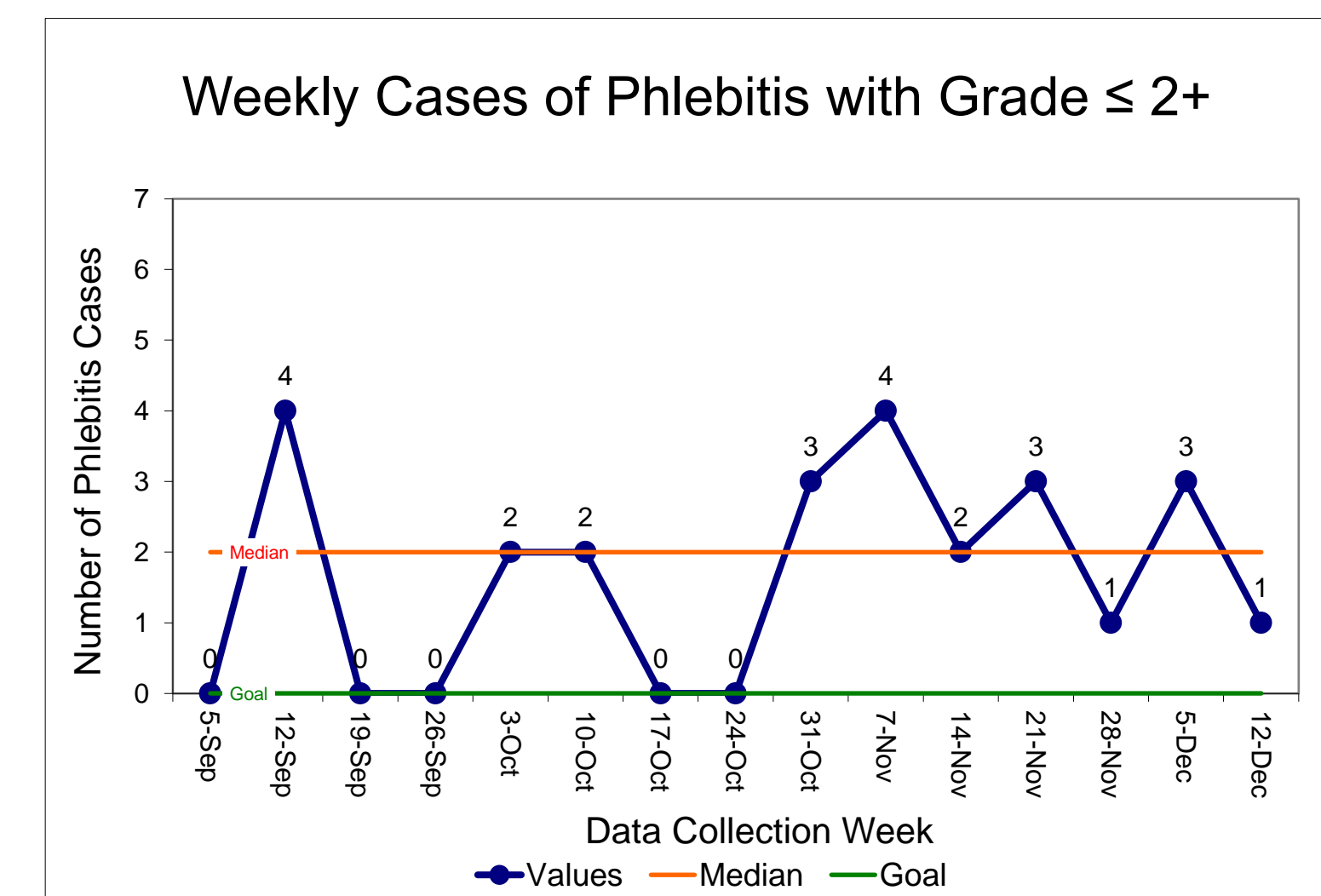


Figure 6



Results

- Among the NTCC RN staff, 100% (N=74) completed PPB education by Week 7 (Figure 3)
- Staff adherence to the PPB reached 100% at Week 4 before 100% of staff had been educated (Figure 4)
- Staff adherence to the PPB was maintained at 100% for 9 weeks (Figure 4)
- Week 9 had the highest number of phlebitis cases reported (Figure 5)
- The number of early phlebitis cases made up 62.5% of all phlebitis cases
- Of the admitted PIVCs, 90.7% were removed by nursing staff
- External PIVC breakdown: 86.8% trauma admitting unit, 94.2% OSH, 100% EMS

Discussion

Adherence to the removal of external PIVCs within 24 hours of admission was a practical change that RNs were able to integrate and sustain in their practice. Complete adherence was achieved within 4 weeks despite partial RN education. The monthly average of phlebitis cases increased from 4 pre-implementation to 13 post-implementation. However, the majority of the phlebitis cases reported were identified early (grade $\leq 2+$) indicating that the PPB was effective at improving RN recognition of phlebitis.

Barriers:

- Short staffed shifts, patient acuity, and difficult intravenous access

Facilitators:

- Stakeholder support, Champions, incentives, Infectious disease and unit NP education

Limitations:

- Documentation, nursing staff underreporting, short staffing, and subjectivity of phlebitis grading

Conclusions

Implications for practice

- PPB is a feasible and sustainable if effectively implemented.
- The PPB practice change has led to increased RN awareness and reporting therefore improving the quality of care

Sustainability and Spread

- Process changes: Hospital-wide implementation of PPB
- Structural changes: inclusion of the PPB in the EHR and hospital policy

References



Full reference list available with QR code

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