ANTIBIOTIC RESISTANT ORGANISMS SURVEILLANCE PROTOCOL FOR ONTARIO HOSPITALS

Developed by the Ontario Hospital Association and the
Ontario Medical Association
Joint Communicable Diseases Surveillance Protocols Committee

Approved by:
The OHA and The OMA Board of Directors
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This protocol was developed jointly by the Ontario Hospital Association and the Ontario Medical Association, in collaboration with the Ministry of Health and Long-Term Care, to meet the requirements of the *Public Hospitals Act 1990,* Revised Statutes of Ontario, Regulation 965.

This protocol is based on current scientific and medical knowledge and a desire to ensure maximum cost effectiveness of programs while protecting health care workers. It is intended as a minimum practical standard for Ontario hospitals. However, hospitals may adopt additional strategies when indicated by local conditions.

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Rationale for
Antibiotic Resistant Organisms (ARO) Protocol

Bacterial resistance to antibiotics has been described since their introduction in the 1940s. Some bacteria have inherent or natural resistance to certain antibiotics (e.g., *Pseudomonas aeruginosa*); while others acquire resistance to antibiotics from new pieces of genetic information. Acquired resistance is the type of resistance that is of concern because these bacteria can continue to change and develop further resistance. Heavy use of antibiotics, both in medicine and in agriculture, is a factor in the emergence of resistance. The more exposure bacteria have to antibiotics, the more selective pressure there is for them to develop resistance. In recent years, many health care facilities have seen a dramatic increase in the numbers of AROs isolated.

AROs can be disseminated through person-to-person contact or by ingestion of food containing resistant organisms. Some are spread by indirect contact when surfaces and items in the healthcare environment become contaminated. As a result of such contact, health care workers and/or patients may become colonized or infected with the organism, and be a potential source for spread to others. In the hospital setting, there is a higher risk that the resistant bacteria will be passed on to others if proper infection control procedures are not followed. The procedures and medications, including antibiotics, used to treat patients predispose them to acquiring colonization and infection with organisms such as AROs. People who have recently been patients in a hospital or other health care facility are more likely to be colonized or infected, and if unrecognized, can spread the organism when admitted to another institution.

Healthcare associated AROs are generally <u>not</u> more virulent or more transmissible than antibiotic susceptible strains. Generally, they are not a threat to healthy people, but people who require treatment in healthcare settings are at risk of exposure. These strains are often resistant to multiple antibiotics, and treatment options for those who do develop infections requiring therapy may be limited to agents that are more toxic and/or more expensive than first-line choices. However, strains of methicillin resistant *Staphylococcus aureus* (MRSA) that are community associated (CA-MRSA) and contain virulence factors that allow them to cause serious illness in otherwise healthy people have recently emerged. These more virulent CA-MRSA strains are genetically different than healthcare associated MRSA.

Health care workers (HCWs) who are identified as carriers of AROs, e.g. MRSA, usually acquire the organism from occupational exposure and are not usually implicated as the "cause" of an outbreak. They generally come to the attention of occupational health through infection control investigations of clusters or outbreaks of colonized or infected patients. Colonization of HCWs may be transient or ongoing; however, once colonized HCWs may serve as a reservoir for ongoing transmission.

Therefore, identification through screening may be important in the investigation of ongoing transmission of AROs and in prevention of further transmission. For this

reason, it is essential that HCWs comply with policies and procedures related to control of AROs, including decolonization therapy if indicated.

HCWs, including immunocompromised HCWs, can avoid acquiring MRSA and other AROs by consistently following Routine Practices, including hand hygiene.

This protocol addresses the occupational health issues associated with the prevention of transmission of antibiotic resistant organisms only; **it is essential that, in addition, hospitals have infection prevention and control policies and procedures in place to prevent the spread of AROs, as outlined in *"Routine Practices and Additional Precautions in All Health Care Settings"* and *"Annex A: Screening, Testing and Surveillance for Antibiotic Resistant Organisms in All Health Care Settings",* Provincial Infectious Diseases Advisory Committee.**

Organization of Protocol

This surveillance protocol is organized into the protocol and an appendix. The protocol establishes some basic principles regarding the role of Occupational Health Service (OHS) in control of antibiotic resistant organisms in hospitals. These principles should be valid in management of antibiotic resistant organisms that may evolve in the future. The appendix covers screening for and treatment of colonized staff for specific organisms. The organisms that are currently of importance in this context are MRSA, vancomycin resistant Enterococci (VRE) and resistant *Enterobacteriaceae* producing resistance enzymes, such as extended spectrum beta-lactamases (ESBLs) and carbapenem resistant *Enterobacteriaceae* (CRE). Other organisms may emerge and need to be added to the appendix.

This protocol deals only with antibiotic resistant organisms that are **spread by contact**. It does not cover organisms that are spread by an airborne route. For information on antibiotic resistant *Mycobacterium tuberculosis,* please refer to the Tuberculosis Surveillance Protocol.

Antibiotic Resistant Organisms Surveillance Protocol for Ontario Hospitals

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I. Purpose

The purpose of this protocol is to assist Ontario hospitals in limiting transmission of Antibiotic Resistant Organisms (AROs), specifically with regard to interrupting transmission of AROs by colonized or infected persons who are carrying on activity in the hospital.

II. Applicability

This protocol deals with organisms that are spread by contact (see Appendix). It does not apply to organisms spread primarily by an airborne route.

This protocol applies to all persons carrying on activities in the hospital who have direct patient contact including employees, students, volunteers, undergraduate and postgraduate medical trainees, physicians and contract workers. The term Health Care Worker (HCW) is used in this protocol to describe these individuals. This protocol does not apply to patients of the facility or to visitors.

When hiring contract workers or training students, the hospital must inform the supplying agency/school that the agency/school is responsible for ensuring that their personnel are educated, screened and managed according to this protocol.

This protocol is for use by the occupational health service (OHS) in hospitals.

III. Preplacement

No routine screening for AROs of persons carrying on activities in the hospital is required. Persons carrying on activities in the hospital must be informed of the ongoing requirement to notify the OHS if they have been identified as being positive for an ARO in any other setting, such as another health care facility.

Reassignment of staff who are immunocompromised for any reason is not required; consistent use of Routine Practices, including hand hygiene, will prevent acquisition of AROs.

IV. Continuing Surveillance

No routine ongoing screening of any person carrying on activities in the hospital is required for AROs. Persons should be instructed to report problems with their hands (e.g., dermatitis, open lesions) to the OHS for assessment.

HCWs who are epidemiologically linked to transmission of AROs may require screening (See Appendix). In outbreak situations where there is ongoing transmission in spite of the use of additional precautions, HCWs may be screened.

V. Post-Exposure Follow-Up

When a patient is identified as colonized or infected with an ARO, the Infection Prevention and Control service of the hospital will institute precautions appropriate to the specific organism, as specified for that ARO by the Medical Advisory Committee of that hospital.

Persons carrying on activity in the hospital will be expected to comply with the hospital's policies for the ARO, including:

- compliance with hand hygiene;
- compliance with barrier precautions:
  - use of gloves and gowns as dictated by the infection control protocol of the hospital for the specific ARO;
- compliance with staff screening policies, if indicated:
  - swabs for culture appropriate for the ARO e.g., nasal, rectal, any open lesion(s);
- compliance with and completion of treatment protocols to eradicate the ARO;
- compliance with work placement modifications, if required, pending eradication of colonization;
- compliance with post-treatment follow-up to ensure eradication of ARO; and
- compliance with their obligation to inform other health care facilities or agencies in which they work if they have been identified as being colonized with an ARO.

Non-compliance with or medical contraindication to the above may result in additional work restrictions or modifications.

See Appendix for details regarding specific organisms.

VI. Acute Disease

Healthcare associated AROs are generally not more likely to cause disease in healthy individuals than antibiotic susceptible organisms; the concern is in interrupting transmission of AROs as treatment options are limited. Health care workers are generally identified as asymptomatic carriers of AROs, which they may have acquired during the course of their activities in the hospital. If acute illness develops, the person should be managed according to current medical management recommendations and hospital policy specific to the illness.

APPENDIX

1. *Definitions*

a) **Direct Patient Contact** involves skin-to-skin contact of the type that occurs in patient care activities that require direct, personal "hands-on" care. Transmission by direct contact is important in the spread of AROs.

Indirect Contact involves contact with inanimate objects in the patient's environment. Transmission by indirect contact is also important in the spread of AROs.

b) **Methicillin Resistant *Staphylococcus aureus* (MRSA**) is defined as *S. aureus* with a minimum inhibitory concentration for methicillin of ≥ 4 mcg/ml or containing the mecA gene coding for penicillin binding protein 2a (PBP 2a). They are resistant to all the beta-lactam classes of antibiotics (e.g. penicillins, penicillinase resistant penicillins and cephalosporins).

c) **Vancomycin Resistant Enterococcus (VRE)** is defined as *Enterococcus faecalis* or *E. faecium* with a minimum inhibitory concentration for vancomycin of ≥ 32 mcg/ml or containing the resistance genes VAN-A or VAN-B. This does not include those species of enterococci that are normally resistant to vancomycin (e.g., *E. gallinarum, E. casseliflavus*).

d) **Extended Spectrum beta-lactamases (ESBL)** are enzymes that may be produced by some strains of *Enterobacteriaceae* that hydrolyse all cephalosporins, including third-generation cephalosporins such as cefotaxime, ceftriaxone and ceftazidime, as well as the monobactam aztreonam.

e) **Carbapenem Resistant *Enterobacteriaceae* (CRE)** are *Enterobacteriaceae* that are resistant to carbapenem antimicrobials (e.g. imipenem, meropenem, ertapenem) through production of carbapenemase enzymes that hydrolyse carbapenems.

f) **Colonization** is the presence of an organism in an individual in the absence of signs or symptoms of infection caused by the organism.

g) **Infection** is presence of the organism with signs and/or symptoms of disease caused by the organism.

2. *Screening Procedures for Persons Carrying on Activities in the Hospital*

HCWs who are epidemiologically linked to transmission of AROs may require screening. In outbreak situations where there is ongoing transmission in spite of the use of additional precautions and other outbreak measures, HCWs may be screened.

a) Methicillin Resistant *Staphylococcus aureus* (MRSA):

- HCWs having direct contact with a patient with MRSA without the use of barrier precautions may be cultured in accordance with hospital infection control policy. If infection control investigations indicate an association of the HCW with nosocomial transmission, the HCW will be screened.
- Sample the following sites:
  - consult with your infection prevention and control program to determine required sampling sites
  - both anterior nares (one swab) and;
  - any open lesions or areas of dermatitis and;
  - rectal or perineal or groin swabs (employees may prefer the option of doing their own rectal/perineal swab).

b) VRE, ESBL and CRE:

HCWs who are carriers of VRE, ESBL or CRE have rarely been associated with transmission; therefore, screening of health care workers having direct patient contact is not generally required or recommended. If infection control investigations indicate an association with ongoing nosocomial transmission, implicated HCWs may be screened and swabs should be taken from:

- the rectum; and
- any open lesions or areas of dermatitis.

3. *Decolonization Protocol for HCWs Found to be Colonized*

a) MRSA:

Decolonization of HCWs is, generally, only indicated if the strain isolated from the HCW is the same genotype as the strain isolated from the patients.

The optimal treatment regimen for eradication of MRSA in colonized HCWs has not been established. Various regimens are reported. One treatment regimen is as follows:

- 4% chlorhexidine bath daily (avoid contact with eyes and ears); plus
- 2% mupirocin cream or ointment to anterior nares 3 times/ day; plus
- trimethoprim/sulfamethoxazole one DS tab orally twice daily, or doxycycline 100 mg orally twice daily; plus
- rifampin 300 mg orally twice daily

all for a total of 7 days.

Vancomycin is <u>not</u> recommended for decolonization.

Open lesions or dermatitis, if present, will require treatment for decolonization to be successful.

One week after treatment is completed, swab anterior nares and any other previously positive sites; repeat cultures weekly for 2 more weeks. A person may be considered clear after 3 consecutive negative sets of swabs. If cultures remain positive after the above treatment, consult with an infectious diseases physician.

Note:

- The choice of trimethoprim/sulfamethoxazole or doxycycline in the above regimen is dependent on the sensitivity pattern of the MRSA.
- If mupirocin is medically contraindicated or isolate is resistant to mupirocin, substitute bacitracin ointment for mupirocin.
- Rifampin will cause urine to become red coloured; soft contact lenses may become stained and should not be worn while taking rifampin.
- Rifampin should not be used as a single oral agent.
- Rifampin may interfere with oral contraceptives; alternate or additional contraceptive measures should be taken for that menstrual cycle.

Work Restrictions:

The need for work restrictions or removal from patient care duties while on treatment should be decided according to hospital infection prevention and control policy on a case-by-case basis dependent on:

- the strain isolated from the HCW is the same genotype as the outbreak strain
- potential consequences of MRSA in high risk populations (e.g., ICU, burn unit, surgical services, implantable devices);
- effectiveness of decolonization therapy;
- compliance with treatment and infection prevention and control precautions;
- evidence for ongoing transmission of the organism;
- presence of respiratory tract infection or poorly controlled allergic rhinitis that would facilitate dissemination through coughing and sneezing;
- evidence that the HCW is linked to ongoing transmission; and
- severity of any infections caused by the MRSA.

If the HCW remains at work, they must consistently practice meticulous hand hygiene.

b) VRE, ESBL or CRE:

- HCWs colonized with VRE, ESBL or CRE have rarely been associated with transmission; screening for and treatment of these AROs in HCWs is not usually required.

- Currently, there is no established treatment regimen for HCWs colonized with these AROs.

- If a HCW is implicated in transmission and found to be colonized, work practices should be reviewed, with particular reference to hand-hygiene. If dermatitis or other lesion is present, it should be treated.

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