

## CCRS is coming

A trial of the Critical Care Resource System management System (CCRS) will begin on August 4 2008. CCRS is part of a suite of integrated business information systems that are under development; other tools include BedBoard and WAND. The main goal of CCRS is to assist in rapidly identifying resources (that is Beds) to meet the needs of critical care patients. CCRS will provide state-wide medical retrieval services as well as Critical Care Units in hospitals with close to real time access to key information on the location of available critical care resources to direct the 'Right Patient, to the Right Hospital, at the Right Time'. The CCRS will provide targeted information to help timely decision making for critical care patients.

### Benefits:

- Real time access to Critical Care Unit information
- Units are able to update their information as circumstances change
- Promotes the effective utilisation of resources
- Units will have the ability to produce and access reports around bed utilization for example and benchmark important indicators against similar units
- Facilitates effective communication between Medical Retrieval Services and Critical Care Units

The first train-the-trainer workshops were held on July 25. CCRS will be fed directly by admission and discharge information however individual units will be able to edit their information. For example the PAS may indicate that a bed is available however the ICU may be expecting an admission and can put a hold on the bed.

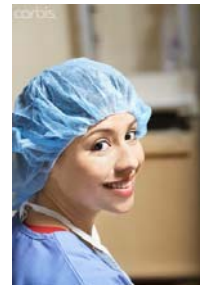
**NSW HEALTH**  
Business Information Program

**accenture**



Unit management is able to qualify the information regarding this bed. Additionally beds may be unavailable for reasons including staffing or exit block. This information can be added to the system and units will be able to run reports showing patterns related to bed utilisation.

After the initial 8-week trial to identify usability and use of CCRS additional components will be launched including reports.



**To wear a hat, or not to wear a hat  
: that is the question**

The Central Line Associated Bacteraemia (CLAB) project advocates the use of "surgical style" sterile insertion technique using "full-barrier precautions" in an attempt to reduce the risk of infection. Implementing a guideline to standardise technique has not been without difficulties and the inclusion of hats has been one of the more contentious issues. The lack of evidence to support the wearing of hats has been cited by clinicians as a reason to omit them from their preparation.

The purpose of this update is to explore the evidence regarding the efficacy of wearing surgical hats during central line insertions and in turn asks the question "where is the evidence negating the need to wear a hat?" It should be noted that whilst compliance with the CLAB ICU guideline is not mandatory, it has informed NSW Health policy in this area. Targets have also been set (see table 1) in regards to compliance and are very likely to be monitored as an ongoing feature of auditing beyond the end of the project. Participating sites are encouraged to aim for the targets set out below (or better) as soon as possible and congratulations go out to units already achieving these targets.

**Resistance**

While guidelines are commonly used to support practice change, their success in influencing behaviour are questionable when used in isolation<sup>1,2</sup>. Ongoing resistance to wearing hats during CVC insertion has necessitated the need for further consultation with clinicians.

The reasons for resistance have been explored during teleconferences and site visits. Many reasons have been cited, most commonly, lack of evidence, resistance to change and resource availability.

Interestingly, the common features leading to success in units where compliance is reported to be high appear to be support of the advocated technique by senior clinicians and easy access to appropriate supplies.

This paper will remind clinicians that hair is a "reservoir" of bacteria and that international and domestic guidelines consistently advocate the use of full barrier precautions during CVC insertion.

**Guideline development**

The CLAB guidelines recommend that a proceduralist don surgical attire based on the suggestion that CLAB is causally related to sterile insertion technique<sup>3</sup>. The seminal work informing this project advocated this approach<sup>4</sup>.

**Surgical attire recommendations<sup>5, 6, 7</sup>**

Surgical attire in operating suites is standardised, requiring head covers to minimise microbial dispersal and shedding onto the surgical field<sup>8</sup>. The absence of hair does not eliminate the need to cover up. Omission of headgear in the operating suite increases bacterial contamination in the surgical area<sup>9, 10</sup>. There is evidence linking hair to surgical site infections.

TABLE 1		
Key Performance Indicator	Target	Target Date
Junior medical staff inserting central lines have undertaken CEC/ICCMU training and assessment process	50%	December 2008
	75%	June 2009
Compliance with clinician bundle <sup>1</sup>	95%	June 2009
Compliance with patient bundle <sup>2</sup>	100%	June 2009
Compliance with post insertion care guidelines	50%	June 2009
1 Cleanse hands, wear hat, mask and eyewear, don sterile gloves and gown		
2 Prepare procedure site, cover patient completely with sterile drape, check line position		

**Hair as a source of infection in the operating theatre**

Skin is colonised by "normal" flora to different extents depending on the site. For example double the colony forming units are found on the scalp than the axillae<sup>11</sup>. Further, hair acts as a filter when left uncovered and is known to be a reservoir for shedding microorganisms<sup>12, 13</sup> in proportion to its length, curliness, and oiliness. In addition to the "normal" flora, clinicians also acquire "transient" flora as a consequence of their work environment. Transient flora, such as MRSA, is more likely to be the causative agent of hospital-acquired infections.

Site	Colony forming units
Scalp	100 x 10 <sup>4</sup> cm <sup>2</sup>
Axillae	50 x 10 <sup>4</sup> cm <sup>2</sup>
Abdomen	4 x 10 <sup>4</sup> cm <sup>2</sup>
Forearm	1 x 10 <sup>4</sup> cm <sup>2</sup>

**Case studies demonstrating the link to surgical site infection**

Common databases and websites, including Medline, CINAHL and Cochrane, Google Scholar, speciality clinician and ISO, were searched for relevant literature and standards. The food safety standards were also searched as clinicians at participating sites have drawn a parallel with the food preparation industry.

**1990<sup>14</sup>**

An investigated hospital outbreak of group A Strep in 20 post surgical patients was attributed to a single carrier with Strep A localised from skin lesions associated with psoriasis on the carrier's scalp. The staff member was not involved in direct patient care durina suraerv.

**1973<sup>15</sup>**

A case series demonstrated a medical staff hair carrier of Staph was connected to 11 infections. After the carrier ceased compliance with an antimicrobial regimen, they were linked to a further 5 infections. A case series demonstrated a medical staff hair carrier of Staph was connected to 11 infections. After the carrier ceased compliance with an antimicrobial regimen, they were linked to a further 5 infections.

**1965<sup>16</sup>**

The results of note in the clinician sub-group were that pathogenic bacteria were isolated from 46% of participants. Staph aureus, Strep viridans and E coli accounted for 54.8% of the organisms. The isolated Staph aureus was also resistant to many antibiotics.

**Caps and CLAB**

**Studies and guidelines**

While it has been demonstrated that hair is a potential source of infection, the role of the cap in the prevention of CLAB has not been clarified. However two studies report a reduction in CLAB as a result of maximal sterile barrier precautions (MSBP), including a cap and many guidelines recommend such precautions based on improved patient safety and cost-benefit analysis. The article most commonly cited supporting MSBP for central line insertion is from 1994. The study was a prospective randomised single centre trial with the control group using small drapes and sterile gloves and the treatment group using MSBP. The groups were comparable and the rate of CLAB was significantly higher in the control group and according to the analysis related to the difference in insertion technique<sup>3</sup>. More recently an Italian study demonstrated a reduced risk of CVC colonisation when using MSBP<sup>17</sup>. This narrative is not a critique of these articles and clinicians are encouraged to read both and consider the implications. Many guidelines advocate MSBP for central line insertion and although not exhaustive, see table 3 below for some recent examples with the full reference in the list.



Study	Year
Bishop et al <sup>18</sup>	2007
McGee & Gould <sup>19</sup>	2007
Halton & Graves <sup>20</sup>	2007
Taylor & Palagiri <sup>21</sup>	2007
Posa, et al <sup>22</sup>	2006
Pronovost, et al <sup>14</sup>	2006
Carrer et al <sup>17</sup>	2005
Berenholtz <sup>23</sup>	2004
Hu et al <sup>24</sup>	2004
Kent, et al <sup>25</sup>	2004
OGrady, et al <sup>26</sup>	2002
Mermel <sup>27</sup>	2000

## CLAB ICU Database

Wearing a surgical hat during insertion is reported together by specifying whether the proceduralist wore a hat, mask and protective eyewear at a single data point. The bundling of the protective equipment has made it difficult to determine non-compliance with the individual items of protective equipment and any causal effect on the risk of infection.

However, reviewing the raw dataset, 22 of the 85 reported infections relate to the 1178 insertions where full personal protective equipment was not donned. Host defence factors, further breach of the advocated technique and post insertion care cannot be ruled out as contributing factors.

As a comparison group, as they are a known quantity, the specific line services which are primarily nurse led were examined separately. These services account for 446 records, a very small number of infections, and all reported positive compliance with the personal protective equipment bundle. Interestingly, an article published in 1956 also reports this difference in operating room practice, noting that in contrast to the medical staff, nursing staff commonly "conformed to surgical technique"<sup>28</sup>. The emphasis in medical training on decision-making autonomy has been suggested as a reason for the difference in attitude resistance to directed practice change<sup>2</sup>.

Response to PPE	Number	CVC BSI
Yes	4482	54
No	969	22
Blank	209	9

## Conclusion

There is no evidence to suggest that wearing caps during CVC insertion should be an "optional extra". Conversely, caps are routinely cited as an element of MSBP, which have been credited with a reduction in CLAB. Overall the evidence suggests that the use of a hat is a pragmatic and reasonable step during CVC insertion.

This paper aimed to diffuse the resistance to wearing hats, as it is an integral part of the insertion technique advocated in the CLAB ICU project. It is hoped that lead clinicians for this project can utilise this information in their unit to lend further support for sustainability of practice improvements. The effect of senior clinician support, or lack thereof, on their unit should not be underestimated<sup>1, 2</sup>. Where senior clinicians do not comply, they may create barriers for junior clinician compliance<sup>29</sup>.

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## Webpage Review:

### AACN Practice Alert

The resources of the American Association of Critical care nurses allows for the development of a broad range of resources. The aim of the practice alert page is to improve bedside care by:

1. closing the evidence-practice gap;
2. provide guidance on care;
3. standardize care; and
4. Identify and inform on advances and new trends.

There is a small but eclectic range of topics such as oral care in ICU, non-invasive blood pressure monitoring and verification on feeding tube placement. A recent edition is an update of the prevention of ventilated associated pneumonia. The practice includes a summary of practice points as well as a comprehensive list of references. A powerpoint presentation is also available to use for education.

#### Education resource

The AACN National Teaching Institute was held in May this year. The NTI is an annual event where thousands (9 200 this year alone!). The link will take you to the poster presentations. You can view the abstract then a ppt for each poster. Examples include

1. Knowledge and Attitudes Regarding Pain: A Survey Among Critical Care Nurses
2. Bundling of Nursing Interventions - Ventilator Associated Pneumonia
3. Totally unrestrictive: Opening the Doors to Patient- and Family-Centred Care in Ten ICUs Across one Institution

<http://classic.aacn.org/AACN/NTIPoster.nsf/vwdoc/2008NTIPosters>



### Members Choice Website

Do you have a website you feel is worth advertising to the collective membership of ICUConnect?

Let us know by email. Include the name of the website, the link and a couple of sentences about why you think it's worth a visit.

[Rollsk@wahs.nsw.gov.au](mailto:Rollsk@wahs.nsw.gov.au)

## Australian Guidelines

### NICS VTE Hospital program

For a number of years prevention of venous thromboembolism (VTE) has been a major focus for National Institute for Clinical Studies (NICS). For more information on this use the link below and then click on the NICS VTE prevention link in the right hand side menu.

<http://www.nhmrc.gov.au/nics/asp/index.asp>

### NHMRC -Ethical guidelines for the care of people in post-coma unresponsiveness

The guidelines aim to contribute to the care of people in a state of post-coma unresponsiveness (PCU) or a minimally responsive state (MRS) by addressing ethical issues associated with this care.

[http://www.nhmrc.gov.au/publications/synopses/e81\\_82syn.htm](http://www.nhmrc.gov.au/publications/synopses/e81_82syn.htm)

### International Guidelines - National Guideline Clearinghouse

Clinical policy: critical issues in the management of adult patients presenting to the emergency department with acute carbon monoxide poisoning.

[http://www.guideline.gov/summary/summary.aspx?view\\_id=1&doc\\_id=12247](http://www.guideline.gov/summary/summary.aspx?view_id=1&doc_id=12247)

## Medscape

### Medication Errors Involving Patient-controlled Analgesia

Authors: Rodney W. Hicks; Vanja Sikirica; Winnie Nelson; Jeff R. Schein; Diane D. Cousins

American Journal of Health-System Pharmacy

<http://www.medscape.com/viewarticle/571902?src=mp&spon=24&uac=68906SZ>

### Viewpoints on study

#### Positive End-Expiratory Pressure Setting in Adults With Acute Lung Injury and Acute Respiratory Distress Syndrome (EXPRESS)

Greg Martin, MD, MSc

Mercat A, Richard JM, Vielle B, et al.

JAMA. 2008;299:646-655

<http://www.medscape.com/viewarticle/573071>

### Resource Center

MEDSCAPE has a number of resource centres.

#### Resuscitation Resource Center

Articles and links related to resuscitation can be found here including Compression only CPR for bystanders, why Compressions are so important in CPR and NiPPV and Palliative care

<http://www.medscape.com/resource/resuscitation>

## Research

### **Pulmonary Complications After Noncardiac Surgery: A Review of Their Frequency and Prevention Strategies.**

#### **Colleagues in Respiratory Medicine**

*Kaw, Roop MD \*; Stoller, James K. MD, MS Clinical Pulmonary Medicine. 15(1):18-23,*

#### **Abstract:**

Postoperative pulmonary complications are an important cause of postoperative morbidity and mortality after major noncardiac surgery. The reported frequency varies widely as defined by the definition of postoperative pulmonary complication, the patient population, and the type of surgery. The most common complications, namely, postoperative pneumonia and respiratory failure are strongly associated with the type of surgical procedure and other procedure specific factors. Among the patient related risk factors, age and the American Society of Anesthesiology class stratify the postoperative risk most powerfully. Preoperative spirometry may not offer incremental predictive benefit except in certain types of surgery. Potential strategies to reduce the postoperative complications include risk stratification for pneumonia and respiratory failure, adequate postoperative analgesia, short-acting neuromuscular blockade, postoperative lung expansion modalities, selective use of postoperative nasogastric decompression, laparoscopic surgery where possible, and nutrition.

### **Impact of adverse events on outcomes in intensive care unit patients\***

*Orgeas MG, Timsit JF, Soufir L, Tafflet M, Adrie C, Philippart F, Zahar JR, Clec'h C, Goldran-Toledano D, Jamali S, Dumenil AS, Azoulay E, Carlet J; on behalf of the Outcomerea Study Group. Crit Care Med. 2008 Jun 12*

**OBJECTIVE::** To examine the association between predefined adverse events (AE) (including nosocomial infections) and intensive care unit (ICU) mortality, controlling for multiple adverse events in the same patient and confounding variables. **DESIGN::** Prospective observational cohort study of the French

**OUTCOMEREA** multicenter database.

**SETTING::** Twelve medical or surgical intensive care units.

**PATIENTS::** Unselected patients hospitalized for  $\geq 48$  hrs enrolled between 1997 and 2003.

**INTERVENTIONS::** None.

**MEASUREMENTS AND MAIN RESULTS::** Of the 3,611 patients included, 1415 (39.2%) experienced one or more AEs and 821 (22.7%) had two or more AEs. Mean number of AEs per patient was 2.8 (range, 1-26). Six AEs were associated with death: primary or catheter-related bloodstream infection (BSI) (odds ratio [OR], 2.92; 95% confidence interval [CI], 1.6-5.32), BSI from other sources (OR, 5.7; 95% CI, 2.66-12.05), nonbacteremic pneumonia (OR, 1.69; 95% CI, 1.17-2.44), deep and organ/space surgical site infection without BSI (SSI; OR, 3; 95% CI, 1.3-6.8), pneumothorax (OR, 3.1; 95% CI, 1.5-6.3), and gastrointestinal bleeding (OR, 2.6; 95% CI, 1.4-4.9). The results were not changed when the analysis was confined to patients with mechanical ventilation on day 1, intermediate severity of illness (Simplified Acute Physiology Score II between 35 and 55), no treatment-limitation decisions, or no cardiac arrest in the ICU.

**CONCLUSIONS::** AEs were common and often occurred in combination in individual patients. Several AEs independently contributed to death. Creating a safe ICU environment is a challenging task that deserves careful attention from ICU physicians.

## Quality

### New at NSWHealth



- **Policy, Directives and Guidelines**

<http://www.health.nsw.gov.au/policies/index.asp>



- **Lessons learnt on Quality and Safety**



Safety Alert



Safety Notice



Safety  
Information

- **Safety Alert Broadcast System**

<http://www.health.nsw.gov.au/quality/sabs>

Use this link to access the latest TGA recall notices

<http://internal.health.nsw.gov.au/quality/cop/>

## Education

### For Your Diary:



- **Trauma Evening**

Wednesday 20th August 2008 4.30 - 8.00pm

Wests Leagues Club (Campbelltown)

Registration is FREE but booking a place is essential!

Registration closes: Friday 15th August 2008

For further information please contact:

Glenn Sisson

NSW Institute of Trauma and Injury Management

[gssisson@nscchahs.health.nsw.gov.au](mailto:gssisson@nscchahs.health.nsw.gov.au)

02 8877 5396

- **Rural Critical Care**

22-23 August 2008 at Batemans Bay.

For further details use the link below

<http://www.ruralcriticalcare.asn.au/>

- **Safety Quality Audit Outcomes Research in Intensive Care**

28-29 August 2008 Christchurch New Zealand

<http://www.anzics.com.au/conference.asp?Section=sqo08>

- **NECSS Care of the Critically Ill**

11-12 September 2008 Albury

Contact: [Rollsk@wahs.nsw.gov.au](mailto:Rollsk@wahs.nsw.gov.au)

- **Asia Pacific Critical Care 2008 Congress:**

**PAST, PRESENT, FUTURE**

Incorporating Annual Scientific Meeting

30 October - 2 November 2008

All web and email addresses were correct at time of publication

Edited by Di Kowal & Kaye Rolls

Intensive Care Coordination & Monitoring Unit (ICCMU)

PO Box 63, Penrith NSW 2751

Tel: (02) 4734 1585 Fax: (02) 4734 1586

Email: [iccmu@wahs.nsw.gov.au](mailto:iccmu@wahs.nsw.gov.au).