

# “Care Bundles in critical care”

## What are they & why use them?

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# Content

What are Care Bundles?

Background to Care Bundles

Types of Care Bundles available

Why and How to USE THEM?

# Standards of Care

- ▶ Healthcare workers are committed to deliver high standards of care to all patients
- ▶ Standards of care are generally defined by evidence based guidelines, e.g. infection control guidelines:
  - ▶ SARI guidelines
  - ▶ CDC guidelines (USA)
  - ▶ EPIC/NICE guidelines (UK)

# What are “Care Bundles”?

- ▶ A Care Bundle is a collection of interventions (usually 3-5) that are evidenced based.
- ▶ All clinical staff know that these interventions are **best practice** but frequently their application in routine care is inconsistent
- ▶ A Care Bundle is a means to ensure that the application of all the interventions is consistent for all patients at all times thereby improving outcomes.
- ▶ The science supporting the individual treatment strategies in a bundle is sufficiently mature such that implementation of the approach should be considered either best practice or a reasonable and generally accepted practice.

# Rules of bundle care

A bundle has specific element that makes it unique. These are

- ▶ 1. All the elements of the bundle are necessary and removing any one of them will result in inferior result.
- ▶ 2. All the elements in the bundle are based on randomized controlled trial (Level 1 evidence) and the recommendations are beyond any controversy. A bundle rather focuses on how to deliver this evidence of care rather than what the right care should be.
- ▶ 3. All elements in the bundle involve an all or none phenomenon and the Bundle itself also bears the same characteristic. That is to say each element in the bundle is either “performed” or “not performed” and entire Bundle performance also follows the same principle without leaving any scope for partial performance.
- ▶ 4. Implementation of all Bundle elements should take place simultaneously at a specific time and place with a minimum delay.

# Background to Care Bundles

- ▶ **Dr. Peter Pronovost** is accredited with developing the 1<sup>st</sup> Care Bundle – insertion and management of CVC's
- ▶ Intensivist in a hospital in Michigan
- ▶ Developed a checklist for insertion and management of CVC's to ensure that key interventions recommended by the CDC 2002 guidelines were implemented every time a CVC was inserted

# Interventions relating to CVC's

## Central line bundle:

Hand decontamination. pre insertion → HANDWASH

Maximum sterile barrier precautions (operator & patient) while inserting central line.

2% chlorhexidine for skin disinfectant

Avoiding use of femoral site.[appropriate selection of site]

Removing unnecessary catheters.



مستشفى الملك فهد التخصصي بالدمام  
King Fahad Specialist Hospital-Dammam



## Central Line Bundle ICU

- Hand Hygiene.
- Maximal Barrier Precautions.
- Chlorhexidine Skin Antisepsis.
- Catheter site selection.
- Catheter daily review.
- Checklist.





# Hand Decontamination

- ▶ Empower nursing to enforce use of a central line checklist to be sure all processes related to central line placement are executed for each line placement.
- ▶ Include hand hygiene as part of your checklist for central line placement.
- ▶ Keep soap/alcohol-based hand washing dispensers prominently placed and make universal precautions equipment, such as gloves, only available near hand sanitation equipment.

# Maximal Barrier Precautions Upon Insertion: tips

- ▶ Empower nursing to enforce use of a central line checklist to be sure all processes related to central line placement are executed for each line placement.
- ▶ Include maximal barrier precautions as part of your checklist for central line placement.
- ▶ Keep equipment ready stocked in a cart for central line placement to avoid the difficulty of finding necessary equipment to institute maximal barrier precautions.

# Chlorhexidine skin antiseptics: tips

- ▶ Empower nursing to enforce use of a central line checklist to be sure all processes related to central line placement are **executed for each line placement**.
- ▶ Include Chlorhexidine antiseptics as part of your checklist for central line placement.
- ▶ **Include Chlorhexidine antiseptics kits in carts** storing central line equipment. Many central line kits include povidone-iodine kits and these must be avoided.
- ▶ Ensure that **solution dries completely** before an attempted line insertion.

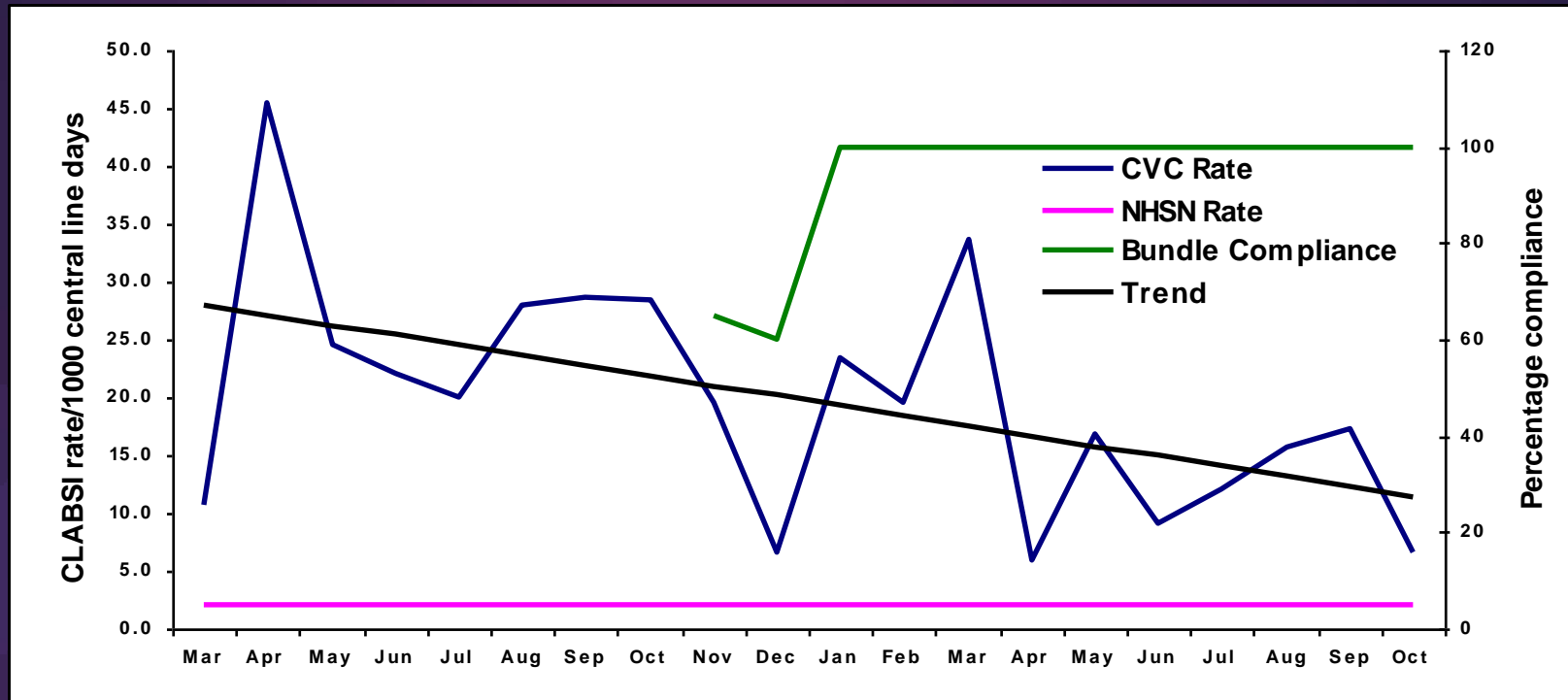
# Optimal catheter site selection: tips

- ▶ Empower nursing to enforce use of a central line checklist to be sure all processes related to central line placement are executed for each line placement.
- ▶ Include optimal site selection as part of your checklist for central line placement with room for appropriate contraindications (e.g., bleeding risks).

# Daily review of Lines/ Prompt removal: tips

- ▶ Empower nursing to enforce use of a central line checklist to be sure all processes related to central line placement are executed for each line placement.
- ▶ Include daily review of line necessity as part of your **multidisciplinary rounds**.
- ▶ Include **assessment for removal** of central lines as part of your daily goal sheets.
- ▶ Record **time and date** of line placement for record keeping purposes and evaluation by staff to aid in decision making.

# Implementation of CVC Care Bundle in a regional ITU in Belfast



March 2007 – CLABSI rate 10.75 per 1000 catheter days

October 2008 – CLABSI rate was 6.5 per 1000 catheters days with CVC care bundle compliance was 95%

Crookshanks H et al 2008

# Results

- ▶ **103 ITU's in 67 hospitals** data was included in the study results
- ▶ Medium rate of catheter-related blood stream infections per 1000 catheter days decreased from 2.7 at baseline to 0 at 3 months after implementation
- ▶ **67% reduction** in catheter related blood stream infections over the 18 months of the study

# Other Types of Care Bundles

- ▶ WHO Surgery Safety Checklist
- ▶ Urinary Catheter Care Bundle
  - ▶ Insertion and Management
- ▶ Clostridium difficile care bundle
- ▶ Ventilator assisted Pneumonia care bundle
- ▶ Palliative care bundle
- ▶ Pressure area care bundle
- ▶ Sepsis care bundle
- ▶ PVC care Bundle



# WHO Surgery Safety Checklist

- ▶ WHO Guidelines for Safer Surgery 2008
- ▶ Evidence was reviewed for
  - ▶ Systems that improved safety for patients
  - ▶ Deficiencies identified following mishaps (wrong patient, wrong site)
- ▶ A checklist was developed for use in all theatres (1st to 3rd world countries) that if applied consistently should improve patient outcomes
  - ▶ Tested in 8 hospitals across 8 countries
- ▶ 36% overall reduction in post operative complications (Haynes 2009)

# WHO Safe Surgery Checklist

## “ATUL Gawande FAME”

**World Health Organization**

### SAFE SURGERY SAVES LIVES

WORLD ALLIANCE FOR PATIENT SAFETY

#### WHO SURGICAL SAFETY CHECKLIST (ADVANCED DRAFT)

Prior to induction of anaesthesia      Prior to skin incision      Prior to patient leaving the operating room

SIGN IN	TIME OUT	SIGN OUT
<ul style="list-style-type: none"> <li><input type="checkbox"/> PATIENT CONFIRMED</li> <li><input type="checkbox"/> IDENTIFY</li> <li><input type="checkbox"/> SITE</li> <li><input type="checkbox"/> PROCEDURE</li> <li><input type="checkbox"/> CONSENT</li> <li><input type="checkbox"/> SITE MARKED/NOT APPLICABLE</li> <li><input type="checkbox"/> ANAESTHESIA SAFETY CHECK COMPLETE</li> <li><input type="checkbox"/> PULSE OXIMETER ON PATIENT AND FUNCTIONING</li> <li><input type="checkbox"/> DOES PATIENT HAVE A KNOWN ALLERGY?               <ul style="list-style-type: none"> <li><input type="checkbox"/> NO</li> <li><input type="checkbox"/> YES</li> </ul> </li> <li><input type="checkbox"/> DIFFICULT AIRWAY/ASPIRATION RISK?               <ul style="list-style-type: none"> <li><input type="checkbox"/> NO</li> <li><input type="checkbox"/> YES, AND EQUIPMENT/ASSISTANCE AVAILABLE</li> </ul> </li> <li><input type="checkbox"/> RISK OF SIGNIFICANT BLOOD LOSS, EXPOSED IN CHILDREN?               <ul style="list-style-type: none"> <li><input type="checkbox"/> NO</li> <li><input type="checkbox"/> YES, AND ALTERNATE IV ACCESS/LINES PLANNED</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE</li> <li><input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM PATIENT, SITE, PROCEDURE</li> <li><input type="checkbox"/> ANTICIPATED CRITICAL EVENTS SURGEON REVIEWS: (WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS)</li> <li><input type="checkbox"/> ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?</li> <li><input type="checkbox"/> NURSING TEAM REVIEWS: HAS STERILITY INCLUDING INDICATOR BEEN TO BE CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?</li> <li><input type="checkbox"/> ANTIBIOTIC PROPHYLAXIS GIVEN IN LAST 60 MINUTES?               <ul style="list-style-type: none"> <li><input type="checkbox"/> YES</li> <li><input type="checkbox"/> NOT APPLICABLE</li> </ul> </li> <li><input type="checkbox"/> ESSENTIAL WARNINGS DISPLAYED               <ul style="list-style-type: none"> <li><input type="checkbox"/> YES</li> <li><input type="checkbox"/> NOT APPLICABLE</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> NURSE VERBALLY CONFIRMS WITH THE TEAM:               <ul style="list-style-type: none"> <li><input type="checkbox"/> THE NAME OF THE PROCEDURE (RECORDED)</li> <li><input type="checkbox"/> THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)</li> <li><input type="checkbox"/> HOW THE SPECIMEN IS LABELED (INCLUDING PATIENT NAME)</li> <li><input type="checkbox"/> WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED</li> </ul> </li> <li><input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT</li> </ul>

# Ventilator associated Pneumonia

## VAP Care Bundle

Elevation of the Head of the Bed to 45 degree.

Daily “Sedation Vacations” and Assessment of Readiness to be Extubate.

Daily Oral Care With Chlorhexidine

Peptic Ulcer Disease Prophylaxis

Deep Venous thrombosis prophylaxis



## What is a Ventilator Bundle?

- Head of bed up 30 degrees
- Daily “sedation vacations”
- Daily assessment of readiness to extubate
- Peptic ulcer disease prophylaxis
- Deep vein thrombosis prophylaxis.

# Head of Bed elevation:

- ▶ Implement a mechanism to ensure head-of-the-bed elevation, such as including this intervention on nursing flow sheets and as a topic at multidisciplinary rounds.
- ▶ Use visual clues so it is easy to identify when the bed is in the proper position, such as a line on the wall that can only be seen if the bed is below a 30-degree angle.
- ▶ Include this intervention on order sets for initiation and weaning of mechanical ventilation, delivery of tube feedings, and provision of oral care.

# Daily sedation vacation/ Spontaneous Breathing Trials: tips I

- ▶ Implement a protocol to lighten sedation daily at an appropriate time to assess for neurological readiness to extubate.
  - ▶ Include precautions to prevent self-extubation such as increased monitoring and vigilance during the trial.
- ▶ Include a sedation vacation strategy in your overall plan to wean the patient from the ventilator
  - ▶ if you have a weaning protocol, add "sedation vacation" to that strategy.
- ▶ Assess that compliance is occurring each day on multidisciplinary rounds.
- ▶ Consider implementation of a sedation scale such as the Riker scale to avoid oversedation.

# Oral Chlorhexidine mouth wash

- ▶ Allow tooth brush if patient is healthy [on NIV]
- ▶ Chlorhexidine mouth wash decrease oral infection leading to pneumonia
- ▶ Three times a day is an expected frequency

# DVT prophylaxis: tips

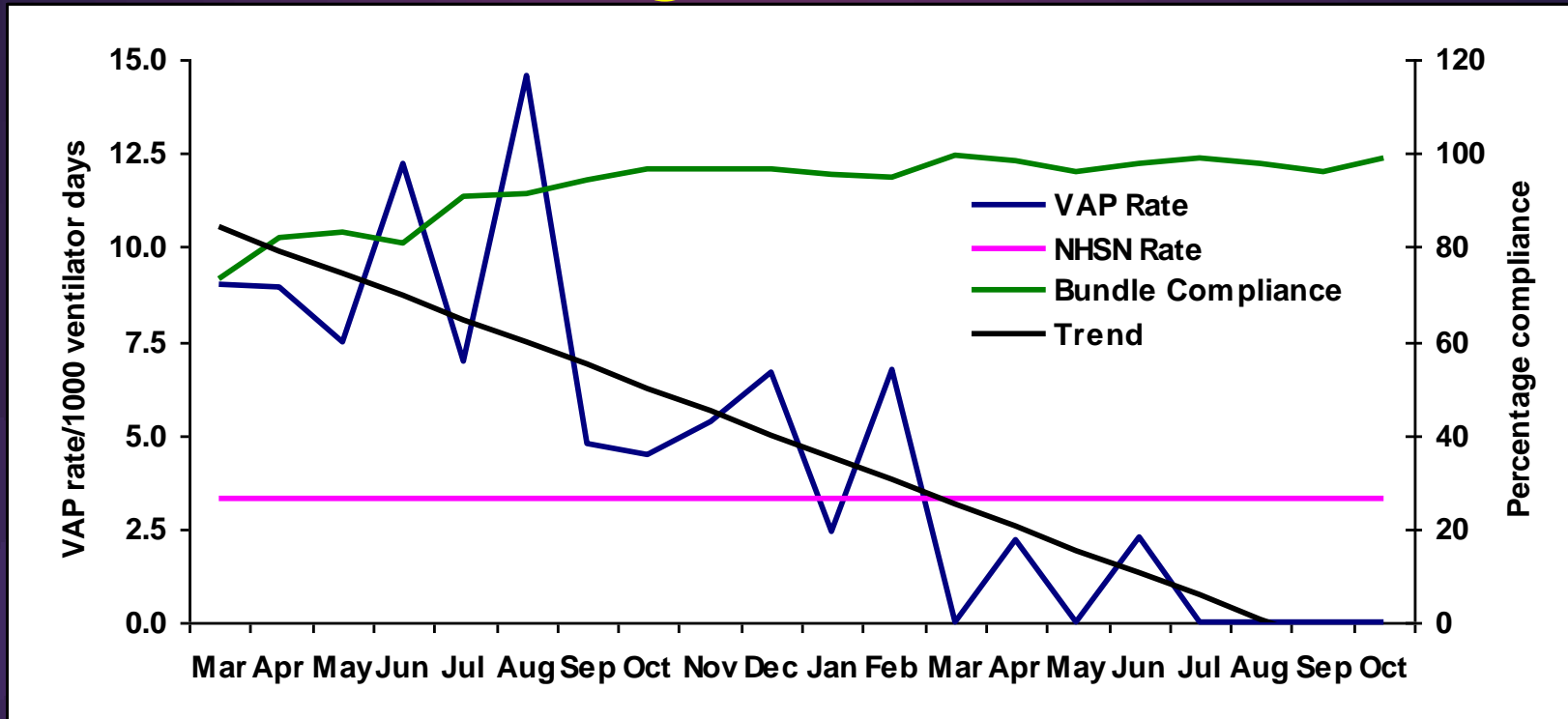
- ▶ Include deep venous prophylaxis as part of your ICU order admission set and ventilator order set. Make application of prophylaxis the default value on the form.
- ▶ Include deep venous prophylaxis as an item for discussion on daily multidisciplinary rounds.
- ▶ Empower pharmacy to review orders for patients in the ICU to ensure that some form of deep venous prophylaxis is in place at all times on ICU patients.
- ▶ Post compliance with the intervention in a prominent place in your ICU to encourage change and motivate staff.



# GI prophylaxis: tips

- ▶ Include peptic ulcer disease prophylaxis as part of your ICU order admission set and ventilator order set. Make application of prophylaxis the default value on the form.
- ▶ Include peptic ulcer disease prophylaxis as an item for discussion on daily multidisciplinary rounds.
- ▶ Empower pharmacy to review orders for patients in the ICU to ensure that some form of peptic ulcer disease prophylaxis is in place at all times on ICU patients.
- ▶ Post compliance with the intervention in a prominent place in your ICU to encourage change and motivate staff.

# Implementation of a VAP Care Bundle in a regional ITU in Belfast



March 2007 – VAP rate 8.99 per 1000 ventilator days & the VAP care bundle compliance was 72%

October 2008 – VAP rate was 0 per 1000 ventilator days with VAP care bundle compliance was 95%

# Urinary Catheter Care Bundle

- ▶ One of the most commonly done procedure
- ▶ A intervention in form of bundle care for this procedure will help in saving lives at a greater level as more patients will be benefited.



# Urinary Catheter Care Bundle

## ▶ Insertion

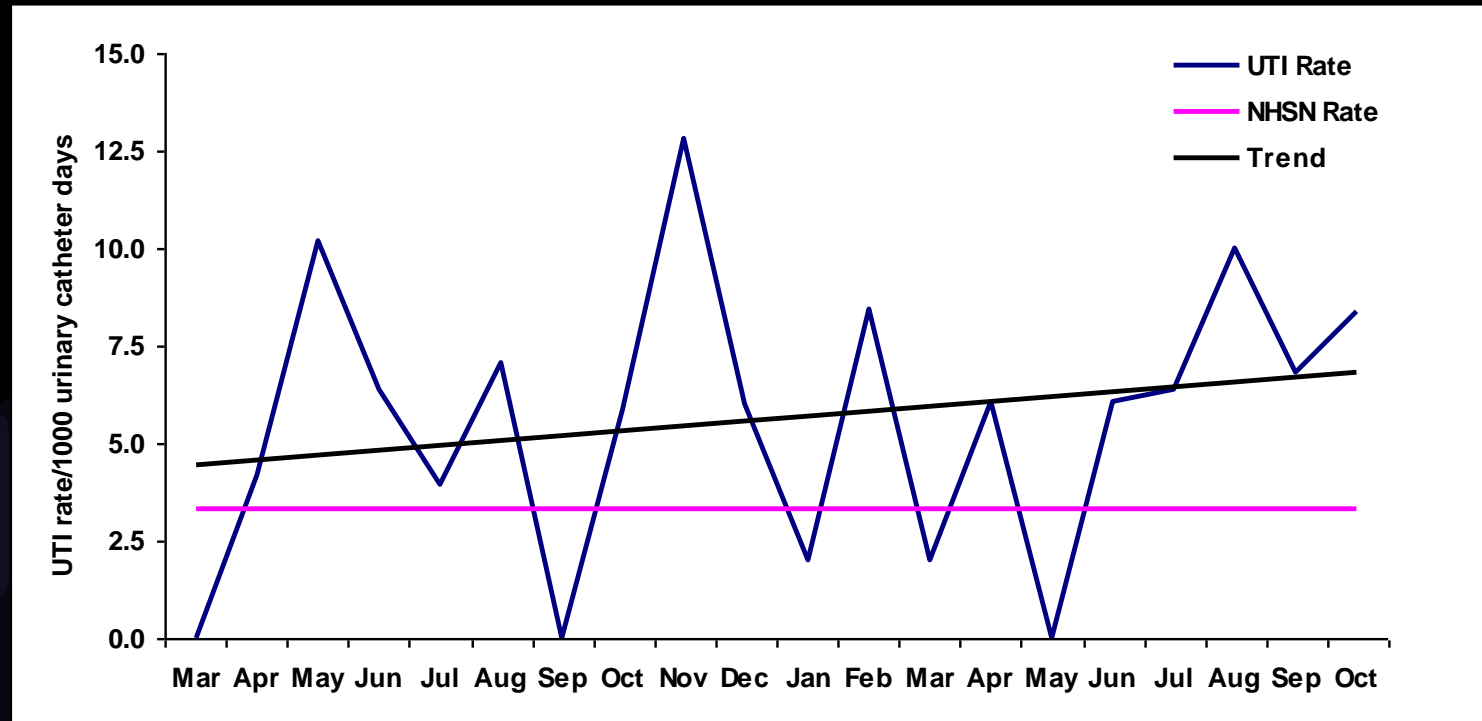
- Insert only for specific reasons
  - Urinary output in critical ill ??
  - Bladder outlet obstruction or neurogenic bladder dysfunction
  - Prevent contamination of sacral wounds
  - Terminal care
- Competent Health Care Worker to insert
- Aseptic technique
- Closed system with bag below bladder

# Urinary Catheter Care Bundle

## ▶ Management

- Review need for catheter daily
- Empty when  $\frac{3}{4}$  full and use clean container for each patient
- **Secure catheter to abdomen**
- Urine samples from sampling port only
- Hand hygiene & PPE before and after any catheter care

# Catheter associated Urinary Tract Infection



Care bundle for CAUTI was not introduced. Urinary tract infections during the study period showed a slight increase

# Severe Sepsis BUNDLES

<http://www.ihl.org/IHI/Topics/CriticalCare/Sepsis/Changes/>

# Sepsis Bundle

- ▶ In 2004 European Society of Intensive Care Medicine (ESICM), Society of Critical Care Medicine (SCCM) and International Sepsis Forum (ISF) published guidelines for the management of severe sepsis and septic shock
- ▶ 2 Care bundles evolved from these guidelines
  - ▶ **Severe sepsis resuscitation bundle**
  - ▶ **Severe sepsis management bundle**
- ▶ [www.ihl.org](http://www.ihl.org)



# Sepsis resuscitation bundle

- ▶ describes **seven tasks** that should begin **immediately**, but must be accomplished within the first 6 hours of presentation for patients with severe sepsis or septic shock.
- ▶ Some items may not be completed if the clinical conditions described in the bundle do not prevail in a particular case, but clinicians should assess for them.
- ▶ The **goal** is to perform all indicated tasks 100 percent of the time within the first 6 hours of identification of severe sepsis.

# Sepsis resuscitation bundle: details

- ▶ Serum lactate measured
- ▶ Blood cultures obtained prior to antibiotic administration
- ▶ Antibiotics in first hour of admission
- ▶ Treat hypotension and/or elevated lactate with fluids → appropriate fluid challenge.
- ▶ Apply vasopressors for ongoing hypotension
- ▶ Maintain adequate central venous pressure
- ▶ Maintain adequate central venous oxygen saturation

# Sepsis management bundle

- ▶ Lists **four** management goals.
- ▶ Efforts to accomplish **these tasks** should also begin immediately.
- ▶ These items may be completed within 24 hours of presentation for patients with severe sepsis or septic shock

# Sepsis management bundle: details

- ▶ Administer Low Dose Steroid by a standard Policy.
- ▶ Maintain adequate glycemic control
- ▶ Prevent excessive Inspiratory Plateau pressure
- ▶ Do not use Activated Protein C in any form of sepsis

Developing your own bundle  
of care for your own ICU  
setup is ideal ...

# Pressure Ulcer Prevention Bundle

1. Risk assessment (Braden tool)
2. Skin assessment 8 hrly
3. Head of bed  $\leq 30^\circ$  unless contraindicated or superseded by VAP bundle
4. Incontinence skin care
5. Position change
  - ▶ bed – 2 hourly
  - ▶ Chair – hourly
6. Heel elevation
7. Nutritional assessment
8. Pressure relief mattresses (not a replacement for positional change)

# Clostridium Difficile Care Bundle

- ▶ Isolate all CDI patients in a single room with clinical hand washing sink and either en suite facilities or a designated toilet/commode until they are at least 48 hours symptom free
- ▶ Review the patient's antibiotic regimen - stop inappropriate antibiotics
- ▶ Check that all HCWs remove PPE (gloves and aprons) immediately after each contact with CDI patient and their environment
- ▶ Ensure that HCWs perform hand hygiene with liquid soap and water immediately after removal of PPE
- ▶ Check that the CDI patient's immediate environment and all patient care equipment has been cleaned today with a neutral detergent and disinfected with a sporicidal disinfectant

Figure 1.

## NEWLY MODIFIED ABCDEF BUNDLE<sup>2,5</sup>

### ABCDEF Bundle

**A**

Assess, prevent, and manage pain

**B**

Both SAT and SBT

**C**

Choice of analgesia and sedation

**D**

Delerium: Assess, prevent and manage

**E**

Early mobility and exercise

**F**

Family engagement and empowerment



# Critical Care Bundle: Conclusions

- ▶ More and more data that the use of these patient-safety bundles are associated with **improved outcomes**
- ▶ some clinicians **disagree** with the validity of the combined content.
- ▶ Nevertheless, it is becoming part of **standard practice for us to document** our awareness of these national patient-safety initiatives

# Summary

A Care bundle is a simple tool used to improve reliability in care delivery

Elements must be evidenced based

Can be used for different conditions or treatments and adapted locally

# References

- ▶ [www.hpsc.ie](http://www.hpsc.ie)
- ▶ Baldelli P. et al Creation and implementation of a pressure ulcer prevention bundle improves patient outcomes. American Journal of Medical Quality, 23(2) 2008 136-142

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- ▶ Nelson J.E. et al Improving comfort and communication in ICU : A practical new tool for palliative care performance measurement and feedback. *Quality and Safety in Health Care* 2006;**15**:264-271
- ▶ Crookshanks H et al The effect of HCAI surveillance and the introduction of care bundles in a regional intensive care unit in Northern Ireland 2008 SHEA Conference proceedings 2008

# CONCLUDED

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