



12. Microorganisms isolated:

1. \_\_\_\_\_ 2. \_\_\_\_\_  
3. \_\_\_\_\_ 4. \_\_\_\_\_  
5. \_\_\_\_\_ 6. \_\_\_\_\_
- MRSA  
 VRE  
 ESBL

13. Criteria for diagnosis of CVC-BSI in this patient. Please check one:

1. Recognised pathogen cultured from one or more blood cultures, unrelated to infection at another site.
2. At least one of: fever >38°C, chills, hypotension (if aged < 1 yr: one of fever >38°C, hypothermia, apnea, or bradycardia) or signs of infection of catheter insertion site, tunnel or pocket  
AND  
Common skin contaminant (e.g. diphtheroids, *Bacillus* spp, *Propionibacterium* spp, coagulase negative staphylococci, micrococci) cultured from two or more blood cultures drawn on separate occasions.
3. At least one of: fever >38°C, chills, hypotension (if aged < 1 yr: one of fever >38°C, hypothermia, apnea, or bradycardia) or signs of infection of catheter insertion site, tunnel or pocket  
AND  
Common skin contaminant (as in 2 above) cultured from one blood culture from a patient with an intravenous line and the physician institutes appropriate antimicrobial therapy.

14. Outcome 4 weeks after enrollment (check one):

- Alive, in ICU
- Alive, in hospital, discharged from ICU       $\frac{\quad}{MM} / \frac{\quad}{DD} / \frac{\quad}{YY}$
- Discharged from hospital       $\frac{\quad}{MM} / \frac{\quad}{DD} / \frac{\quad}{YY}$
- Deceased       $\frac{\quad}{MM} / \frac{\quad}{DD} / \frac{\quad}{YY}$

15. Relationship of bloodstream infection to outcome (check one):

- a.  Alive, bloodstream infection resolved
- b.  Alive, bloodstream infection relapsed      Date:  $\frac{\quad}{MM} / \frac{\quad}{DD} / \frac{\quad}{YY}$
- c.  Died, unrelated to bloodstream infection
- d.  Died, directly related to bloodstream infection
- e.  Died, indirectly related to bloodstream infection
- f.  Died, unable to assess relation of death to bloodstream infection

16. Comments:

**Section B: Case-Control Study**

To be completed by all units participating in the case-control study (in addition to Section A)

*Part 1: Underlying health status*

17. Most responsible admission diagnosis: \_\_\_\_\_

18. Concurrent conditions (✓ all that apply):

- Acute renal failure
- AIDS
- Burn
- Cirrhosis
- Community-acquired bacteremia
- Community-acquired pneumonia
- Congestive heart failure
- COPD
- Diabetes mellitus
- Dialysis-dependent CRF
- Haematopoietic stem cell transplants
- Hepatic failure
- HIV
- Ischemic heart disease
- Leukemia/multiple myeloma
- Lymphoma
- Metastatic cancer
- Neuromuscular disease
- Non-metastatic cancer
- Solid organ transplant
- Stroke with deficit
- Trauma
- Other (specify): \_\_\_\_\_

19. Weight (kg): \_\_\_\_\_ (*pediatric patients only*)

*Part 2: Factors related to hospitalisation*

20. Surgery during admission and prior to enrollment:  No  Yes

21. If yes, number of surgeries: \_\_\_\_\_ Date of most recent surgery: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
MM DD YY

22. Date of admission to ICU: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
MM DD YY

23. Patient had a CVC-related BSI during admission or HSCT and prior to enrollment:

No  Yes. If yes:

CVC-BSI 1 Date:      /      /       
MM DD YY

CVC-BSI 2 Date:      /      /       
MM DD YY

CVC-BSI 3 Date:      /      /       
MM DD YY

24. Patient had a non-CVC related BSI during admission or HSCT and prior to enrollment:

No  Yes. If yes:

non-CVC-BSI 1 Date:      /      /       
MM DD YY

non-CVC-BSI 2 Date:      /      /       
MM DD YY

non-CVC-BSI 3 Date:      /      /       
MM DD YY

25. Patient has a documented infection with another organism at another site at the time of enrollment:  No  Yes. If yes:

- UTI
- Pneumonia
- Skin and soft tissue
- Intraabdominal
- CDAD
- Other (specify) \_\_\_\_\_

*Part 2a: HSCT patients only*

26. Indication for HSCT:

- Acute myelogenous leukemia
- Chronic myelogenous leukemia
- Hodgkins lymphoma
- Multiple myeloma
- Neuroblastoma
- Aplastic anemia
- Acute lymphocytic leukemia
- Chronic lymphocytic leukemia
- non-Hodgkins lymphoma
- Other hematological malignancy
- Other non-hematological malignancy
- Immunodeficiency syndrome (specify) : \_\_\_\_\_
- Other (specify): \_\_\_\_\_

27. Date of HSCT:      /      /       
MM DD YY

28. Source of HSCT:

- Autologous
- Allogeneic - related
- Allogeneic – unrelated

29. Type of HSCT infused:
- Cord blood
  - Peripheral blood
  - Bone marrow
30. Conditioning regimen prior to HSCT:
- BU-CY
  - CY-TBI
  - Other (specify): \_\_\_\_\_
31. Antibacterial prophylaxis:       No       Yes    with  TMP-SMX (Bactrim), and/or  
 fluoroquinolone, and/or  other (specify): \_\_\_\_\_
32. Antifungal prophylaxis:       No       Yes    with  fluconazole, or  
 voriconazole, or  other (specify) \_\_\_\_\_
33. Date of neutropenia:        /        /         
                                  MM      DD      YY
34. Date of resolution of neutropenia:        /        /         
  MM      DD      YY
35. Number of days absolute neutrophil count < 100: \_\_\_\_\_
36. Received GVHD prophylaxis:       No       Yes
37. Does the patient have graft versus host disease (GVHD):     No       Yes
38. This bloodstream infection occurred in the:  outpatient setting     inpatient setting  
 home setting

*Part 2b: Neonatal Intensive Care Unit patients only*

39. Gestational age in weeks: \_\_\_\_\_
40. Premature rupture of membranes:     No       Yes       Unknown
41. Mode of delivery:       Vaginal     C/S     Unknown
42. Apgar score (5 min.): \_\_\_\_\_

Part 3: Factors related to CVCs

43. CVC devices at time of enrollment (✓ all that apply and when inserted):

Line	Insertion date MM/ DD/ YY
PICC	
Tunnelled	
Non-tunnelled	
Umbilical – artery	
Umbilical – vein	
Pulmonary Artery Catheter	
ECMO	
Other (specify)	

Part 4: Factors related to bloodstream infection (cases only)

44. Infection of:      Site:             No             Yes  
                                  Tunnel:         No             Yes  
                                  Pocket:        No             Yes

45. Response to bloodstream infection:

Line	Removal date MM/DD/YY	O-T-W change date MM/ DD/ YY
PICC		
Tunnelled		
Non-tunnelled		
Umbilical – artery		
Umbilical – vein		
Pulmonary Artery		
ECMO		
Other (specify)		

46. Bloodstream infection microbiology results:

Antimicrobial	Organism 1		Organism 2		Organism 3	
	S	R	S	R	S	R
amikacin						
ampicillin						
cefazolin						
cefepime						
cefixime						
cefotaxime/ ceftriaxone						
cefoxitin						
cefuroxime						
ceftazidime						
ciprofloxacin						
clindamycin						
cloxacillin						
gatifloxacin						
gentamicin						
imipenem						
levofloxacin						
meropenem						
metronidazole						
moxifloxacin						
penicillin						
piperacillin						
pip/tazobactam						
ticar/clav						
TMP-SMX						
tobramycin						
vancomycin						
other (specify)						

47. Empiric antimicrobial(s):

Drug	Route	Dose	Start	Stop
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u> MM DD YY	<u>  </u> / <u>  </u> / <u>  </u> MM DD YY
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>

48. Definitive antimicrobial(s):

Drug	Route	Dose	Start	Stop
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u> MM DD YY	<u>  </u> / <u>  </u> / <u>  </u> MM DD YY
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>
_____	_____	_____	<u>  </u> / <u>  </u> / <u>  </u>	<u>  </u> / <u>  </u> / <u>  </u>

Part 5. Vital signs and laboratory values:

49. Severity of illness score on admission to ICU:

- APACHE: value: \_\_\_\_\_
- PRISM: value: \_\_\_\_\_
- SNAP-II: value: \_\_\_\_\_
- Not available

50.

Parameter	On admission to unit	At enrollment
total WBC		
ANC		
platelets		
hemoglobin		
hematocrit		
Na <sup>+</sup>		
glucose		
BUN		
creatinine		
albumin		
total bilirubin		

Completed by:

Date: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
MM DD YY



11. Was the patient fully (head to foot) draped for the line insertion?    Y    N
12. Was a sterile field maintained throughout the line insertion?        Y    N

**CVC Maintenance/Care Checklist (for hematopoietic stem cell transplant patients only)**  
**Page 1 of 1**

CHEC site (1A, 16, 21D, etc): \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
 MM DD YY

**Note: On this form, "CVC" refers to tunnelled and non-tunnelled central venous catheters, including PICC lines.**

**Data on maintenance/ care of PACs is not to be collected.**

1. Information collected by:  
 \_\_\_\_\_ ICP \_\_\_\_\_ unit nurse \_\_\_\_\_ research personnel \_\_\_\_\_ other
2. The type of catheter for which care was provided:  
 \_\_\_\_\_ non-tunnelled CVC \_\_\_\_\_ tunnelled CVC \_\_\_\_\_ PICC
3. Line maintenance/care performed by dedicated HSCT personnel: Y N
4. Gloves were worn by the person performing line maintenance/care: Y N  
 If yes, the gloves were \_\_\_\_\_ sterile \_\_\_\_\_ non-sterile, clean
5. The person performing line maintenance/care wore a mask: Y N
6. The patient wore a mask: Y N
7. Other people in the room wore a mask: Y N
8. The line dressing was checked for integrity: Y N  
 If yes, the dressing was \_\_\_\_\_ intact \_\_\_\_\_ damp, loosened, or visibly soiled
9. The entry site was checked for inflammation or drainage: Y N  
 If yes, the site was (check all that apply):  
 \_\_\_\_\_ clean  
 \_\_\_\_\_ red  
 \_\_\_\_\_ drainage: specify appearance \_\_\_\_\_ serous \_\_\_\_\_ bloody \_\_\_\_\_ purulent
10. A dedicated lumen has been used for TPN for this patient: Y N
11. The lumens were accessed aseptically (70% alcohol or iodophor): Y N
12. A topical antibiotic was applied to the site: Y N
13. The CVC site was covered: Y N  
 If yes, with \_\_\_\_\_ gauze \_\_\_\_\_ semipermeable dressing \_\_\_\_\_ both  
 \_\_\_\_\_ other, specify \_\_\_\_\_
14. The dressing was changed according to unit protocol: Y N
15. The tubing was changed according to unit protocol: Y N

## Algorithm for selecting HSCT control patients

1. At 90 days after the date of the case's bacteremia, examine the line list of all HSCT patients included in the CVC-associated BSI surveillance project.

2. Patient had a nosocomial bacteremia (1° or 2°) during the 90 days post-transplantation:

↓  
**No**                      ↓  
**Yes** → **Stop** → Patient is not eligible

3. Patient has as many days post-HSCT as the case patient had before his/her bacteremia:

↓  
**Yes**                      ↓  
**No** → **Stop** → Patient is not eligible; repeat steps 2 & 3.

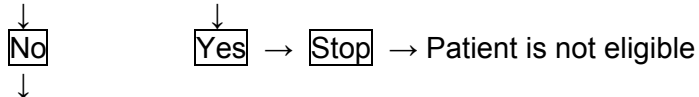
↓  
**Stop** → You have found an eligible control patient

HSCT patients who develop a CVC-associated BSI in a critical care unit are included in the HSCT case-control study and not the critical care unit study.

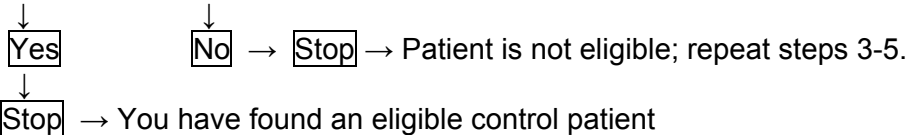
## Algorithm for selecting control patients in critical care

1. For each bacteremia patient, identify the unit he/she is on at onset of the bacteremia.
2. Make a list of, or note on your surveillance line list, all patients in that unit on the day of the patient's bacteremia. This is the list of eligible control patients.
3. 4 weeks after the date of the case's bacteremia, go back to the list to identify one control patient:

4. Patient had a nosocomial bacteremia (1° or 2°) during this admission:



5. Patient was in the unit with a central venous catheter at least the same length of time as the case patient was before his/her bacteremia:



### Notes:

- \* A case patient cannot be a control patient on the same hospital admission.
- \* A control patient may become a case patient if he/she develops a bacteremia after the 28 days period of followup that he/she was a control.
- \* Preferably, a control patient will be a control for only 1 case patient. If a control patient is chosen as a control for a second time, it should only be where there is a different ICU admission. This should be discussed first with the principal investigator (PI) or senior epidemiologist (SE).
- \* Do not collect data on a case patient for whom there is no control until discussed with the PI or SE.
- \* HSCT patients in a critical care unit when they become bacteremic will not be entered into the CVC case-control study. They will be part of the HSCT case-control study.

**Process of Care Form**

**Note: On this form, “CVC” refers to non-tunneled central venous catheters, including PICC lines.**

Unit type (circle one):            MICU, SICU M/SICU, NeuroICU, M/S/NeuroICU, CVICU, CCU, Trauma,  
    Pediatric ICU, Neonatal ICU, HSCT, other \_\_\_\_\_

**Form A: Medical Staff and CVC Insertion Procedures**

To be completed by CNISP ICP or MD with input by physician medical director or nurse manager of unit.

1. Information provided by:  
       \_\_\_\_\_ Physician    \_\_\_\_\_ Nurse manager    \_\_\_\_\_ Both
  
2. Unit medical staff type (select one):  
       \_\_\_\_\_ open (housestaff follows patients from floor to unit)  
       \_\_\_\_\_ closed (dedicated Unit physician staff)  
       \_\_\_\_\_ mixed (some patients covered by a dedicated unit staff and some covered by individual physicians or floor teams)  
       If closed, approximate or average number of physicians assigned per month:  
           Attending staff \_\_\_\_\_    Fellows \_\_\_\_\_    Residents \_\_\_\_\_  
           Interns \_\_\_\_\_
  
3. Among patients in your unit with non-tunneled CVCs during the past 3 months, approximately what percent of the CVCs were inserted in the following locations (best estimate):
 

In your unit	0	<25	25-50	51-75	76-99	100%
In surgery/OR	0	<25	25-50	51-75	76-99	100%
In radiology	0	<25	25-50	51-75	76-99	100%
In emergency dept	0	<25	25-50	51-75	76-99	100%
Other, specify: _____	0	<25	25-50	51-75	76-99	100%
  
4. Of the non-tunneled CVCs inserted in your unit in the past 3 months, approximately what percentage were inserted by (best estimate):
 

Nurse Practitioner	0	<25	25-50	51-75	76-99	100%
Physician Assistant (MD)	0	<25	25-50	51-75	76-99	100%
Intern (PGY1)	0	<25	25-50	51-75	76-99	100%
Resident (>PGY1)	0	<25	25-50	51-75	76-99	100%
Fellow	0	<25	25-50	51-75	76-99	100%
Teaching attending	0	<25	25-50	51-75	76-99	100%
Private attending	0	<25	25-50	51-75	76-99	100%
Hospitalist/Intensivist	0	<25	25-50	51-75	76-99	100%
Other: _____	0	<25	25-50	51-75	76-99	100%

5. Frequency of formal\* education provided to medical housestaff on CVC insertion:  
 never \_\_\_\_\_ once a year \_\_\_\_\_ every mos. \_\_\_\_\_ every new team \_\_\_\_\_
- a. If education is provided, please describe what form of education is used:
- |                        |       |   |
|------------------------|-------|---|
| Didactic/lectures      | Y     | N |
| Practice on mannequins | Y     | N |
| Self-study modules     | Y     | N |
| Web-based learning     | Y     | N |
| Other(please specify): | _____ |   |

\* Formal education defined as at least ½ hour devoted specifically to teaching insertion of central venous catheters. Does not include teaching performed incidentally on rounds or during patient care.



9. Approximately what percent of time were the following used during the insertion of CVCs?
- |                               |   |     |       |       |       |      |            |
|-------------------------------|---|-----|-------|-------|-------|------|------------|
| a. Full body sterile drapes   | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
| b. Sterile drapes < full body | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
| c. Sterile gowns              | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
| d. Sterile gloves             | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
| e. Surgical mask              | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
| f. Cap                        | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
10. Approximately what percent of the time were antimicrobial-coated CVCs inserted?
- |  |   |     |       |       |       |      |            |
|--|---|-----|-------|-------|-------|------|------------|
|  | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% | Don't know |
|--|---|-----|-------|-------|-------|------|------------|



- b. If formal education is provided, please describe what form of training is used:
- |                         |       |   |
|-------------------------|-------|---|
| Didactic/lectures       | Y     | N |
| Practice on mannequins  | Y     | N |
| Self-study modules      | Y     | N |
| Web-based learning      | Y     | N |
| Other (please specify): | _____ |   |

- c. If formal education is provided, is there a policy on how often it must be performed?
- |   |   |     |
|---|---|-----|
| Y | N | N/A |
|---|---|-----|

9. In patients with non-tunneled CVCs who have blood cultures drawn (best estimate):
- |    |   |   |     |       |       |       |      |
|----|---|---|-----|-------|-------|-------|------|
| a. | Approximately what percent of blood cultures are drawn through the CVC (as opposed to through a peripheral venipuncture)? | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% |
| b. | Approximately what percent of the time are $\geq 2$ blood cultures obtained during the first 24 hours after a fever?      | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% |
| c. | When a bloodstream infection is suspected, how often is more than one blood culture obtained?                             | 0 | <25 | 25-50 | 51-75 | 76-99 | 100% |

**Written Policies Used in the Unit**

This will be completed by the CVC-BSI Study Principal Investigator using a written copy of the unit policies and procedures. Please submit all unit policies and procedures that relate to the insertion (eg. preferred access site, hand hygiene, drapes and barriers, etc.), care (eg. antimicrobial ointments, dressing type, dressing changes, etc.), catheter exchange (eg. how often, how, etc.), catheter type (eg. antimicrobial or antiseptic coated/impregnated, etc), line use for TPN, and line use for blood drawing in the units for which you are doing surveillance. If each unit has its own policy and procedure, please send all that are used. If there is only one policy and procedure that applies to several units, please indicate this on the submitted policies and procedures.