

Canadian Nosocomial Infection Surveillance Program (CNISP)

2017 Surveillance Protocol for Vancomycin Resistant *Enterococci* (VRE) in CNISP Healthcare Facilities

December 29, 2016
FINAL

Working Group:

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Please enter/upload case forms to www.cnphi-rcrsp.ca or send data by email to cnisp.pcsin@phac-aspc.gc.ca or by fax to 613-946-0678

Direct questions to:

Public Health Agency of Canada

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INTRODUCTION

Enterococci are bacteria that live in the human intestine, in the female genital tract and are often found in the environment. Generally these bacteria do not cause illness. Vancomycin-resistant *Enterococci* (VRE) are strains of enterococci that are resistant to the antibiotic vancomycin. A person with VRE who has symptoms (e.g. an infection of the urinary tract or bloodstream) is infected with VRE.

VRE infections occur most commonly among people in hospitals with weakened immune systems; those who have been previously treated with vancomycin or other antibiotics for long periods of time; those who have undergone surgical procedures and those with medical devices such as urinary catheters are at a higher risk of becoming infected with VRE.

VRE is usually spread from person to person by direct contact or by contact with contaminated surfaces. VRE can be present on environmental surfaces or on the hands of caregivers after contact with other people with VRE or after touching surfaces or objects contaminated with VRE (e.g. toilet seats, bedrails, door handles, soiled linens, stethoscopes etc.)

To diagnose a VRE infection, an appropriate sample is taken from the patient. Once the sample has been taken, the organism must be allowed to grow in the laboratory. If the organism tests positive for VRE, it is then tested to determine which antibiotics may be effective for treating the infection. VRE infections can be treated with a limited choice of antibiotics other than vancomycin.

OBJECTIVES

1. To determine the incidence of VRE infections among CNISP hospitals.
2. To provide a Canadian benchmark for VRE infections.
3. To describe the epidemiology of VRE infections.
4. To characterize the susceptibility profile and molecular subtype of VRE bloodstream infection (BSI) isolates by Canadian region.

METHODOLOGY

a) *Surveillance period*

The surveillance period is from January 1, 2017 to December 31, 2017.

b) Inclusion criteria

- Isolation of *Enterococcus faecalis* or *faecium*

AND

- Vancomycin MIC \geq 8 ug/ml

AND

- Patient is admitted to the hospital

AND

- Is a "newly" identified VRE infection at a CHEC facility at the time of hospital admission or identified during hospitalization

VRE infection is determined using the January 2015 CDC NHSN definitions/criteria for infections¹. These criteria should be met at the time of the culture that yielded VRE, or within 72 hours of the culture. The NHSN definitions/criteria can be accessed at URL:

www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf

c) Infection case definition

For each **VRE infected** case that meets the case definition, a '**Patient Questionnaire**' (Appendix 2) should be completed by reviewing the patients' chart and reported to the Agency. Data should be submitted through CNPHI. Note: a patient questionnaire is only to be completed for infections.

All participating sites are expected to send one clinical isolate from each infected patient in a timely fashion to the National Microbiology Laboratory (NML) (see page 4-5 for laboratory reporting instructions).

Exclusion criteria

- Previously identified at other CHEC sites (to avoid duplicate reporting to CNISP)
- Identified through emergency (non-admitted patients), clinic, or other outpatient areas
- Re-admitted with VRE (**UNLESS** it is a different strain)

An algorithm for VRE surveillance is provided in Appendix 1.

d) Denominator data

¹ In situations where the infection does not meet the NHSN definitions/criteria for infections, please use in accordance with the best judgment of the healthcare and/or IPC practitioner.

Denominator data will be collected on the quarterly denominator form.

The data collected will include:

1. total number of hospital admissions per year
2. total number of inpatient-days per year

DATA REPORTING

Patient questionnaire data (Appendix 2) should be entered or uploaded on-line through CNPHI at www.cnphi-rcrsp.ca or sent by email or fax on a quarterly basis. To obtain a username and password , if you require training on how to enter data into CNPHI, or have questions regarding the protocol please contact CNISP at cnisp.pcsin@phac-aspc.gc.ca.

LABORATORY REPORTING

All participating sites are expected to send one clinical isolate from each infected patient in a timely fashion to the National Microbiology Laboratory (NML).

- Please do not send isolates for colonized patients
- Multiple samples are not required, regardless of the number of anatomical sites infected with VRE

Every shipment must include the standard shipping form (Appendix 4). Always notify the NML when specimens are being sent.

Instructions for submitting laboratory specimens

Vancomycin-resistant *E. faecium* and *E. faecalis* isolated from an infection will be identified by the submitting lab's preferred methods (e.g. grows on a VRE screen plate and identified by phenotypic methods).

The isolate in pure culture and properly labelled with a CHEC number (in indelible ink/marker) should be stored by an appropriate method (i.e. swab at 4°C, cryobeads or glycerol stock at -20°C). Isolates can be stockpiled for bulk shipment to the NML.

Unique patient ID must use the following syntax:

Site number (alphanumeric) e.g. 01A, year (2 digits) e.g. 17, strain number (3 digits) e.g. CHEC #, would be 01A-17-001.

Note: The unique patient ID for the isolate must match the unique patient ID on the corresponding submitted VRE questionnaire.

Isolates should be sent to the following address:

Dr. George Golding

National Microbiology Laboratory

1015 Arlington St.

Winnipeg, Manitoba, R3E 3R2

Tel: 204-789-2133

Use FedEx billing number: 2299-8435-7

DATA ANALYSIS

Regional and national infection rates (per 1,000 admissions and per 10,000 inpatient-days) will be calculated each year by Agency staff. Rates will be reported through Agency surveillance reports, presentations, publications, and published on the Agency and/or AMMI website.

ETHICS

While this surveillance project is observational and does not involve any alteration in patient care, ethics approval may be sought at some hospital sites. Surveillance for healthcare-associated infections is a routine component of quality assurance and patient care in Canadian healthcare institutions and therefore informed consent is not required. A unique identifier linked to patient name will only identify patients at the local CHEC site and is not transmitted to the Agency. All data submitted to the Agency is kept strictly confidential.

Attached Appendices:

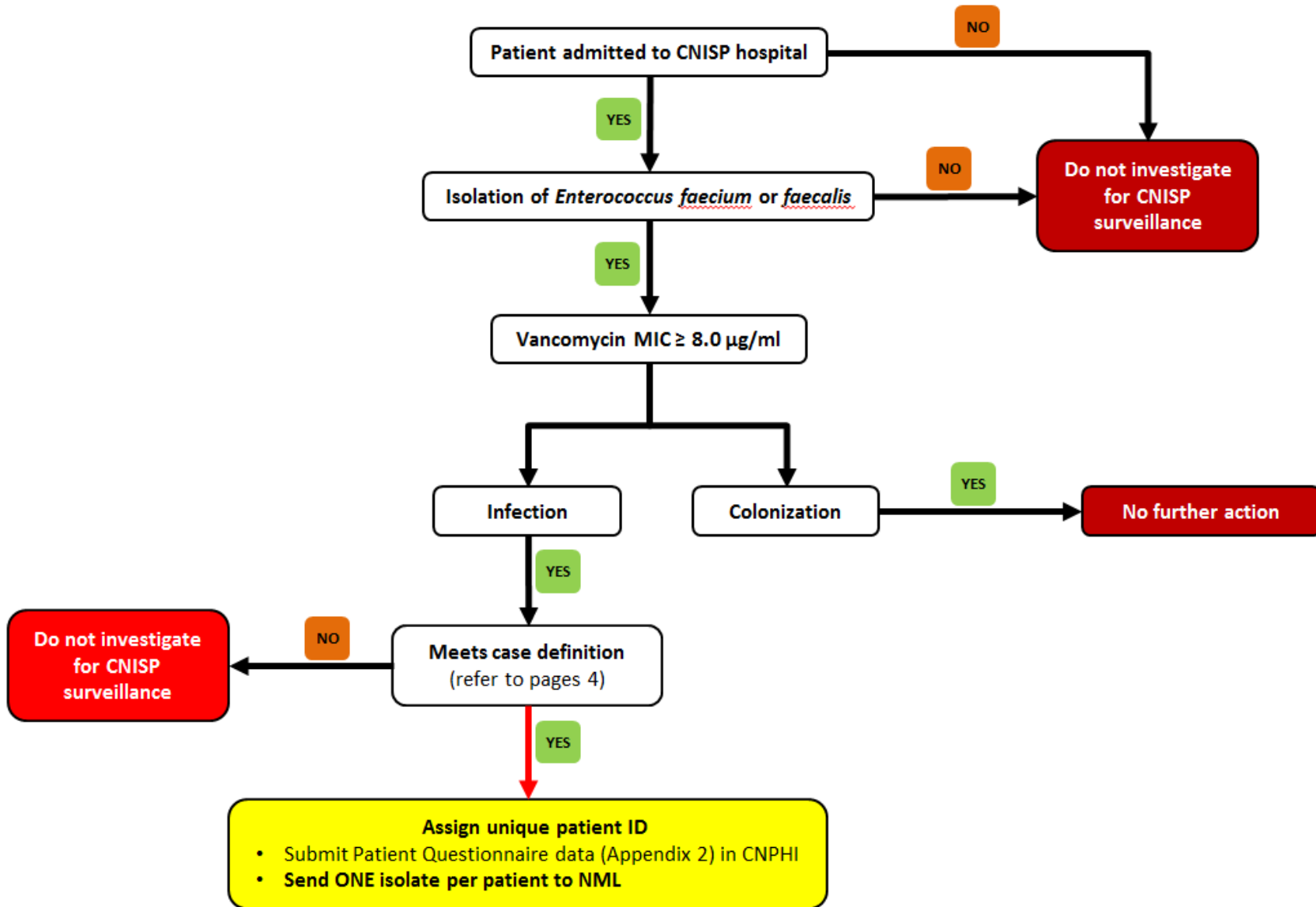
Appendix 1 Algorithm for 2017 VRE surveillance

Appendix 2 2017 VRE patient questionnaire

Appendix 3 Data dictionary for VRE patient questionnaire

Appendix 4 CNISP VRE 2017 Surveillance: Standard Laboratory Shipping Form

APPENDIX 1 – Algorithm for 2017 VRE Surveillance





Appendix 2 - 2017 VRE Infections Patient Questionnaire

Please note: this form is only to be completed for infections

| | | | | | | | | | |
|--|--|--------------------------|------------------------------------|--------------------------|--|--------------------------|------------------------------------|--------------------------|----------------------------|
| 1. Does this patient meet the criteria for a VRE infection ² ? | | | | | | | | | |
| <input type="checkbox"/> Yes – If yes, please complete the remainder of the questionnaire. <input type="checkbox"/> No – If no, do NOT complete this questionnaire. | | | | | | | | | |
| 2. CHEC Site: _____ | | | | | | | | | |
| 3. Unique Patient ID | _____ 17 _____ <small>(CHEC site #) (year) (case number)</small> | | | | | | | | |
| 4. Date of birth | ____/____/____ OR Age ____ <small>(dd/mmm/yyyy) e.g. 17/Jan/1967</small> <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Days | | | | | | | | |
| 5. Gender | <input type="checkbox"/> Male <input type="checkbox"/> Female | | | | | | | | |
| 6. Date of admission | ____/____/____ <small>(dd/mmm/yyyy) e.g. 17/Sept/2017</small> | | | | | | | | |
| 7. Date of patient's positive culture | ____/____/____ <small>(dd/mmm/yyyy) e.g. 01/Oct/2017</small> | | | | | | | | |
| 8. Site of positive culture (check all that apply): | | | | | | | | | |
| <input type="checkbox"/> Blood – if yes, please indicate if: <table style="display: inline-table; vertical-align: top; margin-left: 20px;"> <tr><td><input type="checkbox"/></td><td>BSI – line related, CVC associated</td></tr> <tr><td><input type="checkbox"/></td><td>BSI – line related, non-CVC associated</td></tr> <tr><td><input type="checkbox"/></td><td>BSI – bacteremia, not line related</td></tr> <tr><td><input type="checkbox"/></td><td>Source/site of BSI unknown</td></tr> </table> | | <input type="checkbox"/> | BSI – line related, CVC associated | <input type="checkbox"/> | BSI – line related, non-CVC associated | <input type="checkbox"/> | BSI – bacteremia, not line related | <input type="checkbox"/> | Source/site of BSI unknown |
| <input type="checkbox"/> | BSI – line related, CVC associated | | | | | | | | |
| <input type="checkbox"/> | BSI – line related, non-CVC associated | | | | | | | | |
| <input type="checkbox"/> | BSI – bacteremia, not line related | | | | | | | | |
| <input type="checkbox"/> | Source/site of BSI unknown | | | | | | | | |
| <input type="checkbox"/> Surgical wound | | | | | | | | | |
| <input type="checkbox"/> Other skin or soft tissue/burn | | | | | | | | | |
| <input type="checkbox"/> Other sterile site (e.g. CSF, pleural) (please specify) _____ | | | | | | | | | |
| <input type="checkbox"/> Urine | | | | | | | | | |
| <input type="checkbox"/> Other (please specify) _____ | | | | | | | | | |

² VRE infection is determined using the April 2015 CDC/NHSN surveillance definitions for specific infections. The NHSN definitions/criteria can be accessed at URL: www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf.



9. Where was this VRE infection acquired? (Check one response only)

- Healthcare-associated (acquired in your facility)
- Healthcare-associated (acquired in any other healthcare facility or setting)³
- Community-associated⁴
- Unknown

Note: The following questions are only to be completed if the site of positive culture was **BLOOD** (question 7 above).

10. Was the patient receiving any of the following treatments at the time of positive blood culture?

Check **all** that apply

- Chemotherapy
- Radiation therapy
- Hemodialysis
- Peritoneal dialysis
- Hemodialysis
- Unknown

11. Did the patient have a central venous catheter⁵ at the time of positive blood culture?

- Yes
- No
- Unknown

12. Was the patient a bone marrow or stem cell transplant recipient?

- Yes, please specify date of procedure: ____/____/____
(dd/mmm/yyyy) e.g. 01/Oct/2017
- No
- Unknown

13. Was the patient a solid organ transplant recipient?

- Yes, please specify date of procedure: ____/____/____
(dd/mmm/yyyy) e.g. 01/Oct/2017
- No
- Unknown

³ Healthcare associated (acquired in other health care facility or setting) = Exposure to any healthcare setting (including other acute-care, long-term care, psychiatric, or rehabilitation facility or clinic (dialysis, outpatient) in the previous 12 months. Consideration should be given to the frequency and nature of exposure to a healthcare setting. For example, pediatric patients with clinic visits in the previous 12 months may or may not be considered as HA.

⁴ Community-associated = Has no previous history of the organism and has no healthcare facility or setting admission in the past 12 months and has no reported use of medical devices.

⁵ Central Venous Catheter (CVC) include non-tunneled (standard) CVC, coated or not, peripherally inserted CVC (PICC), tunneled devices (e.g. Broviac, Hickman), tunneled haemodialysis line, intra-cardiac catheters such as intra-arterial & ventricular lines, dual function lines such as temperature/venous catheters e.g. Cool line catheters, Quattro catheters, introducers etc.), pulmonary catheters, umbilical artery and vein catheters and implanted catheters (including ports).



14. Please indicate which treatment the patient received for the VRE BSI (please check all that apply):

- Linezolid
- Daptomycin
- Tigecycline
- Other, please specify: _____
- None

15. Please indicate which antimicrobials the patient received 30 days prior to their positive blood culture (please check all that apply):

- Vancomycin
- Fluoroquinolones
- Cephalosporins
- Carbapenems
- Penicillins
- Macrolides
- Linezolid
- Daptomycin
- Other, please specify: _____
- None
- Data not available

16. Was the patient admitted to an ICU within 30 days of positive blood culture?

- Patient was already in an ICU at the time the positive blood culture was obtained
- Yes, please indicate the date of ICU admission: ____/____/____
(dd/mmm/yyyy) e.g. 01/Oct/2017
- No
- Unknown

17. What was the outcome at 30 days from the date of positive blood culture?

- Patient discharged or transferred alive, please specify date: ____/____/____
(dd/mmm/yyyy) e.g. 01/Oct/2017
- Patient still alive and in hospital
- Patient died, please specify date: ____/____/____
(dd/mmm/yyyy) e.g. 01/Oct/2017
- Unknown



APPENDIX 3 – Data dictionary for VRE patient questionnaire

1. Does this patient meet the criteria for a VRE INFECTION?

VRE infection is determined using the April 2015 CDC/NHSN surveillance definitions for specific infections. In situations where the infection does not meet the NHSN definitions/criteria for infections, please use in accordance with the best judgment of the healthcare and/or IPC practitioner. The NHSN definitions/criteria can be accessed at URL:

www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf

If the patient meets the criteria for infection, please complete the remainder of this questionnaire.

If the case does NOT meet the criteria for infection, please do NOT complete this questionnaire.

2. CHEC Site

This will be the **3-character** alphanumeric number assigned to your institution. It will always begin with the two digit number assigned to your CHEC member e.g., 07, 15, and a letter assigned by the CHEC member for that specific institution e.g., A, B, C, etc. The CHEC site # for each institution should always be the same for all the CHEC/CNISP surveillance projects and will always have all three alphanumeric digits reported as the CHEC site #, e.g., 07A, 15A.

3. Unique patient identifier

This 10 character code should consist of the 3 character CHEC site # (e.g., 09A), the surveillance year the infection occurred in (e.g., 17), and a consecutive number starting at 001 and continuing on with each additional case. An example of the first case in an institution would be 09A-17-001. An example of the thirty-fifth case would be 09A-17-035, and so on.

Note: Always label the laboratory isolate with this **same** unique patient ID.

4. Date of birth

Please enter Day (##), Month (May) and Year (1973) in this order. If the date of birth is not available please enter the patient's Age (in years, months or days) at the time of positive culture.

5. Gender

Check male or female as appropriate.

6. Date of admission

Indicate the date when the patient was admitted to the hospital.

7. Date of this patient's positive culture

For the current admission, please indicate when the positive culture for VRE was obtained.

8. Site of positive culture

Please indicate the site of infection from which the positive culture was obtained.

BSI – line related, CVC associated

A laboratory-confirmed bloodstream infection where a central venous catheter (CVC) or umbilical catheter (UC) was in place for >2 calendar days on the date of the positive blood culture, with day of device placement being Day 1.

AND



A CVC or UC was in place on the date of the positive blood culture or the day before. If a CVC or UC was in place for >2 calendar days and then removed, the BSI criteria must be fully met on the day of discontinuation or the next day.

BSI – line related, non CVC associated

A laboratory-confirmed bloodstream infection where a line other than a central venous catheter (CVC) (e.g. intra-vascular catheter) was in place for >2 calendar days on the date of the positive blood culture, with day of device placement being Day 1.

AND

A line other than a CVC (e.g. intra-vascular catheter) was in place on the date of the positive blood culture or the day before. If the line was in place for >2 calendar days and then removed, the BSI criteria must be fully met on the day of discontinuation or the next day.

BSI – bacteremia, not line related

A laboratory-confirmed bloodstream infection with compatible clinical features for another site of infection

AND

VRE needs to be cultured from that site (e.g. urinary infection, intra-abdominal infection, biliary infection, wound infection or endocarditis).

Source/site of BSI unknown

Not meeting any of the criteria for primary or secondary bacteremia

Surgical Wound

As per the NHSN definitions for Surgical Site Infections

<https://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf?agree=yes&next=Accept>

Urine

Positive urine culture with no more than two species of organisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml. All elements of the UTI criterion must occur during the infection window period.

At least **one** of the following signs or symptoms:

- Any patient ≤ 65 years of age:
 - Fever $>38^{\circ}\text{C}$
 - Suprapubic tenderness⁶
 - Costovertebral angle pain⁶
 - Urgency⁷
 - Frequency⁷
 - Dysuria⁷
- Any patient ≤ 1 year of age:
 - Fever $>38^{\circ}\text{C}$
 - Hypothermia ($<36^{\circ}\text{C}$)
 - Suprapubic tenderness⁶
 - Costovertebral angle pain⁶
 - Apnea⁶
 - Bradycardia⁶
 - Lethargy⁶

⁶ With no other recognized cause.

⁷ These symptoms cannot be used when catheter is in place.



- Vomiting⁶

9. Source of acquisition

Please indicate whether the infection was acquired in a healthcare setting or in the community according to the following definitions. If the source of acquisition cannot be determined, the VRE case may be reported as unknown.

Healthcare-associated is defined as inpatient who meets the following criteria:

- Exposure to any healthcare setting (including long-term care facilities or clinics) in the previous 12 months

OR

- Has been hospitalized for greater than 48 hours

Healthcare associated (acquired in other health care facility or setting) is defined as exposure to any healthcare setting (including other acute-care, long-term care, psychiatric, or rehabilitation facility or clinic (dialysis, outpatient) in the previous 12 months. Consideration should be given to the frequency and nature of exposure to a healthcare setting. For example, pediatric patients with clinic visits in the previous 12 months may or may not be considered as HA.

Community-associated is defined as an inpatient who meets ALL of the following criteria:

- Has been hospitalized for less than 48 hours
AND
- Has no previous history of the organism under surveillance
AND
- Has no prior hospital or long-term care admission in the past 12 months
AND
- Has no reported use of medical devices

Note: The following questions (Q9-Q18) are only to be completed if the site of positive was **BLOOD** (question 7).

10. Receiving treatment at the time of positive blood culture

Please indicate if the patient was receiving any of the following treatments: chemotherapy, radiation therapy, hemodialysis, peritoneal dialysis at the time of positive blood culture.

11. Patient with central venous catheter (CVC) at the time of positive blood culture

Please indicate if the patient has CVC at the time of positive blood culture. Central Venous Catheter (CVC) refers to non-tunneled (standard) CVC, coated or not, peripherally inserted CVC (PICC), tunneled devices (e.g. Broviac, Hickman), tunneled haemodialysis line, intra-cardiac catheters such as intra-arterial & ventricular lines, dual function lines such as temperature/venous catheters e.g. Cool line catheters, Quattro catheters, introducers etc.), pulmonary catheters, umbilical artery and vein catheters and implanted catheters (including ports).

12. Bone marrow or stem cell transplant recipient

Please indicate if the patient was a bone marrow or stem cell transplant recipient. If yes, please specify the transplant date.

13. Solid organ transplant recipient



Please indicate if the patient was a solid organ transplant recipient. If yes, please specify the transplant date.

14. Treatment for VRE BSI

Please indicate all of the treatment the patient received for their VRE BSI.

15. Antimicrobials exposure within past 30 days

Please indicate which antimicrobials the patient received 30 days prior to their positive blood culture.

16. ICU admission within 30 days

Please indicate if the patient was admitted or transferred to the ICU within 30 days following the date of positive blood culture.

17. Outcome at 30 days

Please indicate what the patient's outcome was at 30 days following the date of positive blood culture.

APPENDIX 4 - CNISP VRE 2017 Surveillance: Standard Laboratory Shipping Form

Dr. GEORGE GOLDING, *National Microbiology Laboratory*

1015 Arlington St.
 Winnipeg, Manitoba
 R3E 3R2

Tel: 204-789-2133

Use FedEx billing number: 2299-8435-7

| Hospital Lab # | Unique Patient ID <i>(01C-17-001)</i> | Site of VRE Isolation | Specimen collection date • <i>dd-mmm-yyyy</i> | Optional Notes from Submitting Lab • Indicate if the sample is not available, or provide any important information about the isolate |
|----------------|--|-----------------------|--|---|
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Please ensure that this form is included in your shipment!



Revision History

May 1, 2014 – Added question 9 to the questionnaire addressing the 30-day outcome of patients with VRE bacteremia.

October 30, 2014 – Began making changes to homogenize CNISP protocol formatting.

November 3, 2014 – ‘Case Definition’ renamed to ‘Inclusion Criteria’.

November 3, 2014 – ‘Numerator Data’ moved under ‘Inclusion Criteria’.

November 5, 2014 – ‘Introduction’ added (copied from VRE Report ‘Background’).

November 5, 2014 – ‘Data Analysis’ and ‘Ethics’ copied from the CDI protocol.

November 12, 2014 – Edited ‘Unique identifier code’ in the Data Dictionaries.

November 27, 2014 – Updated protocol to reflect 2015 surveillance year

December 29, 2014 – Added Q9-18 to collect additional data for blood stream infections only

October 30, 2015 – No collection of VRE colonization data as for 2016.

October 30, 2015 – Additional response category (other sterile site) added for the question of site of positive culture

October 30, 2015 – Additional question added for blood isolates: “Did the patient have a central venous catheter at the time of positive blood culture?”.

October 30, 2015 – Question 14 was changed from 3 months to 30 days prior to the positive blood culture.

December 29, 2016 – addition of antimicrobials for Q15. Addition of definitions for Surgical Wound and Urine in Data Dictionary.