Staying Connected: A Novel Way to Manage & Secure Tubes and Drains to Reduced Patient Harm

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ADVANCING NURSING THROUGH KNOWLEDGE & INNOVATION

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Disclosures

- Consultant-Michigan Hospital Association Keystone Center
- Subject matter expert on Catheter-associated Urinary Tract Infections (CAUTI), CLABSI, Hospital-Acquired Pressure Injury (HAPI), Safety culture for Activity Hospital Association(AHA)
- Consultant and speaker bureau
  - Stryker's Sage business
  - Baxter healthcare
  - Bioderm Medical
  - Potrero Medical

Objectives

- Discuss nurse's role in reducing patient harm
- Outline the clinical problems with lack of effective tube securement
- Discuss strategies for improving care of tubes and drains

Resetting the Culture
Notes on Hospitals: 1859

"It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm."

- Florence Nightingale

Advocacy = Safety

Protect The Patient From Bad Things Happening on Your Watch

Implement
Interventional Patient Hygiene

INTERVENTIONAL PATIENT HYGIENE

Hand Hygiene

- Hygiene…the science and practice of the establishment and maintenance of health
- Interventional Patient Hygiene….nursing action plan directly focused on fortifying the patients host defense through proactive use of evidence-based hygiene care strategies

Catheter Care

Bathing and Assessment

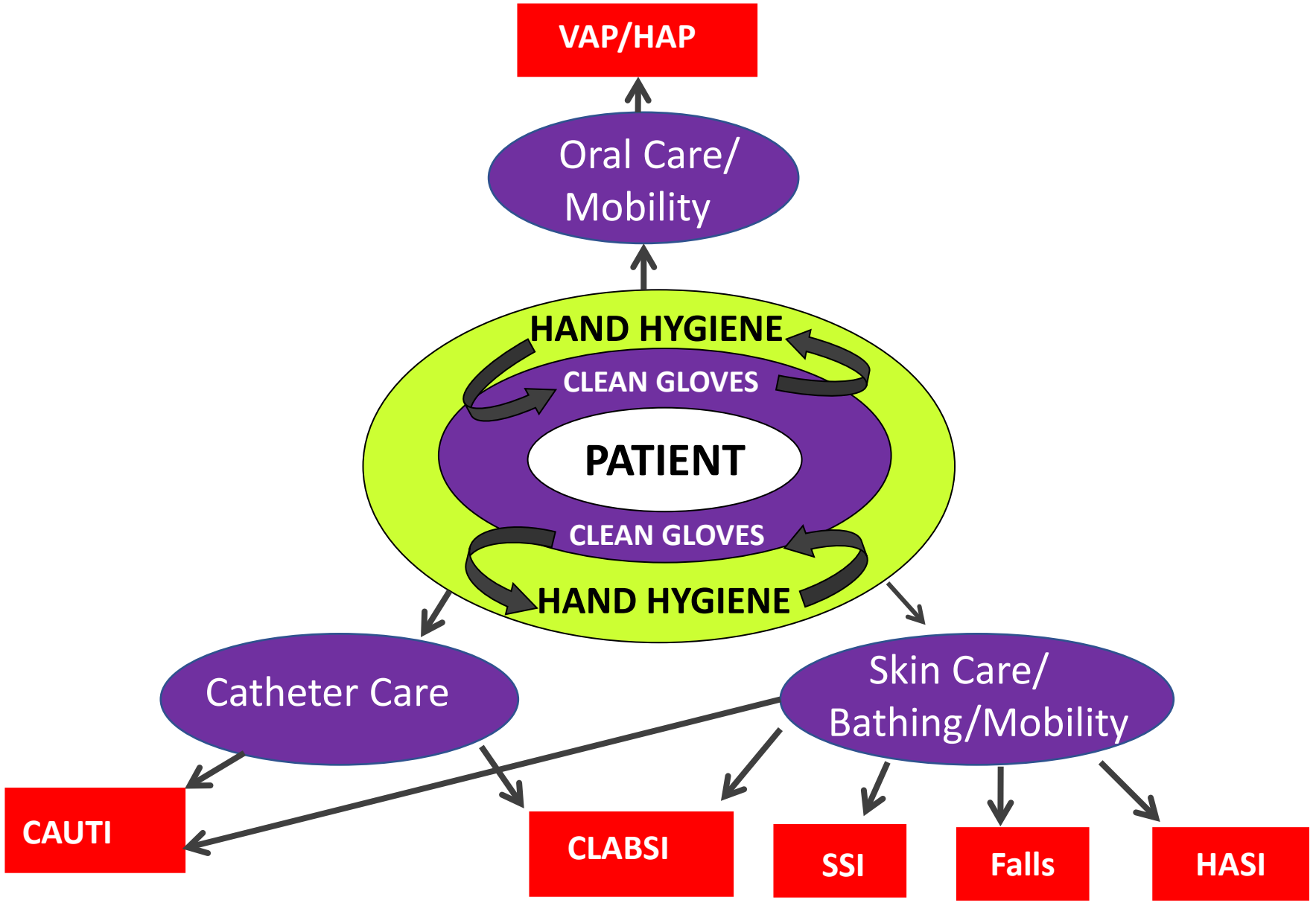
Comprehensive Oral Care Plan

Incontinence Associated Dermatitis Prevention Program

Pressure Ulcer Prevention

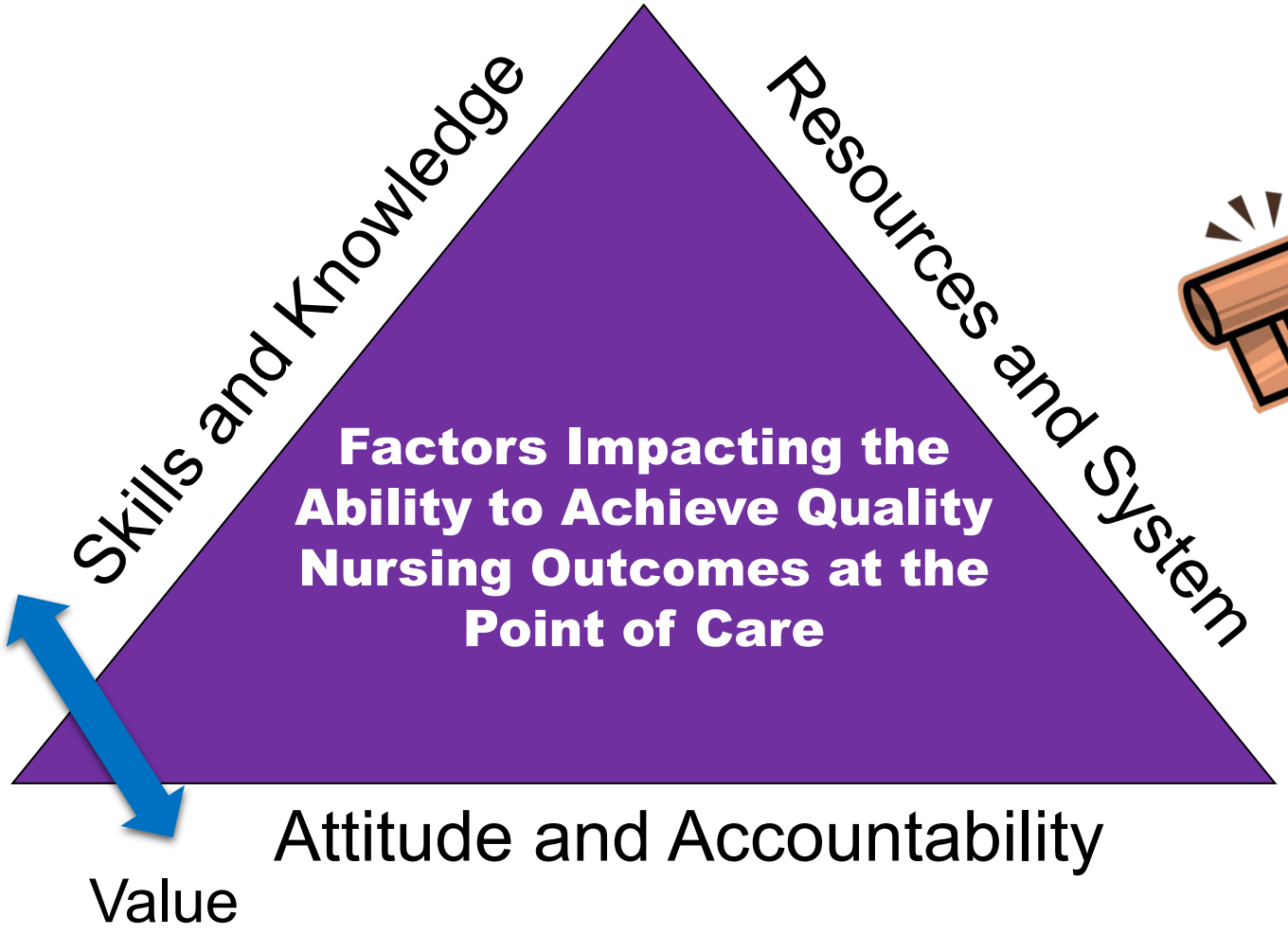
Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154

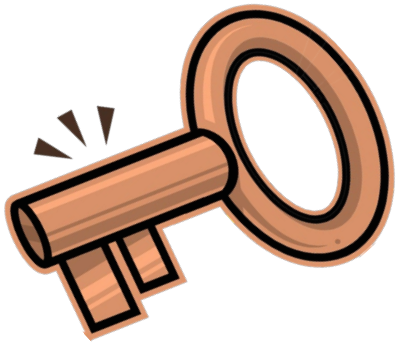
INTERVENTIONAL PATIENT HYGIENE(IPH)



Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154

Achieving the Use of the Evidence





Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154

Tubes, Tubes and More Tubes

- PEG tubes

- Chest tubes

- Urinary Catheters

- Surgical Drains

- Ventricle Assist Device

The role of securement for devices is to limit movement, reduce transmission of external skin bacteria into the insertion site, and reduce the occurrence of accidental dislodgement

Hill, S., Moureau, N.L. (2019). Right Securement, Dressing, and Management.
In: Moureau, N. (eds) Vessel Health and Preservation:
The Right Approach for Vascular Access. Springer, Cham. https://doi.org/10.1007/978-3-030-03149-7_9

PEG Tubes

- Longer duration nutritional support
- External length of the tube should be marked/documented and periodically checked
- Wait 3-6 hrs after placement to use for feeding
- Stoma/catheter care:
  - Clean daily with mild soap and dry site
  - Wk 1-2 provider may request antiseptic cleansing
  - Lightly cover with gauze first 1-2 weeks
  - Daily rotation of tube clockwise/counterclockwise to reduce pressure injury
  - Secure excessive tubing to abdomen
  - Med delivery-liquid or dissolved medications

Alsunaid S, et al J Thoracic Dis 2021;13(8):5297-5313

PEG Tubes/Complications

- Complication rates range from .4% to 22.5%

Minor	Major
• Granuloma formations • Wound infection • Stomal leakage • Catheter obstruction	• Hemorrhage • Ileus • Aspiration • Buried bumper syndrome • Tube dislodgement

Nurses Impact to Reduce Complications?

Alsunaid S, et al J Thoracic Dis 2021;13(8):5297-5313

Tube Dislodgement

- Early dislodgement 1-13.4%
- Clinical and financial burden
- Prevention:
  - **Secure a tube exiting the abdominal wall to the abdomen near the exit site without putting undue tension on it**.
  - Secure the tube's distal portion with sufficient slack on the tube to stop it from dislodging during movement.

Wounds Infection

- Incidence ranges from 4-30%
- Prevention:
  - Regular skin and stomal care
  - Prevent excessive traction on the tube

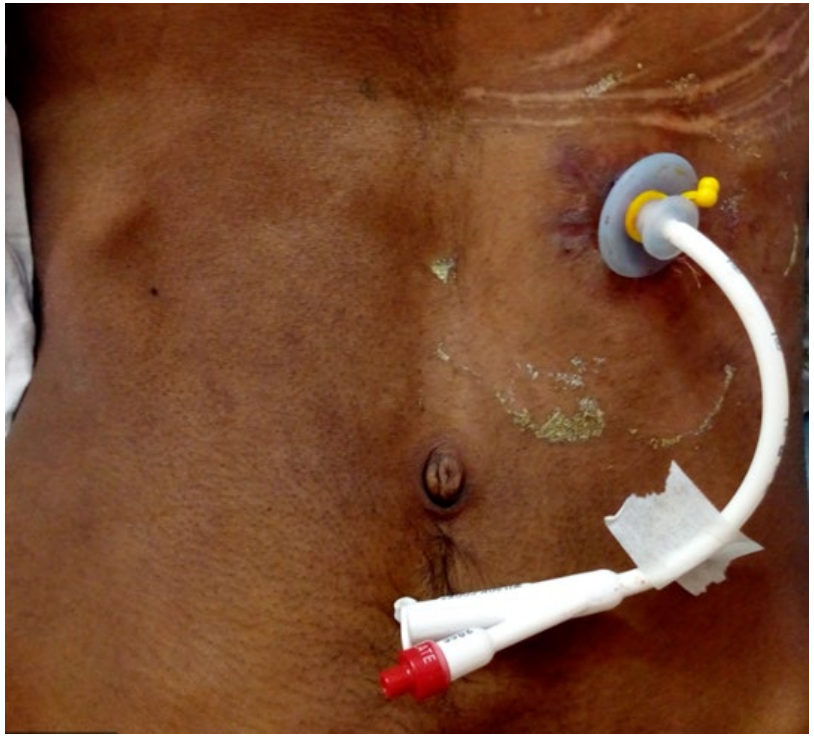
Clogging

- Incidence ranges from 23-35%
- Causes: thick feeds, bulking agents, medications
- Prevention:
  - Flush with 40-50ml before & after medication delivery
  - Completely dissolve meds, or use liquid medication
  - Warm flushes to be most effective

Blumenstrin I, et al. World J Gastronenterol 2014;20(26):8505-8524
Alsunaid S, et al J Thoracic Dis 2021;13(8):5297-5313

Which One Prevents Traction on the Tube?

1



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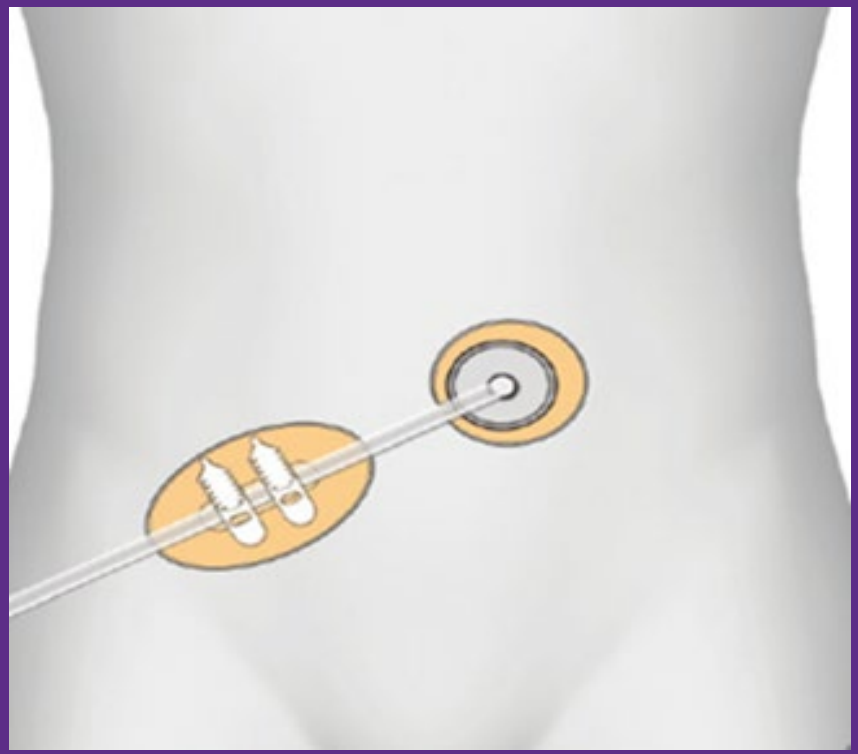


ECMO/VAD tubes

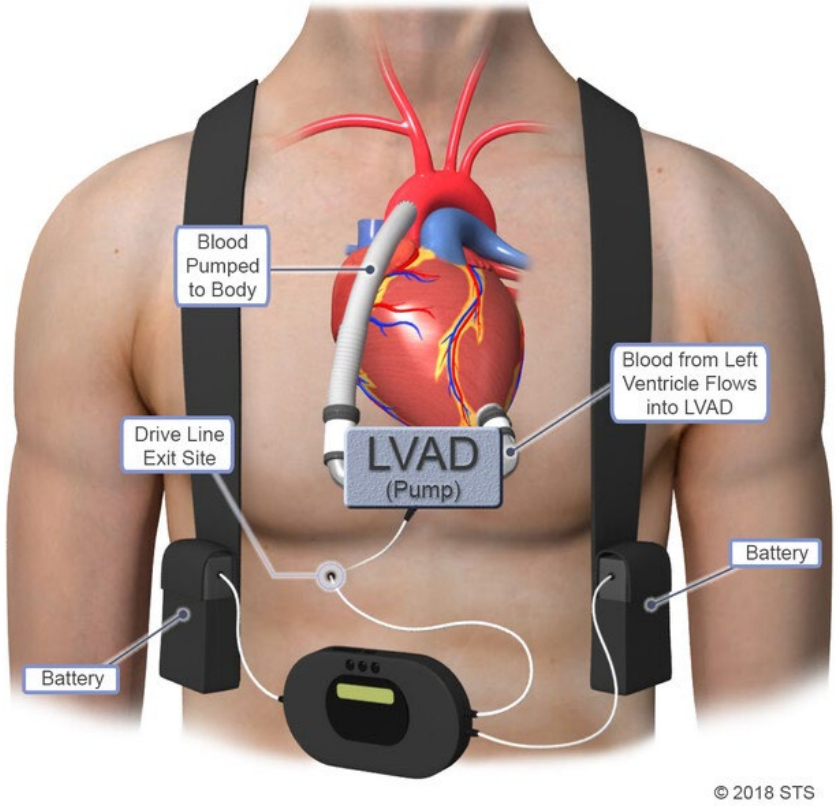
- Artificial devices that perform partial or full support for a heart and or lungs that are unable to function adequately
- Challenges
  - Cannula infection-16 to 24 BSI's per 1000 ECMO days
  - Cannula anchoring
  - Variation in dressing management and tube securement

http://www.learnecmo.com/cannulation

Garaffa, Kelly and Amos, Mickey, "A Bundled Approach to Integrative Care for Peripherally Inserted Extracorporeal Membrane Oxygenation Cannula Insertion Site" (2021). Nursing DNP Projects. 41. https://openriver.winona.edu/nursingdnp/41

Impact of Driveline Infections & Complications

- LVAD infections, stroke and GI bleeding leadings causes of readmission
- Biofilm development
- Median of the frequency DLI's was 13.8% with a range of 0–52.6%.
- 0.6-11% of device exchanges are performed because of infection and need for source control.
- Median direct hospital cost per readmission $7000.00



Leuck AM. *J Thorac Dis*. 2015;7(12):
Koken ZO, et al. Eur J Cardiothoracic Surg 2021;60:506-15
2151-2157.

Survey of Dressings and Securing Methods

- 396 ELSO registered ECMO coordinators
- 391 individuals responded from 45 different countries
- 76% had written guidelines for cannular dressing management
- 34% rate of dislodgement, migration and accidental decannulation over 5 years
  - Cause: Inadequate cannula securement methods primary cause in 28% of reported dislodgements
  - Other causes—patient removal, turning and transport—could be related to securement

Garaffa, Kelly and Amos, Mickey, "A Bundled Approach to Integrative Care for Peripherally Inserted Extracorporeal Membrane Oxygenation Cannula Insertion Site" (2021). Nursing DNP Projects. 41. https://openriver.winona.edu/nursingdnp/41

LVAD Driveline Dressing Change Protocols: A Need for Standardization

- 15 academic centers advanced heart failure/heart transplant centers
- Content analysis of driveline dressing protocols
- 1388 VADs implanted-median of 95 at each center
- All 15 used CHG for cleansing-no specific scrub length
- Variation in frequency dressing change
- 67% had kit with either CHG-Biopatch (70%) or Silver based (30%)

Wilcox JE, et al A Report from the SimVAD Investigators. *J Card Fail*. 2019;25(8):695-697.

Item, n (% of 15)	N=15** institutional dressing change protocols
1. The protocol states how often the dressing should be changed for a dry non-draining wound*	12 (80)
a. Once a week (7 days)	5 (33)
b. Two times a week	5 (33)
c. Three times a week	3 (20)
d. One to three times a week	1 (7)
2. Patient positioning: The Protocol states the appropriate/allowable position(s) for the patient to be in while the dressing change is being performed*	2 (13)
a. Laying down	2 (13)
3. Set up	
a. The protocol state that the surface being used is clean	12 (80)
i. ii. Disinfectant (alcohol, bleach, ammonia)	9 (60)
ii. iii. Does not specify how to clean surface	3 (20)
b. Protocol lists all needed supplies	14 (93)
c. Protocol states to collect all supplies before starting the dressing change (or before putting on sterile gloves)	11 (73)
d. Uses a dressing change kit	10 (67)
e. Everyone in room dons masks	6 (40)
f. Only the procedure performer dons a mask	1 (7)
g. The patient and procedure performer wear a mask	8 (53)
4. Sterile technique	15 (100)
a. Protocol includes reminders on how to correctly maintain sterile technique	8 (53)
b. Hand Washing: protocol states must wash hands at some point	14 (93)
i. Specifies duration of hand washing	6 (40)
1. > or = 15 seconds <20 seconds	2 (13)

Driveline Exit Site Care Protocols for LVAD: Systematic Review

- 11 articles met criteria for inclusion-4 to 285 patients
- 9 retrospective cohort & 2 prospective studies
- LVAD strategies:
  - Bridge to transplant/recovery (63%)
  - Destination therapy (37%)
- Significant variability in driveline exit site care
- Infection rates: average 13.8% (0-52.6%) 6-44 month follow up
- Most common organisms: Staphylococcus aureus & pseudomonas aeruginosa

Koken ZO, et al. Eur J Cardiothoracic Surg 2021;60:506-15

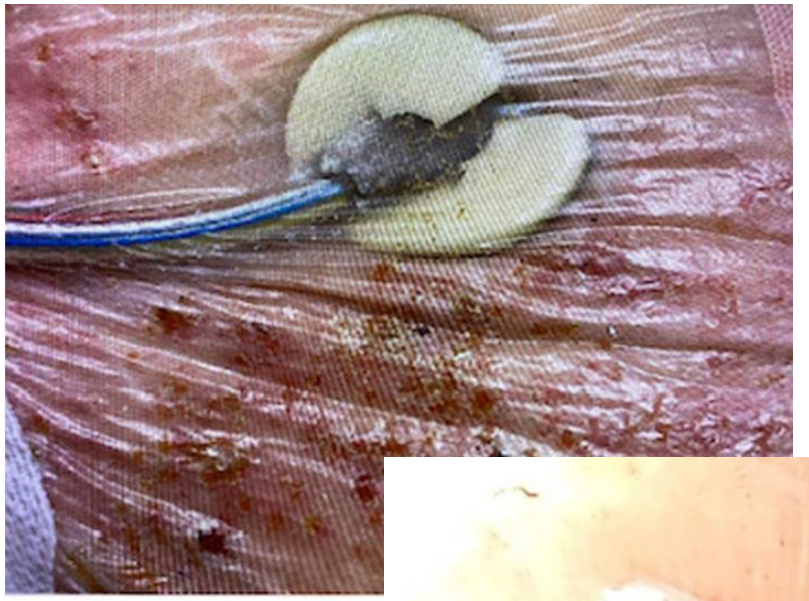
Driveline Exit Site Care Protocols for LVAD: Systematic Review

- Driveline exit cleaning agents
  - CHG to clean site
  - If irritation to CHG povidone-iodine used
- Dressing material for driveline exit site
  - Sterile gauze & silver dressing most frequent
  - Infection rates:
    - Silver dressing compared to sterile gauze 7.5% vs. 15.8%
    - Used CHG to clean and silver to dress: first infection at 180 days
    - Foam compared to sterile gauze: 19% vs. 13%
    - Foam & CHG dressing 7.6%

Koken ZO, et al. Eur J Cardiothoracic Surg 2021;60:506-15

Challenges to Using CHG Disc/Dressings

- LVAD, Impella, Berlin Heart, and ECMO (Mechanical Circulatory Support) patients
- NICU/Pediatrics or another contraindicated patient group
- Burn patients
- CHG allergies
- Large gauge cannulas-fit issues
- G-Tubes, Chest tubes, and Trach care



Lehigh Valley: QI to Improve Driveline Infections

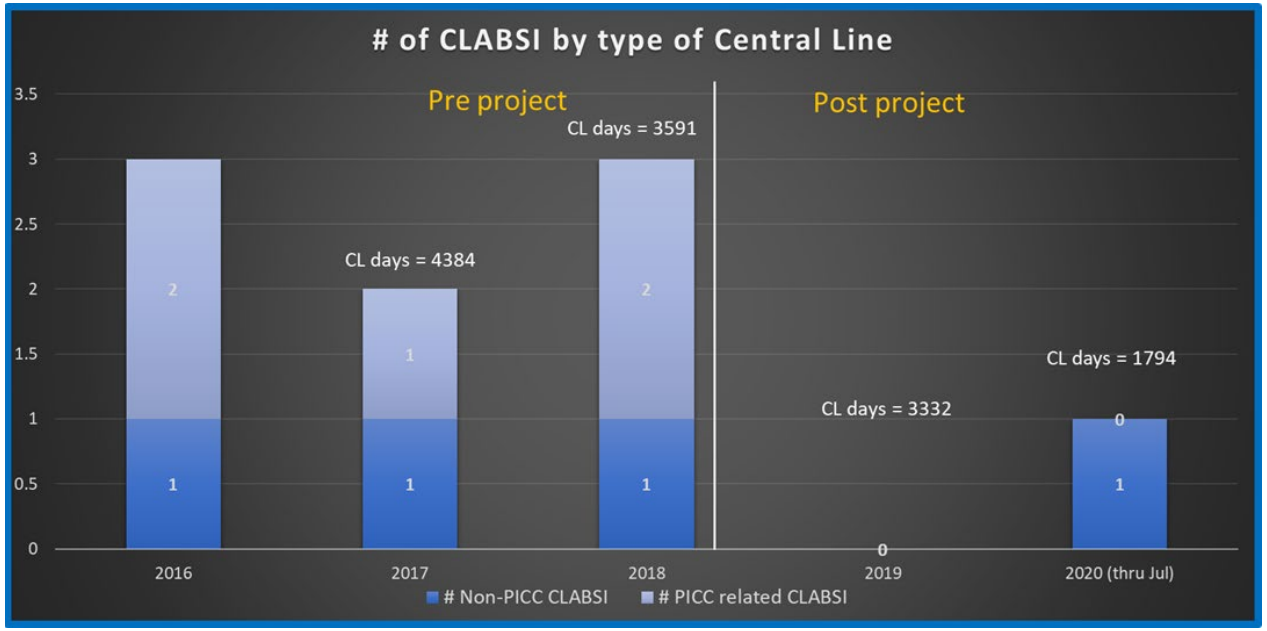
- 2013-2020
  - Driveline infection rates 19%
  - Leads to higher mortality & frequent readmissions
- Intervention
  - Nov 2020: Placement of a silver patch in driveline dressing kits
- Results:
  - Nov 2020-Sept 2022: Driveline infections ↓ 19% to 0%
  - ↓ readmissions:
    - 2021: 30% readmission r/t infections
    - 2022: 0% readmission r/t infections

Barrett KR, et al. The Journal Of Heart and Lung Transplantation. 2023;S129-130 abs

PICC Insertion Site Care for Neonatal

- Level 4 NICU
- Hesitation to utilize silver in neonates exists due to the risk of absorption and toxicity
- Silver is bactericidal and bacteriostatic, shown to ↓ CLABSI in adult ICU's
- Changed Practices
  - Introduced Silver disc dressing
  - Dressing securement
  - Catheter visualization
  - Disc positioning

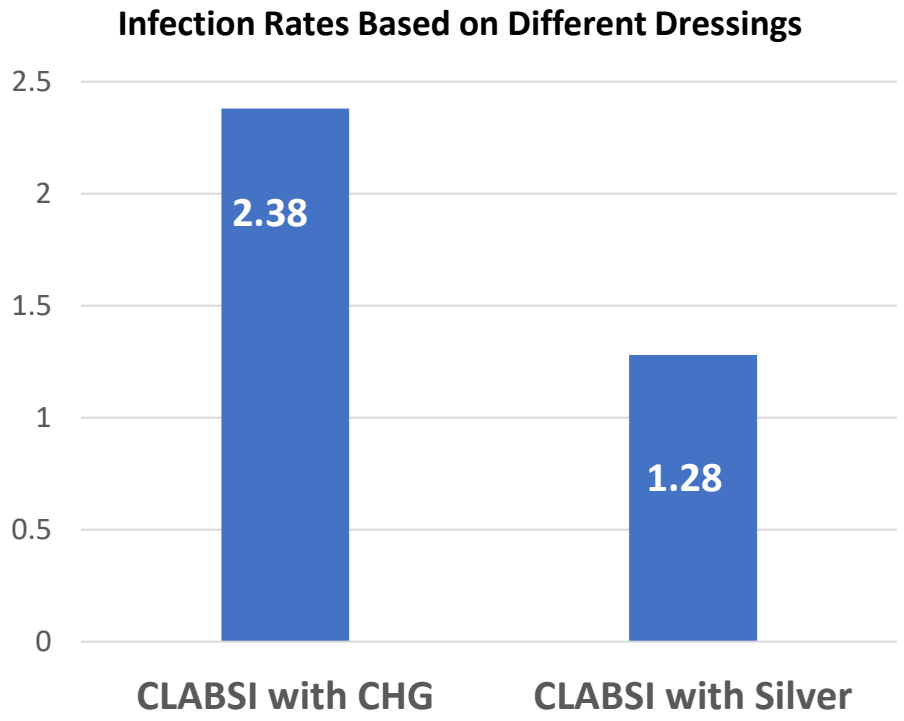
- Results



Medina G, et al. poster

CVC Dressing with Silver versus CHG Sponge In ICU's

- Retrospective study
- Large academic level 1 trauma center
- Evaluation period:
  - Jan 2009-Dec 2009-CHG Disc
  - Jan 2010- Dec 2010- Silver Disc
- 7ICU's -3189 patient records
- CLABSI rates compared
- Maintain new practice post study and sustained low rates



Karlnoski R, et al. J of Intensive Care Medicine, 2017;1-6

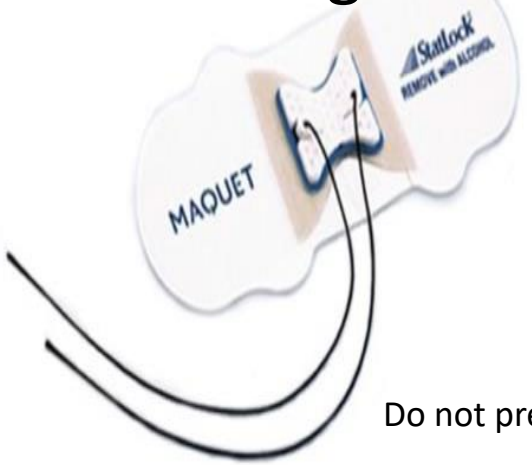
Driveline Exit Site Care Protocols for LVAD: Systematic Review

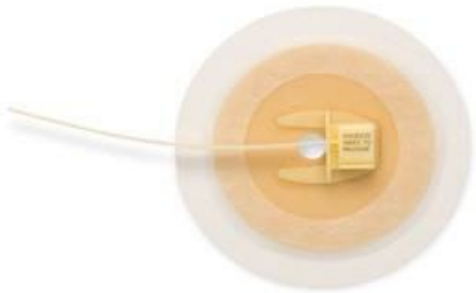
- Anchoring Devices:
  - When using an anchoring device, silver-based dressing and CHG cleansing infection rates 6-7.4% not till 180 days
  - Higher when using same anchor but CHG and foam dressings: infection rates 5.4-21.3%
  - Tapes reported higher infection: 27%
- Frequency of Site Care
  - Weekly with a kit, CHG cleanse, silver dressing and anchor: infection rate 6%-180 days out
  - Daily dressing change: infection 12-13%
  - More frequent > infections
- Using a Kit:
  - 2 studies:
  - CHG cleanse, silver dressing & anchor device vs. historical group: 7.5% 180 days vs. 15.8 154 days
  - Silver dressing and anchor device kit vs. historical gauze with no anchor: 11% reduction

Koken ZO, et al. Eur J Cardiothoracic Surg 2021;60:506-15

Previous Practice → New Cannula Site Care Bundle

- Variation in dressing sizes/use multiple dressings
- Biopatch to small
- Site cleaning supplies inadequate
- Differing anchor devices





Do not prevent migration

- 1 - 4” x 6” chlorhexidine impregnated dressing
- 1 – cavilon barrier (medium)
- 1 – Prevantics swabstick (additional one)
- 1 Cath-grip dual anchor

Garaffa, Kelly and Amos, Mickey, "A Bundled Approach to Integrative Care for Peripherally Inserted Extracorporeal Membrane Oxygenation Cannula Insertion Site" (2021). Nursing DNP Projects. 41. https://openriver.winona.edu/nursingdnp/41

Key question

Is there a standardized left ventricular assist device (LVAD) driveline exit-site care protocol?

Key finding(s)

This systematic review reveals a marked variability in driveline exit-site care protocols without a standardized driveline dressing technique.

Take-home message

The LVAD driveline exit-site care protocols that include chlorhexidine, silver-based dressing and anchoring device might be best in reducing driveline infection rates.

An anchoring device should be used to prevent driveline exit-site trauma.[4,7,8,12,14,15,18,34,37]

- Silver-based dressing should be used in infected/high infection-risk wounds.[7,15,18]
- Foam-based dressing should be used in exudate wounds.[8,19]
- Sterile gauze dressing should be used in healed dry wounds as a cost-effective material.[4,8,12,15,19]

Koken ZO, et al. Eur J Cardiothoracic Surg 2021;60:506-15

Drainage tubes

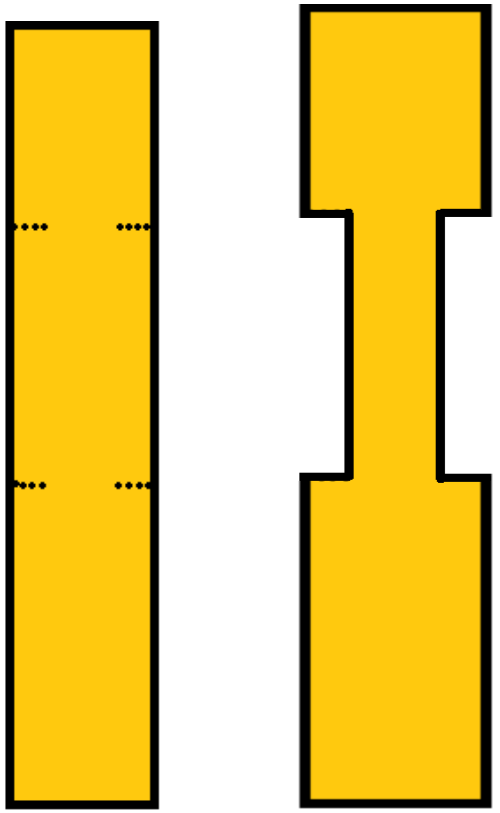
- Purpose:
  - Active bleeding assessment/leaks
  - Discharge fluid or air from the body
- Variation in dressing and fixation methods to skin
- Complication:
  - Chest tube dislodgement-32% of complications
  - Skin injury from adhesives
- Prevention:
  - Standardized dressing and fixation strategy

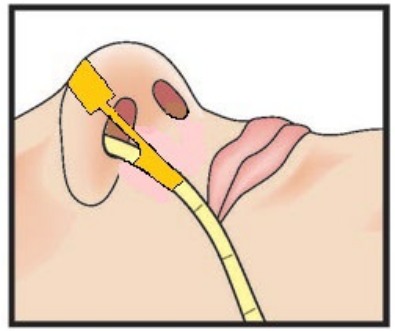
Waters J AACN Procedural Manual, 2017. Chapter 22;pg 178-183
Homma T, et al. J of Thoracic Disease 2020;12(3):493-503

NGT's

- Purpose:
  - Tx of ileus/bowel obstruction
  - Adm of medication
  - Adm of enteral nutrition
  - Stomach lavage
- EBR: not needed prophylactically for decompression in post op setting
- Chest x-ray confirmation on initial placement
  - Gastric content return
  - Capnography
- Complications:
  - Incorrect placement
  - Pressure injuries-4.8%-8.1%

- Securement
  - Prep skin





Intended to last 3 days

Asti E, et al.. *European Surgery.* 2017;49.
Ambutas S, et al. Med-Surg Nursing, 2014;23(2):96-100

Essential Practices CAUTI Reduction: Infrastructure & Resources

- Ensure that the supplies for following best practices for managing urinary issues are readily available to staff in each unit
  - Bladder scanners
  - Non-catheter incontinence management supplies (urinals, garments, bed pads, skin products),
  - Male and female external urinary catheters,
  - Straight urinary catheters,
  - Indwelling catheters including the option of catheters with coude tips.
- Ensure that non-catheter urinary management supplies are as easy to obtain for bedside use as indwelling urinary catheters.
- Ensure the physical capability for urinary catheters with tubes attached to patients (eg, indwelling urinary catheters, some external urinary catheters[EUCs]) to be positioned on beds, wheelchairs without kinking for patients in their rooms and during transport.

Purchased from Shutterstock

Patel PK, et al. Infect Control Hosp Epidemiol. 2023;44(8):1209-1231.

SHEA/ISDA/APIC:
Indications for Placement of Indwelling Catheter

- Perioperative use for selected surgical procedures;
  - urologic surgery or surgery near structures of GI
  - prolonged surgery (if only reason should be removed in OR)
  - large volume infusions or diuretics during surgery
- Hourly assessment of UO in ICU patient when used clinically to modify therapies;
  - Volume resuscitation, diuresis & vasopressor
- Management of acute urinary retention and urinary obstruction
  - Postvoid residual bladder volume > 500 cm^3 by scanner if no symptoms
  - >300 cm^3 if bladder fullness, persistent urge, leaking
- Assistance in pressure ulcer healing for incontinent patients when alternative supplies to protect wound or manage incontinence is not feasible
- Part of palliative/comfort care regimen if address specific goal of patient, reducing pain or frequent movement to change bed

Patel PK, et al. *Infect Control Hosp Epidemiol*. 2023;44(8):1209-1231.

Essential Recommendations

- Insertion:
  - Insert urinary catheters only one necessary for patient care and leave in only as long as indications remain
  - Consider other methods for bladder management: intermittent catheterization, male or female external devices
  - Use appropriate technique for catheter insertion
  - Consider working in pairs to help perform patient positioning and monitor for potential contamination
  - Hand hygiene
  - Insert following aseptic technique and sterile equipment
  - Use sterile gloves, drape and sponges, a sterile antiseptic solution and a sterile single use pack of lubricant Jelly for insertion
  - Use the catheter with the smallest feasible diameter

Patel PK, et al. *Infect Control Hosp Epidemiol*. 2023;44(8):1209-1231

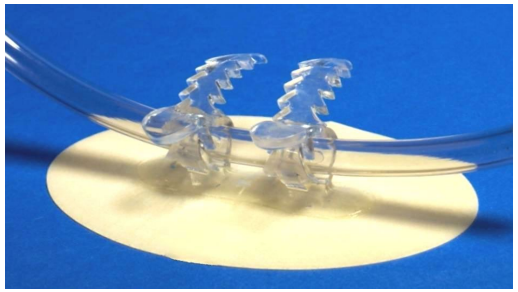
Essential Maintenance Recommendations

- Properly secure indwelling catheter
- Maintain a sterile, continuously closed drainage system
- Replace the catheter in the collection system using aseptic technique when breaks in technique, disconnection or leakage occur
- Maintain unobstructed urine flow
  - Bag below level of the bladder
  - Keep catheter and tube from kinking
  - Empty bag regular basis
- Routine hygiene: cleaning the medial area with antiseptic solutions and unresolved issue, emerging literature supports CHG use prior to catheter insertion
- For examination of fresh urine, collect a small sample by aspirating urine from a needleless sample port with sterile syringe after cleansing the port with disinfectant
  - If a catheter placed > 7 day, change the catheter before collecting a specimen[1]
- Timely transport to the lab if not feasible use a collection device with a preservative

Patel PK, et al. *Infect Control Hosp Epidemiol*. 2023;44(8):1209-1231

Securement

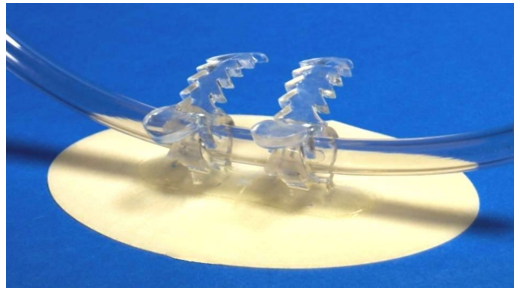
- The Problem:
  - Risk of dislodgement
  - Compromised skin integrity
  - Patient discomfort
  - Variation in practice
- Prevention
  - Adequate skin prep
  - Commercially available anchoring device vs. tape
  - Placed in kits (if possible)



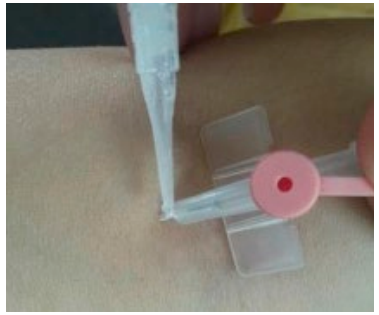
Types of Securement

- Anchoring

- Locking devices



- Tissue adhesives

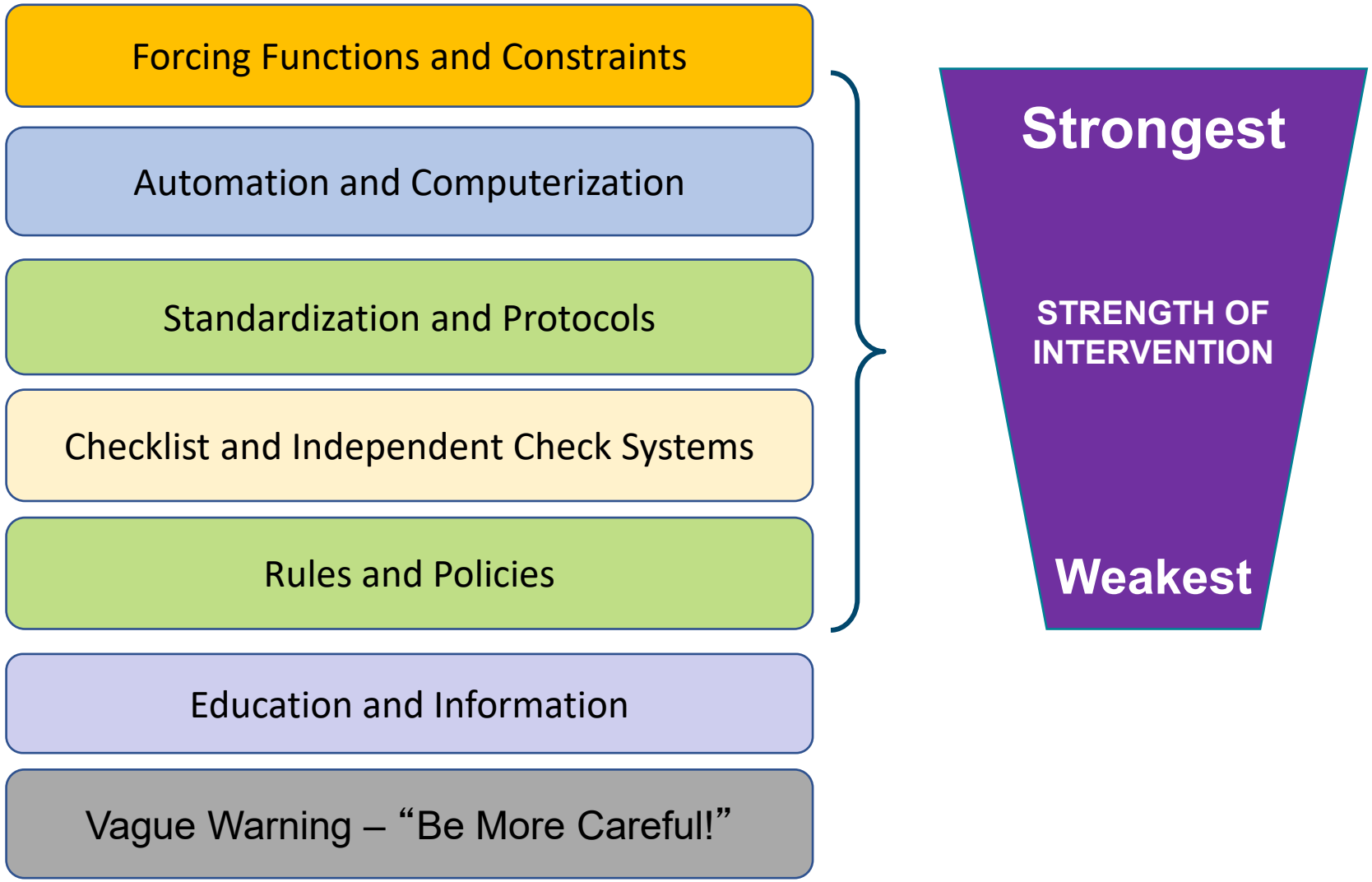


- Subcutaneous securement

- Sutures

Evaluating Practice to Reduce Harm

Building Resiliency into Interventions



Model for Improving Care[1-4]

LOCAL PROBLEMS

Comprehensive Unit-based Safety Program (CUSP)

Prework: Measure clinician and staff perceptions of safety culture with Hospital Survey on Patient Safety Culture

1. Educate staff on science of safety
2. Identify defects
3. Partner with a senior executive
4. Learn from defects
5. Improve teamwork and communication

ADAPTIVE WORK

COMMON PROBLEMS

Translating Evidence Into Practice (TRIP)

1. Summarize the evidence in a checklist
2. Identify local barriers to implementation
3. Measure performance
4. Ensure all patients get the evidence
   - Engage
   - Educate
   - Execute
   - Evaluate

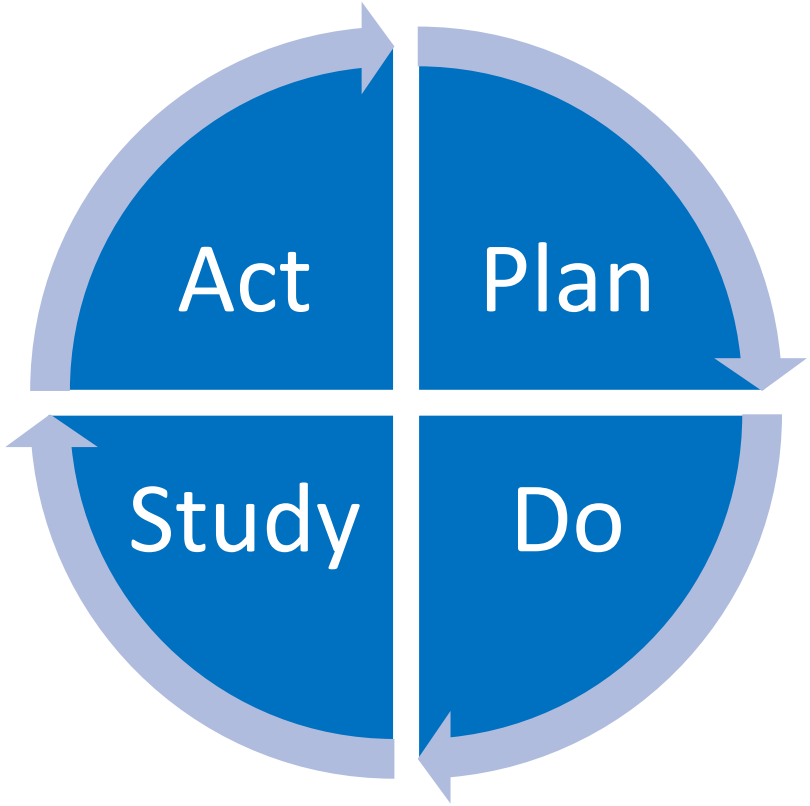
Improving Care of Patients with Catheters or Drains

1. Adequate skin prep
2. Commercially available anchoring device
3. Placed in kits (if possible
4. Review daily for clinical necessity; remove as soon as no longer indicated

TECHNICAL WORK

Action Plan for Translating Research Into Practice: Gap Analysis and Tests of Change: Slide Presentation. Content last reviewed February 2017. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/cusp/actionplan-trip-slides.html.

Why Bother Testing a Change?



What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Rapid Cycle Test of Change

Principles for Tests of Change

- Test to evaluate if a new idea or innovation will work
- Test small (low hanging fruit or quick wins), and usually less than 4 weeks in duration
- Engage those interested in testing
- Identify what the question you're trying to answer is
  - Identify what data you need to answer the question
- Collect data over specified time period for pre-post comparison
- Make informed changes based on data analysis
- Test under a wide range of conditions

Principles for Tests of Change. Transforming Care at the Bedside Toolkit. Robert Wood Johnson Foundation, 2008.

PDSA: Planning small test of change

In order to accomplish your AIM, what ideas are you going to test in your organization?

Small tests of change	What do you need to test this idea?	Who will be involved in the tests?	How will you educate/inform the participants?	Where will the test occur?	When will the test occur?	How will you know it is successful?

When will you compare what happened to what you predicted? When will you decide what to do next?

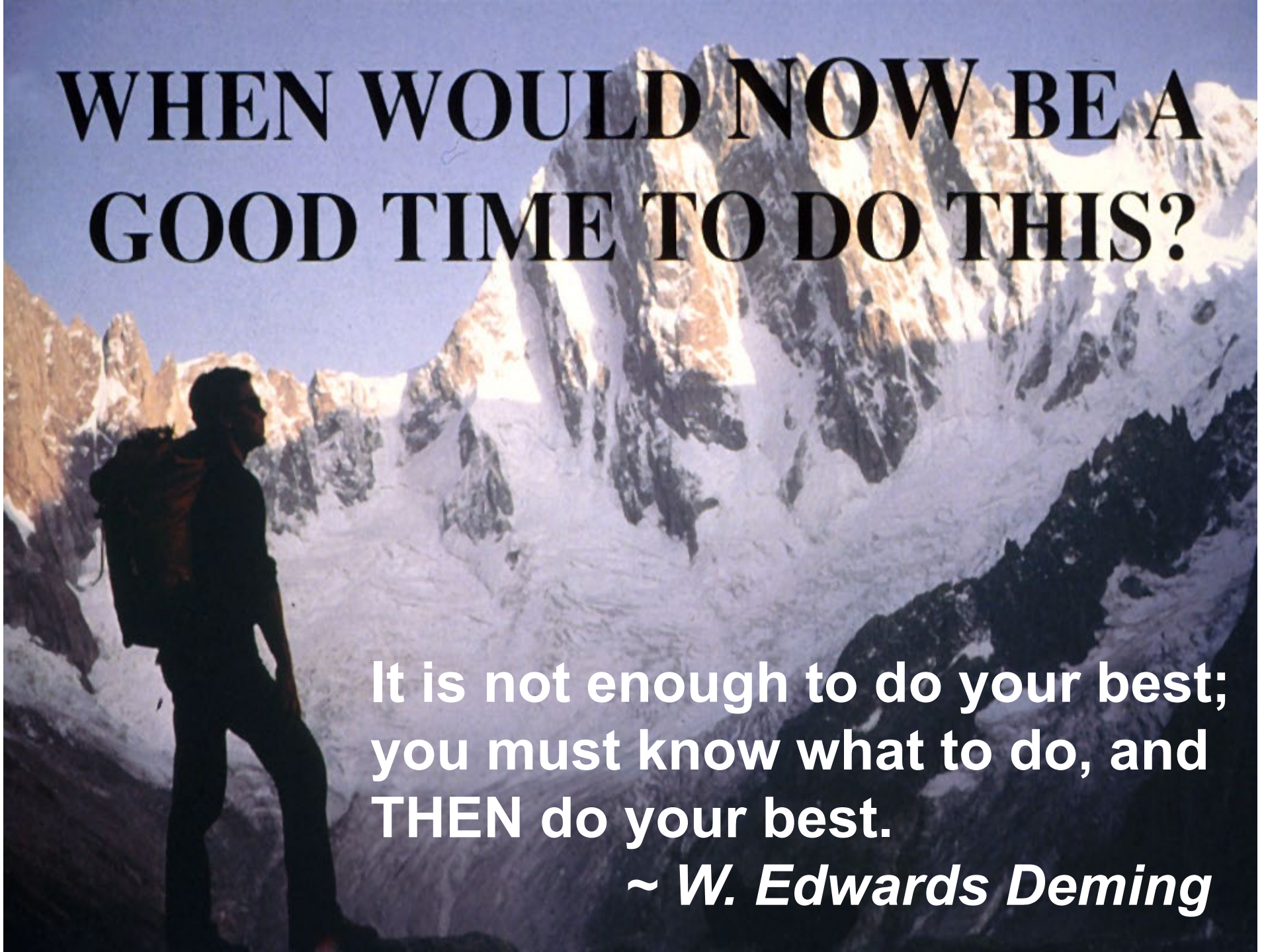
Small test of change	What did you predict will happen?	What happened?	What are the next steps?

PLAN: What will happen if we try something different?

DO: Let's try it! Describe what actually happened when you ran the test.

STUDY: Did it work? Describe the measured results and how they compared to your predictions

ACT: What's next? Describe what changes to the plan will be made for the next cycle.


WHEN WOULD NOW BE A GOOD TIME TO DO THIS?
It is not enough to do your best; you must know what to do, and THEN do your best.
~ W. Edwards Deming

Kathleen Vollman
ADVANCING NURSING THROUGH KNOWLEDGE & INNOVATION

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