Manual

Period Prevalence Survey for Blood Stream Infection

First Edition
December 2013

Quality in Medical Care Section
Medical Development Division
Ministry of Health
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<th>Description</th>
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<td>A&amp;E</td>
<td>Accident and emergency</td>
</tr>
<tr>
<td>BSI</td>
<td>Bloodstream infection</td>
</tr>
<tr>
<td>CDC</td>
<td>Centre for Disease Control and Prevention</td>
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<tr>
<td>CFU</td>
<td>Colony-forming units</td>
</tr>
<tr>
<td>CVC</td>
<td>Central vascular catheter</td>
</tr>
<tr>
<td>ESBL</td>
<td>Extended-spectrum beta-lactamase</td>
</tr>
<tr>
<td>HCAI</td>
<td>Healthcare-associated infections</td>
</tr>
<tr>
<td>ICN</td>
<td>Infection control nurse</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive care unit</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>PPS</td>
<td>Point Prevalence Survey</td>
</tr>
<tr>
<td>PVC</td>
<td>Peripheral vascular catheter</td>
</tr>
<tr>
<td>SSI</td>
<td>Surgical site infections</td>
</tr>
<tr>
<td>SUTI</td>
<td>Secondary to Urinary Tract Infection</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Committee Members

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Primary bloodstream infection (BSI) is a leading, infectious complication among critically ill patients. It represents about 15% of all nosocomial infections and affects approximately 1% of all hospitalized patients, with an incidence rate of 5 per 1,000 central-line days\(^1\). Approximately 90% of primary BSIs occur in patients with intravascular devices, especially central lines, and these represent the most powerful risk factors for BSI\(^1\).

The causative organisms of BSI have changed over time due to the wide use of long-term central venous catheters such as a Hickman catheter, use of prophylactic antibiotics, administration of initial empirical broad-spectrum antibiotics for neutropenic fever, changes in empirical antifungal therapy, and increased awareness of the importance of infection control\(^2\).

The frequency of gram-positive bacteria (GPB) as a microbial cause of BSI has continuously increased in U.S. or Europe, but in Asia, it has been reported until recently that the frequency of BSI caused by gram-negative bacteria (GNB) was high regardless of presence of neutropenia, and the resistant pattern of isolated organisms against antibiotics have changed over time\(^2\).

The impact on patient outcome is tremendous; BSI increases the mortality rate, prolongs patient stay in an intensive care unit (ICU) and in the hospital, and generates substantial extra costs. For these reasons, surveillance and prevention of BSI are high priorities, and several interventions have proven to be effective\(^1\).

### Objective

**General objective:** To reduce blood stream infection prevalence / incidence rate

**Specific objective:**

1. To estimate the total burden (prevalence/ incidence) of blood stream Infection in hospitals participating in 1 month period prevalence study
2. To assess all laboratory detected blood stream infections to determine if the cause may be related to healthcare.

3. To determine the characteristic of infection - types organism, pattern of antibiotic usage, invasive procedures and other predisposing factors of blood stream infection

4. To provide a standardized tool for hospitals to identify targets for quality improvement

**Methodology**

a) **Design**

It is a one month period prevalence survey. The survey is conducted twice a year, one month in March and one month in September

b) **Population under surveillance**

The population under surveillance is all inpatients in the month of surveillance.

**Inclusion:**

Any case that met the BSI criteria as in Appendix 1

**Exclusion criteria;**

- Cases from Emergency department, clinic, or other outpatient services
- Cases previously identified at other hospitals
- Cases from screening culture
- Cases with organisms identified as contaminants

c) **Definition of Healthcare Associated Blood Stream Infection**

Events that occur >48 hours after admission and was not incubating on admission **OR** occurs within 48 hours of discharge. **OR**

Events that occur <48 hours after admission and meet **at least one** of the following key clinical criteria:
• Is a complication of the presence of an indwelling medical device (e.g. IV catheter, urinary catheter);
• Occurs within thirty days of a surgical procedure, where the bloodstream infection is related to the surgical site infection;
• An invasive instrumentation or incision related to the bloodstream infection was performed within 48 hours before onset of the infection. If the time interval was longer than 48 hours, there must be compelling evidence that the infection was related to the invasive device or procedure; or
• Associated with neutropenia (<1x10⁹/L) contributed to by cytotoxic therapy.

d) Classification of healthcare associated BSI by the focus of principal site of the infection.

**Indwelling medical device**
Classify as either intravascular or non intravascular device related BSI

• Intravascular catheter-associated bloodstream infection:
  An intravascular catheter was present within 48 hours before the BSI AND the organism/s are not related to an infection at another site.

• Non-intravascular device associated BSIs:
  When an indwelling device such a urinary catheter, a percutaneous endoscopic gastrostomy (PEG) tube, chest tube, peritoneal dialysis catheter was in place within 48 hours of the HCA BSI and there is clinical or microbiological evidence of the same causative organism/s associated with the site of device insertion or an organ connected to the device.

**Secondary to a surgical site infection**

• When the BSI occurs within 30 days of a surgical procedure where a surgical site infection with the same causative organism has been identified

**OR**

• When the BSI occurs within one year of a surgically implanted prosthesis or device where there is a proven prosthetic or device infection with the same causative organism as the BSI.
e) Calculation of Blood Stream Infection Prevalence

**Numerator** : Any patient that met the BSI criteria as in **Appendix 1**
**Denominator:**
1. Total admissions in the month of survey
2. Total patient days in the month of survey

**Department / discipline BSI prevalence**

1. \[ \frac{\text{No. of patient with BSI in the department in the month of survey}}{\text{Total admissions of the department in the month of survey}} \times 100 \]
2. \[ \frac{\text{No. of patient with BSI in the department in the month of survey}}{\text{Total patient days of the department in the month of survey}} \times 1000 \]

**Hospital BSI prevalence**

1. \[ \frac{\text{No. of patient with BSI in the hospital in the month of survey}}{\text{Total admissions of the hospital in the month of survey}} \times 100 \]
2. \[ \frac{\text{No. of patient with BSI in the hospital in the month of survey}}{\text{Total patient days of the hospital in the month of survey}} \times 1000 \]

---

**Data collection, compilation and reporting**

- Infection Control Nurse shall collects data on positive blood culture result on daily basis from the laboratory.
- ICN will inform Link Nurse to fill in the BSI /MOH/2013/1 form as in **Appendix 2**.
- All Link Nurse should fill in the numerator and denominator data into BSI/MOH/2013/2 [Excel Format] as in **Appendix 3**.
At the end of the survey month, ICN should collect **BSI/MOH/2013/1** and **BSI/MOH/2013/2** form from all the wards.

Each case should be followed up one month after the diagnosis to determine the clinical outcome (alive or died).

The ICN will then compile the data using **BSI/MOH/2013/3 [Excel Format]** as in Appendix 4 and complete the line listing (Appendix 5). Completed **BSI/MOH/2013/3** form to be e-mailed to Infection Control State Coordinator for compilation.

State Coordinator will compile **BSI/MOH/2013/3** from all hospitals and e-mail them to the Infection Control Unit, Medical Development Division within 1 month after the completion of the BSI Period Prevalence Survey.

The national secretariat will compile all the data from the state and produce a report on the national performance of the BSI.

The flow chart for the blood stream investigation is shown in the next page (page 10).
Positive blood culture

Is the positive blood culture a bloodstream infection or a contaminant?

Bloodstream infection (recognised pathogen)

Healthcare associated infection

YES

Establish focus of infection and undertake an investigation

Document investigation findings

Report findings to clinicians and infection control team

Refer flow chart in Appendix 1 to determine the focus of infection

NO

Contaminant

No further investigation
**DEFINITION OF BLOOD STREAM INFECTION – FIRST EDITION 2013**

This document has been adapted from the CDC/NHSN Surveillance Definition of Healthcare Associated Infection and Criteria for Specific Types of Infections in the Acute Care Setting and European Centre for Disease Prevention and Control, Point prevalence survey of healthcare associated infections and antimicrobial use in European acute care hospitals- protocol version 4.3. Stockholm: ECDC; 2012,

**INFECTION SITE:** Laboratory-confirmed bloodstream infection (LCBI)

**CODE: BSI**

**DEFINITION:** Laboratory-confirmed bloodstream infection must meet at least one of the following criteria:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
</tr>
</thead>
</table>
| LCBI 1    | Patient has a recognized pathogen cultured from one or more blood cultures  
And  
organism cultured from blood is not related to an infection at another site**. |
| LCBI 2    | Patient has at least one of the following signs or symptoms: fever (>38°C), chills*, or hypotension*  
And  
positive laboratory results are not related to an infection at another site  
And  
common commensal (i.e., diphtheroids [Corynebacterium spp. not C. diphtheriae], Bacillus spp. [not B. anthracis], Propionibacterium spp., coagulate-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., and Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions. Criterion elements must occur within a timeframe that does not exceed a gap of 1 calendar day  
*With no other recognized cause |
| LCBI 3    | Patient ≤ 1 year of age has at least one of the following signs or symptoms: fever (>38°C core) hypothermia (<36°C core), apnea*, or bradycardia*  
And  

positive laboratory results are not related to an infection at another site
And
common skin commensal (i.e., diphtheroids [Corynebacterium spp. not C. diphtheriae], Bacillus spp. [not B. anthracis], Propionibacterium spp., coagulase-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions. Criterion elements must occur within a timeframe that does not exceed a gap of 1 calendar day
*With no other recognized cause

**What is the meaning of the statement “not related to infection at another site” in relation to a positive blood culture?**

The purpose of using the CDC/NHSN infection criteria is to identify and consistently categorize infections that are healthcare-associated into major and specific infection sites or types. LCBI criteria include the caveat that the organism(s) cultured from the blood cannot be related to infection at another site (i.e., must be a primary BSI).

One must be sure that there is no other CDC-defined primary site of infection that may have seeded the bloodstream secondarily; otherwise the bloodstream infection may be misclassified as a primary BSI or erroneously associated with the use of a central line, i.e., called a CLABSI. For locations participating in in-plan VAE surveillance, refer to the VAE chapter for specific guidance on assigning a secondary BSI to a VAE.

Below are listed several scenarios that may occur with guidance on how to distinguish between the primary or secondary nature of a BSI, along with the definition of “matching organisms”, and important notes and reporting instructions.

1. **Blood and site-specific specimen cultures match for at least one organism:**

In a patient suspected of having an infection, blood and a site-specific specimen are collected for culture and both are positive for at least one matching organism. If the site-specific culture is an element used to meet the infection site criterion, then the BSI is considered secondary to that site-specific infection.
a. Example: Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >105 CFU/ml of *E. coli*) and blood culture from the same date grows *E. coli*. This is an HAI SUTI with a secondary BSI and the reported organism is *E. coli*.

b. Example: Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >105 CFU/ml of *E. coli*) and blood culture from the same date grows *E. coli* and *P. aeruginosa*. This is an HAI SUTI with a secondary BSI and the reported organisms are *E. coli* and *P. aeruginosa*, since *P. aeruginosa* is a logical pathogen for this site of infection.

c. Example: Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >105 CFU/ml of *E. coli*) and blood culture from the same date grows *E. coli* and *S. epidermidis*. This is an HAI SUTI with a secondary BSI and the reported organism is only *E. coli*, since the single common commensal *S. epidermidis* positive blood culture by itself does not meet BSI criteria.

2. Blood and site-specific specimen cultures do not match:

There are two scenarios that can occur when a patient suspected of having an infection has blood and a site-specific specimen cultured but the organisms do not match.

a. If the site-specific culture is an element used to meet the infection site criterion and the blood isolate is also an element used to meet another criterion at the same infection site, then the BSI is considered secondary to that site-specific infection.

Example: Postoperative patient becomes febrile and complains of nausea and abdominal pain. Blood and an aseptically-obtained T-tube drainage specimen are collected for culture. A CT scan done that day shows fluid collection suggestive of infection. Culture results show *Escherichia coli* from the purulent drainage specimen but the blood grows *Bacteroides fragilis*. Because the patient meets IAB criteria by positive site-specific culture (IAB criterion 3a) and by positive blood culture as an element of a different criterion of the same infection site (IAB 3c), the blood is considered a secondary BSI to an IAB and both organisms would be listed as the IAB infection pathogens. No primary BSI would be reported.

b. If the site-specific culture is an element used to meet the infection site criterion and the blood isolate is not, then the BSI is considered a primary infection.
i. Example: Postoperative patient has an intraabdominal abscess (IAB) noted during reoperation and purulent material is obtained at that time which grows *Escherichia coli*. The patient spikes a fever two days later and blood culture shows *Bacteroides fragilis*. Because the organisms from the site and blood cultures do not match, and no site-specific criterion that includes positive blood culture as an element is met, both a site-specific infection (criteria 1 and 2) and a primary BSI would be reported.

ii. Example: Unconscious ICU patient with a Foley catheter and central line for past 4 days spikes a fever; blood, urine and sputum specimens are collected for culture. The urine culture grows >100,000 CFU/ml of *Escherichia coli*, blood culture grows Enterococcus faecium, and sputum shows oral flora only. Because the organisms from the urine and blood cultures do not match, and a UTI criterion that includes positive blood culture as an element is not met, both a SUTI (SUTI criterion 1a) and a primary BSI would be reported. This infection does not meet the ABUTI criterion since that requires at least one matching uropathogen organism in urine and blood in an asymptomatic patient.

3. **No site-specific specimen culture, only a positive blood culture:**

In a patient suspected of having an infection, if the only specimen cultured is blood and it grows a logical pathogen for the suspected body site of infection, and a site-specific infection criterion is met, an element of which may or may not include a positive blood culture, the BSI is considered secondary to that site-specific infection.

a. Example: Postoperative patient has an abscess in the small bowel noted during reoperation. The only specimen cultured is blood which grows *B. fragilis*. Because gastrointestinal tract infection (GIT) criterion 1 is met with the surgically-identified abscess alone and because *B. fragilis* is a logical pathogen for this site of infection, the BSI is considered secondary to a GIT and *B. fragilis* is listed as the GIT infection pathogen.

b. Example: Patient has a positive blood culture with *E. coli* proximal in time with fever, abdominal pain, and CT scan evidence of intraabdominal abscess (IAB). This patient meets IAB criterion 3c, which includes a positive blood culture as one of its elements. The BSI is considered secondary to the IAB and *E. coli* is listed as the IAB infection pathogen.
4. **Negative site-specific specimen culture with positive blood culture:**

In a patient suspected of having an infection, if a specimen from the suspected site of infection is cultured and yields no growth, but a blood specimen collected as part of the infection work-up is positive, that BSI is only considered a secondary BSI if another of the site-specific criteria that includes positive blood culture as an element is met. Otherwise, the BSI is considered a primary BSI, even if another criterion for that site is met and the blood isolate is a logical pathogen for the infection.

a. Example: Patient has purulent material from the IAB space cultured and it yields no growth. The patient also has fever, abdominal pain, a positive blood culture with *Pseudomonas aeruginosa*, and radiographic evidence of IAB infection. This patient does not meet IAB criterion 1 (positive culture from purulent material) but does meet IAB criterion 3c, an element of which is a positive blood culture (signs/symptoms plus positive blood culture plus radiographic evidence). This BSI is considered secondary to the IAB and *P. aeruginosa* is listed as the IAB infection pathogen.

b. Example: Postoperative knee replacement patient with a central line spikes a fever; blood and knee joint fluid are cultured. Only the blood cultures from at least two separate blood draws are positive for *S. epidermidis*. No other JNT infection criteria are met. This BSI should be reported as a CLABSI.

c. Example: Patient has a central line in place for 10 days. Patient complains of knee joint tenderness and limited range of motion. CT scan findings suggest joint (JNT) infection but culture of a needle-aspirated joint fluid is negative. However, a blood culture from the same time period grows *S. aureus*. While this patient does not meet JNT criterion 1 (positive joint fluid culture), he does meet JNT criterion 3d (signs/symptoms plus positive laboratory test on blood [blood culture]). Since a positive blood culture is part of the criterion met for JNT infection, this BSI is considered secondary to the JNT infection and not reported as a CLABSI. *S. aureus* is reported as the pathogen for the JNT infection.
A matching organism is defined as one of the following:

1. If genus and species are identified in both cultures, they must be the same. a. Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter cloacae* are matching organisms.

2. Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter aerogenes* are NOT matching organisms as the species are different.

3. If the organism is less definitively identified in one culture than the other, the identifications must be complementary.
   
   a. Example: A surgical wound growing *Pseudomonas* spp. and a blood culture growing *Pseudomonas aeruginosa* are considered a match at the genus level and therefore the BSI is reported as secondary to the SSI.
   
   b. Example: A blood culture reported as *Candida albicans* and a urine culture reported as yeast are considered to have matching organisms because the organisms are complementary, i.e. Candida is a type of yeast.

Notes:

1. If the blood isolate by itself does not meet BSI criteria (e.g., only one positive blood culture of a common commensal), then that isolate may not be used to indicate the presence of a secondary BSI (see example 1c).

2. Antibiograms of the blood and potential primary site isolates do not have to match.

3. Blood and site-specific specimens do not have to be collected on the same day but there must be evidence of infection at the specific site at the time of blood culture collection.

4. If a site-specific criterion requiring positive culture results is met, be sure to check the positive culture box when specifying the criteria used when adding the event, even if another criterion that does not include culture results is also met. For example, using the scenario in 2.a.i above, the following boxes for criteria used would be checked when entering the SSI into the NHSN application: fever, nausea, pain or tenderness, positive culture, positive blood culture, imaging test evidence of infection.
The goal of NHSN (CDC) infection site criteria is to identify and consistently categorize infections that are healthcare associated into major and specific infection sites or types. Several of the criteria include the caveat that signs, symptoms, and laboratory findings may not be related to infection at another site. When assessing positive blood cultures in particular, one must be sure that there is no other CDC defined primary source of HAI that may have seeded the bloodstream secondarily, otherwise the infection may be misclassified as a primary BSI or erroneously associated with the use of a central line.

If the CDC criteria for the remote infection require a culture, then the organism(s) cultured from that site must match the organism(s) in the blood culture. In instances where a culture of the involved site is not required for NHSN criteria, and no such culture is collected, it may be necessary to use clinical judgment regard in the likelihood of it causing a secondary bloodstream infection. In these instances, the following guidance may be used to help determine the relatedness of remote sources of infection to a positive blood culture:
INFECTION FOCUS IDENTIFICATION FLOW CHART

Positive blood culture

Does patient meet the criteria for HCAI at another site?

Community acquired or Healthcare associated infection?

Healthcare associated

Primary BSI

Community acquired

This community acquired infection with secondary BSI is excluded

Is blood isolate a common pathogen for this site?

NO

Site infection with secondary BSI

YES

Primary BSI
A. CASE IDENTIFICATION DATA

Name: ________________________________  RN: ________________________________
I/C or Passport No: _____________________  Gender: Male/ Female  Age: ______
Hospital: ______________________________  Department: _________________________
Ward: ________________________________  Date of Admission: _______________________

B. CLINICAL DATA

i. Clinical Diagnosis ________________________________

ii. Investigation criteria [V where appropriate]

a. ≥ 48 hours admission
b. Dialysis within 30 days
c. Surgery within 30 days
d. Ambulatory onco therapy within 30 days
e. Surgical implant within 1 year
f. Admission to ICU ≥ 24 hours
g. Newborn ≥ 24 hours
h. Case of antibiotic resistance
### ii. General predisposing risk factors [✓ where appropriate]

| a. Hematology condition                  |   |
| b. Oncology condition                    |   |
| c. Immunosuppressive therapy             |   |
| d. Parenteral nutrition                  |   |
| e. Solid organ transplant                |   |
| f. Prosthetic implant                    |   |
| g. Medical, surgical or anaesthetic procedure within 48 hours prior to BSI |   |
| h. No risk factor                        |   |

### iii. Type of devices used before the onset of BSI [✓ where appropriate]

<table>
<thead>
<tr>
<th>Device</th>
<th>Date of insertion</th>
<th>Location of insertion</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Intravascular device/catheter eg; CVC, Arterial / line, IV line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. On intravascular device eg; chest tube, CBD, PEG tube, peritoneal dialysis catheter</td>
<td></td>
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</tr>
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</table>

### iv. Antibiotic therapy given in the past 2 weeks [✓ where appropriate]

<table>
<thead>
<tr>
<th>No.</th>
<th>Name and Group of Antibiotic</th>
<th>Indication</th>
<th>Date commenced</th>
<th>Route of admission</th>
<th>Duration (days)</th>
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<tbody>
<tr>
<td></td>
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<td>Empirical</td>
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<td></td>
<td></td>
<td>Therapeutic</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Prophylaxis</td>
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C. MICROBIOLOGICAL DATA  (Please attach the relevant positive C&S report)

<table>
<thead>
<tr>
<th>Date of collection</th>
<th>Date of lab report</th>
<th>Organism isolated</th>
<th>Antibiotic susceptibility report</th>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D. OUTCOME DATA – at one month of diagnosis (Y for YES and N for NO)

- Alive: [ ]
- Died: [ ] BSI contributed to the death [ ]

Reported by:

Signature: _______________________________

Name and Designation:_____________________

Date:____________________________________
Blood Stream Infection Surveillance Reporting Form - Section A
(BSI/MOH/2013/2)

<table>
<thead>
<tr>
<th>Total no. of patient with BSI</th>
<th>#VALUE!</th>
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</thead>
<tbody>
<tr>
<td>BSI rate per 100 admissions</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>BSI rate per 1000 patient days</td>
<td>#VALUE!</td>
</tr>
</tbody>
</table>

1. Blood stream infection rate = \( \frac{\text{No. of patient with BSI}}{\text{Total admissions of the hospital in the month of survey}} \) \times 100

2. Blood stream infection rate = \( \frac{\text{No. of patient with BSI}}{\text{Total patient days of the hospital in the month of survey}} \) \times 1000

Signature : _______________________

Name and Designation : _______________________

Date : _______________________

Name and Designation : _______________________
### Blood Stream Infection Surveillance Reporting Form - Section B
(BSI/MOH/2013/3)

**MONTH OF SURVEY:** ____________________________________

**HOSPITAL:** ____________________________________

**Total admissions of the hospital in the month of survey:** ____________________________________

**Total patient days of the hospital in the month of survey:** ____________________________________

**Total no. of patient with BSI**

<table>
<thead>
<tr>
<th>Department</th>
<th>No. of patient</th>
<th>BSI per 100 admission</th>
<th>BSI per 1000 patient days</th>
</tr>
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<tbody>
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**Investigation Criteria**

<table>
<thead>
<tr>
<th>No. of patient</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>a. ≥ 48 hours admission</td>
<td>#DIV/0!</td>
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<tr>
<td>b. Dialysis within 30 days</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>c. Surgery within 30 days</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>d. Ambulatory oncology within 30 days</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>e. Surgical implant within 1 year</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>f. Admission to ICU ≥ 24 hours</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>g. Newborn ≥ 24 hours</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>h. Case of antibiotic resistance</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>i. Medical, surgical or anaesthetic procedure within 48 hours prior to BSI</td>
<td>#DIV/0!</td>
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</tbody>
</table>

**General Predisposing Factor**

<table>
<thead>
<tr>
<th>No. of patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Hematology condition</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>b. Oncology condition</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>c. Immunosuppressive therapy</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>d. Parenteral nutrition</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>e. Solid organ transplant</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>f. Prosthetic implant</td>
<td>#DIV/0!</td>
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<tr>
<td>g. No risk factor</td>
<td>#DIV/0!</td>
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</tbody>
</table>

**Indwelling Device**

<table>
<thead>
<tr>
<th>No. of patient</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>a. Intravascular catheter associated BSI</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>b. Non intravascular device associated BSI (eg, chest tube, CBD, PEG tube, peritoneal dialysis catheter)</td>
<td>#DIV/0!</td>
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</tbody>
</table>
### Antibiotic Therapy

<table>
<thead>
<tr>
<th>Group of Antibiotic</th>
<th>No. of Patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Aminoglycosides</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>b. Carbapenems</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>c. Cephalosporins</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>d. Penicillins</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>e. Vancomycin</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>f. B-lactam/B-lactamase inhibitor</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>g. Fluoroquinolones</td>
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### Indication of Antibiotic

<table>
<thead>
<tr>
<th>Indication</th>
<th>No. of Patient</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>a. Empirical</td>
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<tr>
<td>b. Therapeutic</td>
<td>#DIV/0!</td>
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<tr>
<td>c. Prophylaxis</td>
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### Duration of Antibiotic

<table>
<thead>
<tr>
<th>Duration</th>
<th>No. of Patient</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>a. Less than 3 days</td>
<td>#DIV/0!</td>
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<tr>
<td>b. 3 to 7 days</td>
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<td>c. More than 3 days</td>
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### Meet Local policy

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<thead>
<tr>
<th>Policy</th>
<th>No. of Patient</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>a. Yes</td>
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<tr>
<td>b. No</td>
<td>#DIV/0!</td>
<td></td>
</tr>
<tr>
<td>c. Not known</td>
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</tbody>
</table>

### Organism isolated

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<tr>
<th>Organism</th>
<th>No. of patient</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>MRSA</td>
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<tr>
<td>Staph. aureus</td>
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<tr>
<td>P.Aeruginosa</td>
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<tr>
<td>P.Aeruginosa</td>
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<tr>
<td>K.Pneumo</td>
<td>#DIV/0!</td>
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<tr>
<td>K.Pneumo</td>
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<tr>
<td>E.coli</td>
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<td>E.coli</td>
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<td>CN Staph</td>
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<tr>
<td>Acineto spp</td>
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<td>Acineto spp</td>
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<td>Enterobac gp</td>
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<tr>
<td>Others</td>
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1. Blood stream infection rate = \[
\frac{\text{No. of patient with BSI}}{\text{Total admissions of the hospital in the month of survey}} \times 100
\]

2. Blood stream infection rate = \[
\frac{\text{No. of patient with BSI}}{\text{Total patient days of the hospital in the month of survey}} \times 1000
\]

Signature : _______________________
Name and Designation : _______________________
Date : _______________________

---

24
### Line Listing for Blood Stream Infection Surveillance

**HOSPITAL:** 

**MONTH OF SURVEY:** 

<table>
<thead>
<tr>
<th>Case Identification Data</th>
<th>Clinical Data</th>
<th>Investigation criteria</th>
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<tbody>
<tr>
<td><strong>No.</strong></td>
<td><strong>Name</strong></td>
<td><strong>Department</strong></td>
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### Microbiological Data

<table>
<thead>
<tr>
<th><strong>Hematology condition</strong></th>
<th><strong>Oncology condition</strong></th>
<th><strong>Immunosuppressive therapy</strong></th>
<th><strong>Parenteral nutrition</strong></th>
<th><strong>Solid organ transplant</strong></th>
<th><strong>Prosthetic implant</strong></th>
<th><strong>No. risk factor</strong></th>
<th><strong>Intravascular catheter/device</strong></th>
<th><strong>Non-intravascular device</strong></th>
<th><strong>Group of Antibiotic</strong></th>
<th><strong>Date commenced</strong></th>
<th><strong>Indication</strong></th>
<th><strong>Duration</strong></th>
<th><strong>Date of lab report</strong></th>
<th><strong>Organism isolated</strong></th>
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</tbody>
</table>


4. CDC/NHSN Surveillance Definition of Healthcare-Associated Infection and Criteria for Specific Types of Infections in the Acute Care Setting, January 2013

5. CDC/NHSN Surveillance Definition of Healthcare-Associated Infection and Criteria for Specific Types of Infections in the Acute Care Setting, January 2014

6. NHSN Newsletter, May 2009

7. July 2013 CDC/NHSN Protocol Clarifications


9. Bloodstream infection surveillance module for rural hospitals and non acute settings.

10. Tasmanian Infection Prevention and Control Unit (TIPCU), Department of Health and Human Services, Tasmania, 2013