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II 2ND Convegno GAVePed Conference

3 Dicembre December 3rd

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New Technologies for the Early Diagnosis of Infusate Infiltration in Pediatrics with Peripheral Venous Access

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-

Tuesday, December 3, 3:00pm

ivWatch®

BACKGROUND

INFILTRATION

Defined as a nonvesicant solution leaking out of the vein into surrounding tissue.

Symptoms include redness, swelling, pain and / or leaking at the insertion site.

EXTRAVASATION

Defined as a vesicant solution leaking out of the vein into surrounding tissue.

More serious and can lead to blistering, necrosis, nerve damage, compartment syndrome and amputation.

IV INFILTRATION IN THE PEDIATRIC PATIENT

Reported infiltration incidences in pediatric patients range from 16 – 78%.

High risk population due to –

- Age
- Activity level
- Limited communication skills
- IV site in an area of flexion
- Small vessel size
- Frequent need for vesicants

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Amjad I, Murphy T, Nylander-Housholder L, et al. A new approach to management of intravenous infiltration in pediatric patients. J Infus Nurs. 2011;34:242–249.

RISK / HARM

The Patient

- Pain
- Swelling
- Nerve damage
- Additional procedures
- Amputation

Patient / Family Experience

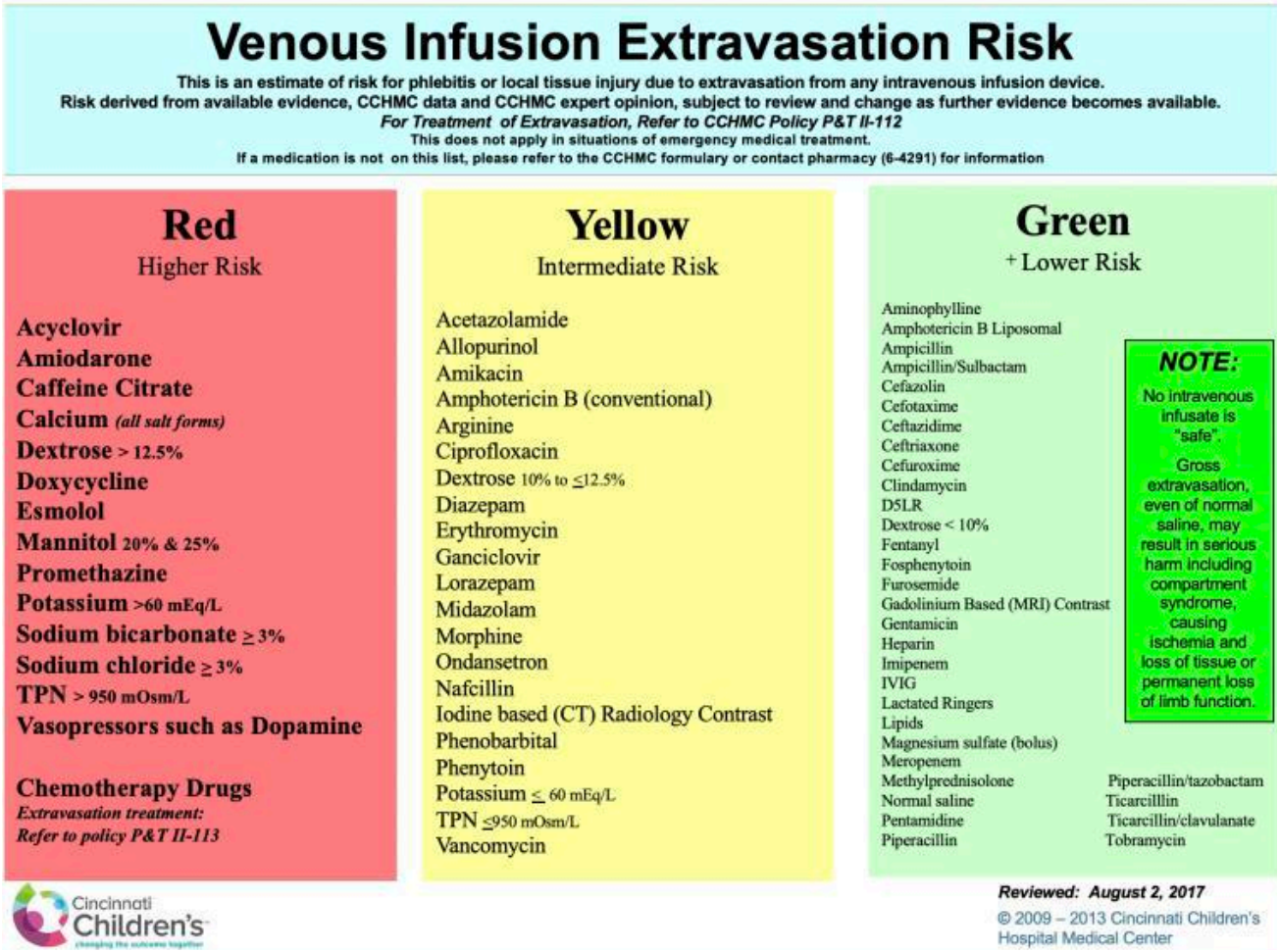
- Mistrust in healthcare system

The Care Facility

- Extended hospital stays
- Surgeries
- Drug costs
- Liability
- Reputation

CAUSES OF IV INFILTRATIONS

CURRENT PREVENTION PRACTICES



Venous Infusion Extravasation Risk

This is an estimate of risk for phlebitis or local tissue injury due to extravasation from any intravenous infusion device.
Risk derived from available evidence, CCHMC data and CCHMC expert opinion, subject to review and change as further evidence becomes available.
For Treatment of Extravasation, Refer to CCHMC Policy P&T II-112
This does not apply in situations of emergency medical treatment.
If a medication is not on this list, please refer to the CCHMC formulary or contact pharmacy (6-4291) for information

Red
Higher Risk

Acyclovir
Amiodarone
Caffeine Citrate
Calcium *(all salt forms)*
Dextrose > 12.5%
Doxycycline
Esmolol
Mannitol 20% & 25%
Promethazine
Potassium >60 mEq/L
Sodium bicarbonate ≥ 3%
Sodium chloride ≥ 3%
TPN > 950 mOsm/L
Vasopressors such as Dopamine

Chemotherapy Drugs
Extravasation treatment:
Refer to policy P&T II-113

Yellow
Intermediate Risk

Acetazolamide
Allopurinol
Amikacin
Amphotericin B (conventional)
Arginine
Ciprofloxacin
Dextrose 10% to ≤12.5%
Diazepam
Erythromycin
Ganciclovir
Lorazepam
Midazolam
Morphine
Ondansetron
Nafcillin
Iodine based (CT) Radiology Contrast
Phenobarbital
Phenytoin
Potassium ≤ 60 mEq/L
TPN ≤950 mOsm/L
Vancomycin

Green
+ Lower Risk

Aminophylline
Amphotericin B Liposomal
Ampicillin
Ampicillin/Sulbactam
Cefazolin
Cefotaxime
Ceftazidime
Ceftriaxone
Cefuroxime
Clindamycin
D5LR
Dextrose < 10%
Fentanyl
Fosphenytoin
Furosemide
Gadolinium Based (MRI) Contrast
Gentamicin
Heparin
Imipenem
IVIG
Lactated Ringers
Lipids
Magnesium sulfate (bolus)
Meropenem
Methylprednisolone
Normal saline
Pentamidine
Piperacillin
Piperacillin/tazobactam
Ticarcilllin
Ticarcillin/clavulanate
Tobramycin

NOTE:
No intravenous infusate is "safe".
Gross extravasation, even of normal saline, may result in serious harm including compartment syndrome, causing ischemia and loss of tissue or permanent loss of limb function.

Reviewed: August 2, 2017

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- Select appropriate vascular access device
- Select appropriate IV Sites
- Avoid vesicant infusions through IVs
- Frequent IV site assessments

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T-L-C FOR YOUR IV

TLC | For IV Safety: Touch, Look, and **COMPARE**

TMC | Para una vía intravenosa segura: Toque, Mire y **COMPARE**

TOUCH

Touch every 60 minutes

IV site should feel:
- Soft
- Warm
- Dry
- Pain free at all times

TOQUE

Toque cada 60 minutos

El sitio de la vía IV se debe sentir:
- Blando
- Tibio
- Seco
- Sin dolor siempre

LOOK

Look every 60 minutes

IV site should be:
- Uncovered
- Dry
- Without redness

MIRE

Mire cada 60 minutos

El sitio de la vía IV debe estar:
- Destapado
- Seco
- Sin enrojecimiento

COMPARE

Compare every 60 minutes

IV site should be:
- Same size as other side
- Without swelling

COMPARE

Compare cada 60 minutos

El sitio de la vía IV debe:
- Tener el mismo tamaño que el otro lado
- No estar hinchado

IV Checks must happen even when asleep!

Call your nurse if you notice anything wrong or if you have questions or concerns.

¡Los chequeos de la intravenosa deben hacerse inclusive mientras duerme!

Llame a la enfermera si ve que algo no está bien o si tiene dudas o inquietudes.

KM203 03/2019

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Cincinnati Children's

changing the outcome together

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EARLY CLINICAL CHALLENGES

Routine, hourly IV site assessments are crucial for **detecting early symptoms** of infiltration however, challenges exist.

- Clinicians often struggle with accomplishing timely and consistent IV assessments due to multiple factors including:
  - Time
  - Lack of knowledge
  - Inability to visualize IV site
  - Concern regarding awakening patient
  - Lack of patient / caregiver knowledge regarding importance of IV assessment

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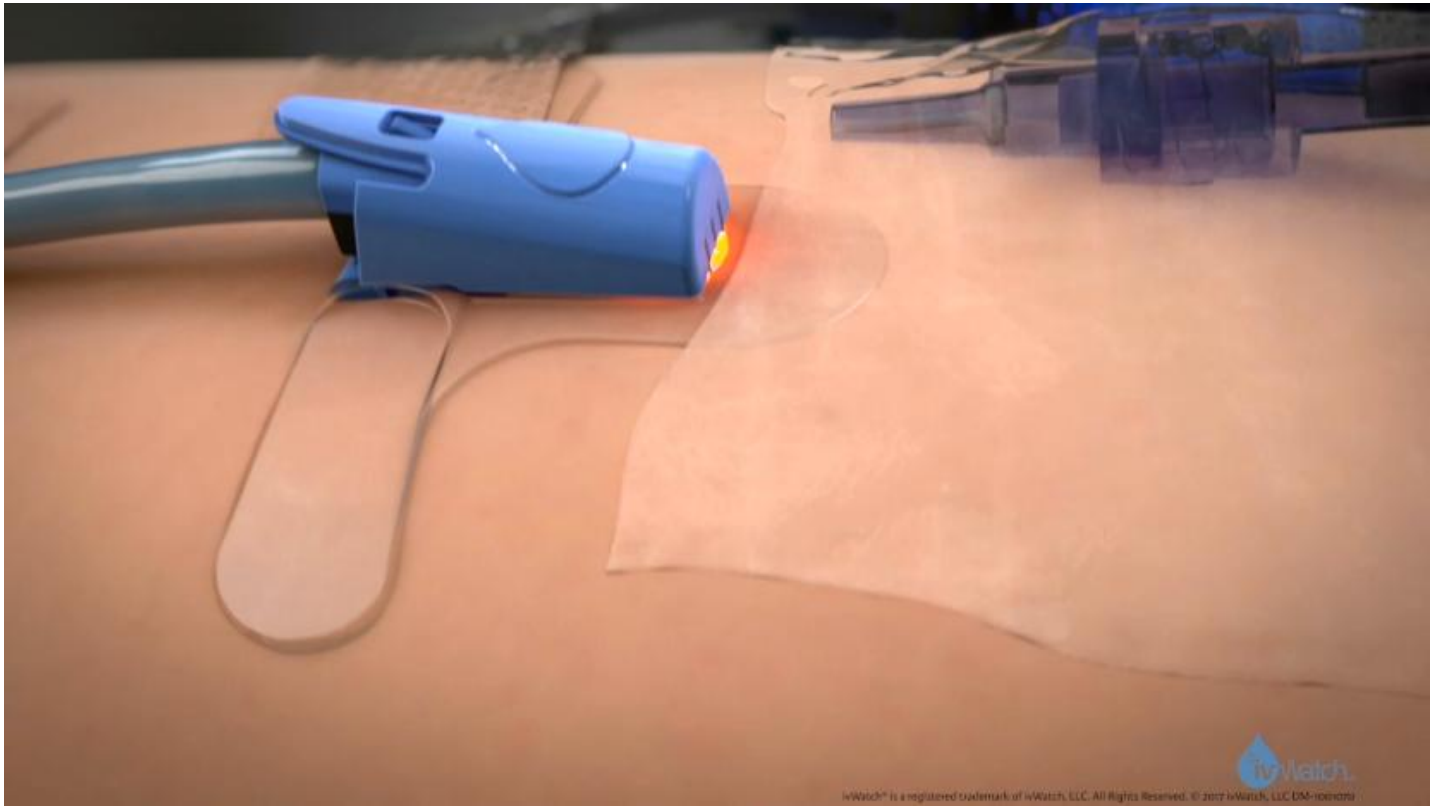
IVWATCH TECHNOLOGY

The ivWatch Model 400

- **FDA-cleared and CE-marked, noninvasive** medical device.
- Device **uses visible and near-infrared light** to **aid** in the **early detection** of an **infiltration/extravasation**.
- Early detection of infiltration events is key to **minimizing patient harm and improving patient safety** and outcomes.

HOW IVWATCH WORKS



CINCINNATI CHILDREN'S HOSPITAL, CINCINNATI, OHIO - CLINICAL STUDY

- Multi-year relationship to prepare for and conduct clinical study
- Vascular access team (VAT) conducted study
- Study phases
  - Investigation pilot to prove concept
  - Non-Alarming phase ('control group')
    - Compare time to IV infiltration detection
  - Alarming phase ('study group')
    - Notification rate

156 pediatric subjects

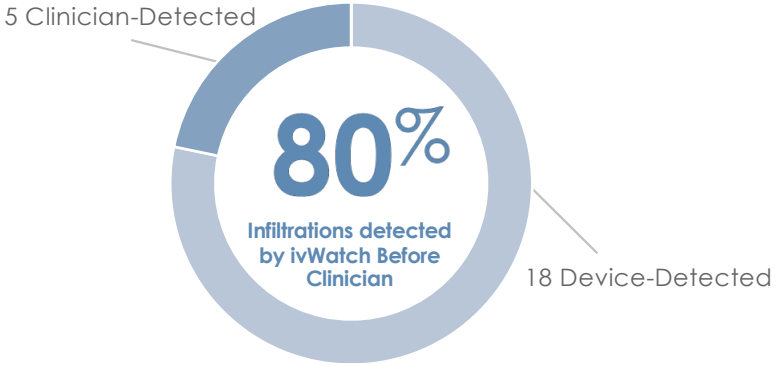
Notifications disabled

Collected Check IV data; analyzed after clinician-confirmed infiltration to find detection time difference between device and clinician

CLINICAL STUDY KEY RESULTS
NON-ALARMING PHASE

INFILTRATION RATE

A total of 23 clinician confirmed extravasations occurred in 156 patients, corresponding to an infiltration rate of 14.7 %.



Detected 18 of 23 (80%) Extravasation Events Prior To Clinician Confirmation

29
HOURS
BEFORE CLINICIAN CONFIRMATION

A red "Check IV" notification occurred an average time of 29.8 hours before clinician detection.
29.8 hours | 95% Confidence Interval: 14.8 to 44.8 hours

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Darcy Doellman and Sylvia Rineair (2019) The Use of Optical Detection for Continuous Monitoring of Pediatric IV Sites. Journal of the Association for Vascular Access: Summer 2019, Vol. 24, No. 2, pp. 44-47.

57 pediatric subjects

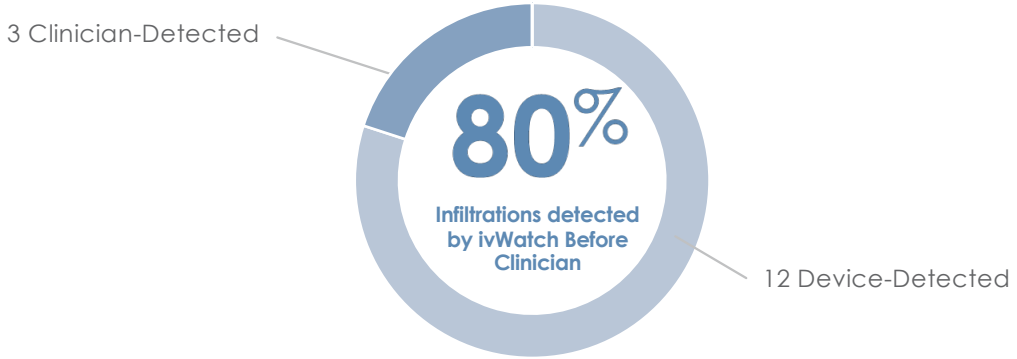
Notifications enabled

Collected Check IV data; analyzed after comparing device sensitivity to clinician

CLINICAL STUDY KEY RESULTS
ALARMING PHASE

INFILTRATION RATE

A total of 15 clinician confirmed extravasations occurred in 57 patients, corresponding to an infiltration rate of 26.3 %.



Detected 12 of 15 Extravasation Events Prior To Clinician Confirmation

2.1 hrs

Median Time Between Red Check IV and Clinician Detection

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Darcy Doellman and Sylvia Rineair (2019) The Use of Optical Detection for Continuous Monitoring of Pediatric IV Sites. Journal of the Association for Vascular Access: Summer 2019, Vol. 24, No. 2, pp. 44-47.

PATH TO IMPLEMENTATION

- **Hourly IV site checks** are challenging with many patients
- Using **TLC method** versus eyes under the skin
- **Generalized edema**
- ivWatch added to **IV infiltration event review**
- Goal of **immediate** recognition to prevent **pain and harm**
- Need for an **intervention with higher reliability**

PATH TO IMPLEMENTATION

- Focus on **patient harm reduction**
- **Module training / hands-on**
  - Quick reference cards
- Identify **superusers**
  - Seeking those who are engaged to drive change forward
- Consistent **rounding**
  - Checking placement
- Overcoming **unit buy-in** challenges

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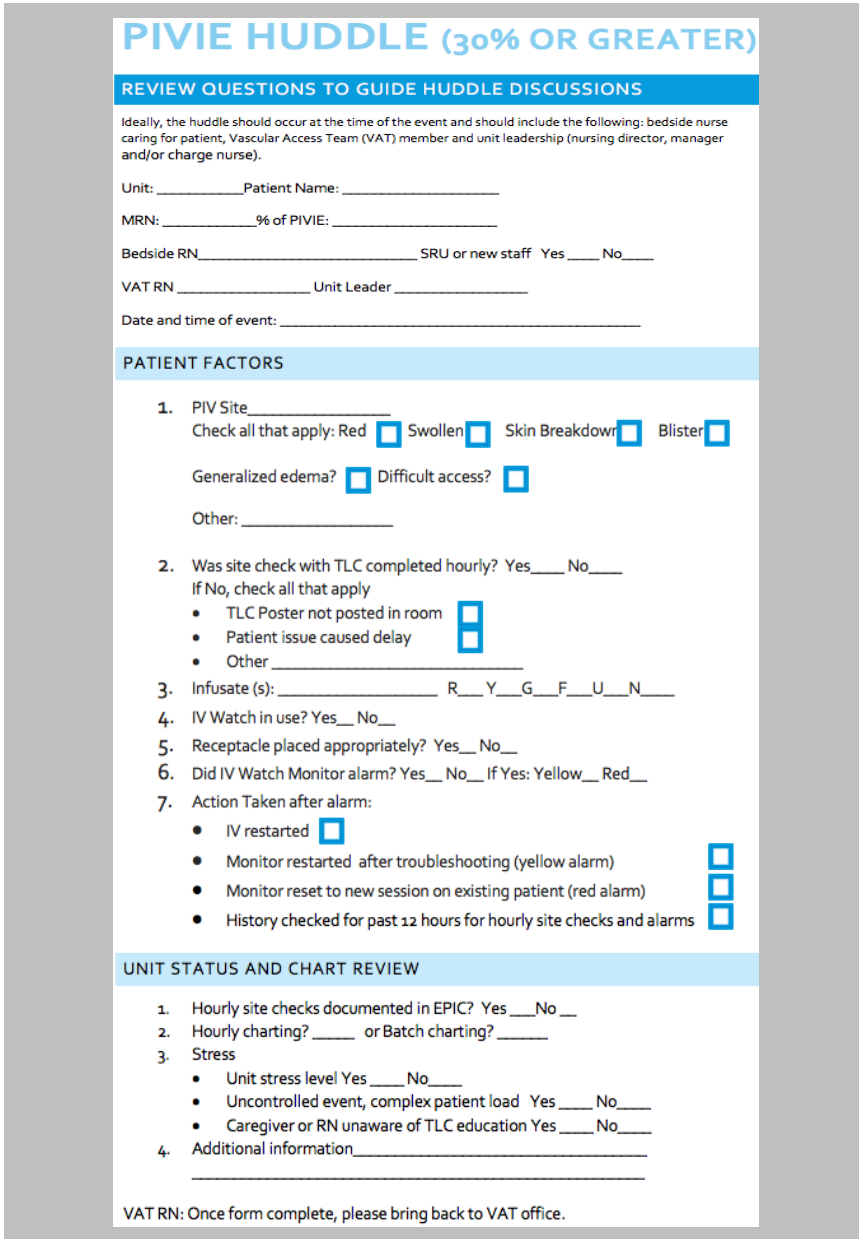

PIVIE HUDDLE (30% OR GREATER)

REVIEW QUESTIONS TO GUIDE HUDDLE DISCUSSIONS

Ideally, the huddle should occur at the time of the event and should include the following: bedside nurse caring for patient, Vascular Access Team (VAT) member and unit leadership (nursing director, manager and/or charge nurse).

Unit: _____Patient Name: _____

MRN: _____% of PIVIE: _____

Bedside RN_____ SRU or new staff Yes ____ No____

VAT RN _____ Unit Leader _____

Date and time of event: _____

PATIENT FACTORS

1. PIV Site_____
   Check all that apply: Red ☐ Swollen ☐ Skin Breakdown ☐ Blister ☐

   Generalized edema? ☐ Difficult access? ☐

   Other: _____
2. Was site check with TLC completed hourly? Yes____ No____
   If No, check all that apply
   - TLC Poster not posted in room ☐
   - Patient issue caused delay ☐
   - Other _____
3. Infusate (s): _____ R___ Y___G___F___U___N____
4. IV Watch in use? Yes__ No__
5. Receptacle placed appropriately? Yes__ No__
6. Did IV Watch Monitor alarm? Yes__ No__ If Yes: Yellow__ Red__
7. Action Taken after alarm:
   - IV restarted ☐
   - Monitor restarted after troubleshooting (yellow alarm) ☐
   - Monitor reset to new session on existing patient (red alarm) ☐
   - History checked for past 12 hours for hourly site checks and alarms ☐

UNIT STATUS AND CHART REVIEW

1. Hourly site checks documented in EPIC? Yes ___No __
2. Hourly charting? _____ or Batch charting? _____
3. Stress
   - Unit stress level Yes ____ No____
   - Uncontrolled event, complex patient load Yes ____ No____
   - Caregiver or RN unaware of TLC education Yes ____ No____
4. Additional information_____
   _____

VAT RN: Once form complete, please bring back to VAT office.

DATA COLLECTION

- Aiming for a **downward shift**
- **Delving into data** to make it easier to present
  - Pre- and post- intervention reports
- **Safety reporting system** vs. **Electronic Health Records**
- **IV infiltration huddle / event reviews**
  - Internal data sharing
  - All teach, all learn
- Collaboration with **quality outcomes managers**

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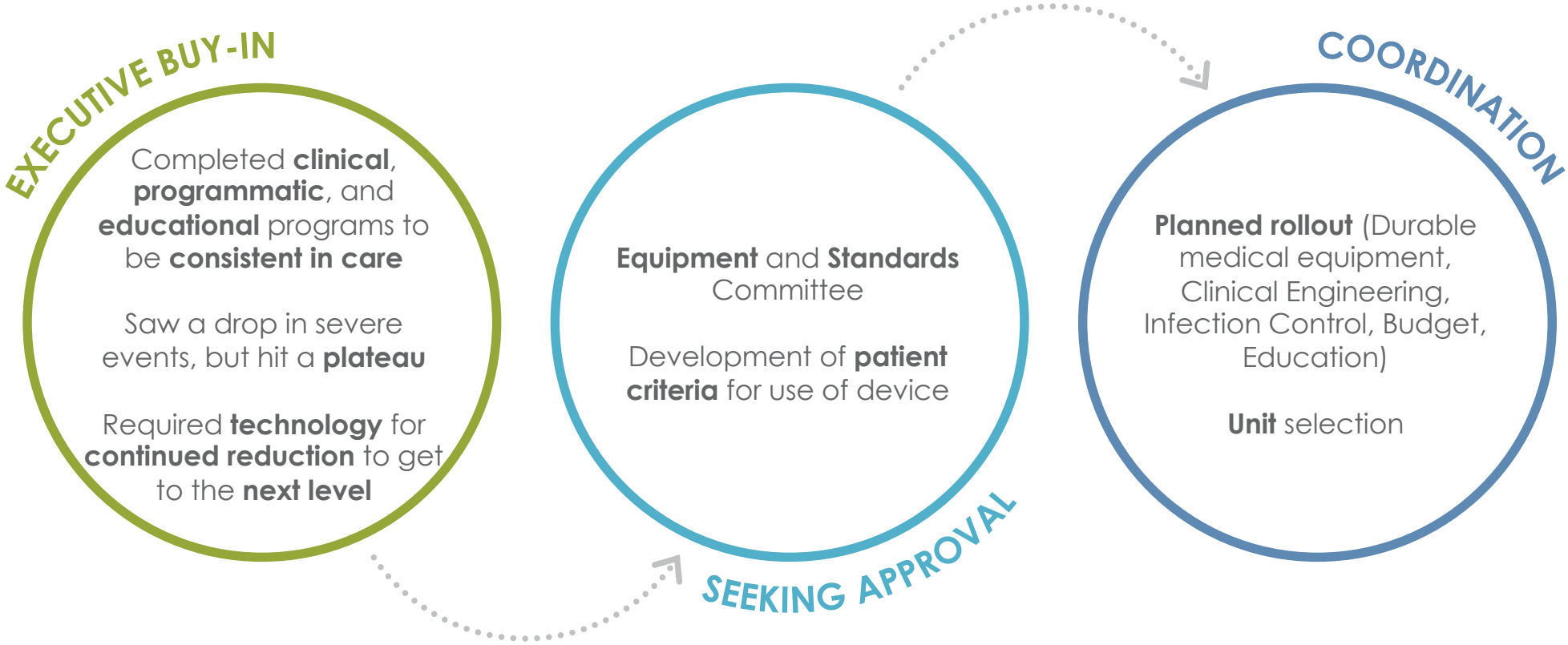
BUILDING THE BUSINESS CASE FOR TECHNOLOGY BUY-IN



BEST PRACTICES AND SUSTAINING MOMENTUM

Continuation of **house-wide** education

Criteria development for **patient and site selection**

Support through **VAT** and med. device **reps** after go live

ivWatch on all **continuous infusions** with clear fluids > 24 hours

Trial on patients – critical care units / **IV fluid bolus'** (intermittent meds greater than 60 min.)

Using **unit data** to demonstrate **success** and drive **acceptance**

Different education methods for **experienced** and **new** clinicians

Use unit data to tell the story, staff display (**days between data**)


THANK YOU!
QUESTIONS?
ivWatch®