CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTION (CLABSI) IN
INTENSIVE CARE UNITS

By Goh Helen¹

ABSTRACT

This paper compares the Central Line-Associated Bloodstream Infection (CLABSI) rates in the various intensive care units (ICUs) of public acute-care hospitals with international benchmarks during 2004-2010.

INTRODUCTION

Critically ill patients require a wide range of therapeutic and diagnostic services to meet their needs. As a result, devices such as central lines, ventilators and indwelling urinary catheters are frequently used in critical care settings. Although meant to be life-saving, these devices also expose the patient to an increased risk of device-associated infections.

This paper presents the progress made thus far by our local public hospitals in improving our CLABSI rates as compared with the published rates of the US National Healthcare Safety Network (NHSN). The NHSN is a benchmarking database based on the cumulative incidence of nosocomial infections among participating US hospitals reported since 2005. The NHSN is under the auspices of the US Centers for Disease Control and Prevention (CDC).

Definitions:

Bloodstream infections may occur in patients from various sources. A bloodstream infection that develops in a patient as a result of the insertion of a central line is termed a CLABSI.

The rate of CLABSI in our public sector ICUs is obtained and calculated using the standardized data definition and collection methodology of the NHSN.

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\text{Central Line-Associated BSI Rate:} \quad \frac{\text{Number of CLABSI}}{\text{Number of central line-days}} \times 1000
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To improve comparability of our results with NHSN results, we have stratified the comparison by type of ICUs, i.e. Coronary Care Unit (CCU), Medical ICU (MICU), and Surgical ICU (SICU).

OUTCOMES

The incidence rates of CLABSIs for the local public hospitals for the years 2004-2010 were compared against the NHSN pooled mean rate reported for the following ICUs: (1) CCU, (2) MICU, and (3) SICU.

1. Coronary Care Unit

During the SARS crisis period, some of our public hospitals were unable to submit reports to MOH. When data submission resumed following SARS, the initial low denominator in 2004 resulted in a relatively high rate of 2.0 per thousand patients. This figure was, nevertheless, lower than the US NNIS figure (The NNIS was the predecessor of the NHSN benchmarking database).

Since 2005 the CLABSI rates reported by the reporting hospitals’ CCUs have been consistently lower than the pooled mean rates of the NHSN. Although the NHSN rates showed a decrease over the years, our CLABSI rates have remained at less than 1.0 per thousand central line days (Chart 1).

Chart 1 Central Line-Associated BSIs per 1000 central line-days in CCU (Years 2004 – 2010)
2. Medical Intensive Care Unit

The CLABSI rates for MICUs have also been consistently lower than the pooled mean rates of the NHSN. The spike in 2006 was attributed to the small denominator reported by hospitals for that year. And following the increase in incidence in 2009, a quality improvement project was conducted, which resulted in improvement to 0.58 in 2010 (Chart 2).

*Chart 2 Central Line-Associated BSIs per 1000 central line-days in MICU (Years 2004 – 2010)*

3. Surgical Intensive Care Unit

The CLABSI rate per 1000 central line-days of in Singapore public hospitals’ SICUs has decreased from the baseline of 1.79 in 2004 to 0.40 in 2010. This follows the trend shown by the US hospitals reporting from 4.6 to 1.80 per thousand central line days. As in the other ICUs, Singapore’s rates are lower than those of the NHSN.
CONCLUSION

The stringent infection control measures instituted in local public hospitals have led to a marked reduction of the CLABSI rates in critical care settings. Through a programme of surveillance, benchmarking and quality improvement, application of CLABSI bundle\textsuperscript{2} instituted at the public hospitals in Singapore, the CLABSI rates in the ICUs have been brought down to levels that are comparable with those achieved by US hospitals enrolled in the NHSN.

Feedback to MOH

If you have any comments or questions on the information paper, you can email us directly at moh_info@moh.gov.sg. Alternatively, you can also fax or write to us at:

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\textsuperscript{2} The Central Line Bundle consists of a set of concurrent measures that has been shown elsewhere to be effective in controlling infection rates (a) hand hygiene, (b) maximal barrier precautions, (c) Chlorhexidine skin antisepsis, (d) optimal catheter site selection, with the subclavian vein as the preferred site for non-tunneled catheters, and (e) daily review of line necessity, with prompt removal of unnecessary lines.