

Questions and Answers

New Delhi metallo beta-lactamase (NDM-1 enzyme)

Recent media reports inform that an increased number of people in India and those who have traveled to India for surgery or treatment have developed antibiotic resistant infections.

The reports are substantiated by an article published in *The Lancet* on August 11, 2010 which discusses the emergence of a new antibiotic resistant gene called blaNDM-1. This gene spreads from one bacterium to another, causing antibiotic resistance.

These questions and answers have been developed to address concerns from the public and health care professionals.

1. What is NDM-1?

NDM-1 stands for New Delhi metallo beta-lactamase.

It is an enzyme produced by some bacteria that renders all current beta lactam drugs used in clinical practice inactive. The enzyme is encoded by a gene carried on a plasmid, and thus can spread from one organism to another. This is the first time a metallo beta-lactamase, the most potent of drug resistant enzyme in its class, has been found on a plasmid in clinically relevant cases.

Most commonly, it is *E. coli* and *K. pneumoniae* that harbour this resistance mechanism and infections noted to date have been pneumonia (often ventilator associated), bacteremias and urinary tract infections.

NDM-1 enzyme has been identified in people who returned to the United Kingdom, USA, Australia and the Netherlands after undergoing surgery in India or Pakistan. There have been three cases of NDM-1 identified in Canada.

2. Where have the cases in Canada been found?

The three cases identified in Canada are in Alberta, British Columbia and in Ontario.

3. Should Ontario health care settings be concerned?

The emergence of any new antibiotic resistance organism is of concern since the treatment options become more limited. However, this development is not unexpected and the risk to Canadians and Ontarians is very low at this time. Routine infection prevention and control practices such as hand hygiene, appropriate use of personal protective equipment, cleaning and disinfection of patient care equipment should be emphasized for all client care.

4. What is Ontario doing about NDM-1?

The Ontario Agency for Health Protection and Promotion (OAHPP) Public Health Laboratory (PHL) has been aware of this resistance phenomenon since the publication of the Lancet article earlier this month and is pursuing studies on the gene that causes this drug resistance.

PHL does have the capacity to use molecular methods to identify the NDM-1 enzyme if a laboratory suspects a case.

The Ministry of Health and Long Term Care is staying abreast of the issue and is working with OAHPP to deliver important messages to Public Health Units and Health Care Providers in the community.

5. What is Ontario doing about patient safety in health care settings?

As part of its patient safety initiative, the Government has required full public reporting on nine patient safety indicators by all Ontario hospital sites.

Among the patient safety indicators, public reporting is required for Antibiotic Resistant Organisms (AROs) such as: *clostridium difficile infection* (CDI), methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE). The reporting requirements have been fully and are publicly available on the ministry's Patient Safety website: ontario.ca/patientsafety.

Hospitals are also required to immediately report outbreaks of CDI to their local public health units to give medical officers of health the information they need to monitor and respond to outbreaks and to report to the ministry.

The ministry has already taken action on AROs through initiatives including:

- A multifaceted hand-hygiene program for hospitals, called *Just Clean Your Hands*, was launched by the ministry in March 2008 and was expanded to include Long-Term Care (LTC) homes in December 2009; improving hand hygiene is the single most effective way of reducing the spread of infections.
- Creating 166 infection control practitioner positions in hospitals to help ensure that the necessary capacity and expertise is in place to prevent and control infections and infectious diseases in hospitals;
- Establishing 14 regional infection control networks (RICNs) across the province to promote a common approach to infection prevention and control and the use of best practices;
- Developing a standardized educational program -- Infection Prevention and Control Core Competency Education -- for front-line health-care providers;
- Establishing Infection Control Resource Teams (ICRTs) to provide rapid, on-site assistance with outbreak investigation and management in hospitals; and

- Supporting hospitals in the most effective use of antibiotics through work the Ontario Agency for Health Protection and Promotion is doing with the Institute for Safe Medication Practices Canada.

6. Should health care settings be screening all patients who have been in India and Pakistan for NDM-1?

There have only been three cases of NDM-1 identified in Canada. Local epidemiology should govern decision-making regarding routine screening of clients. If the local incidence of Extended-Spectrum Beta-Lactamase (ESBL) producing bacteria is high, then there is some value to routinely screening patients that meet the criteria.

The Provincial Infectious Disease Advisory Committee (PIDAC) best practice on ARO's (2007) recommends that all clients should be screened on admission for risk factors for acquisition of ARO's and those at high risk should have screening specimens taken, particularly for MRSA or VRE colonization. One of these risk factors is receiving health care outside of Canada in the last 12 months. Clinical specimens from patients with risk factors showing carbapenamase resistance could be forwarded to the Provincial Lab for NDM-1 testing.

7. What are the risk factors for acquisition of NDM-1?

At the present time, hospitalization in India or Pakistan is the only definite risk factor associated with acquisition of NDM-1.

8. How does NDM-1 spread?

There has been no patient-to-patient transmission documented in the cases seen in Canada. ESBLs, which are related to NDM-1, are most commonly transmitted via the hands of health care providers from client-to-client.

9. Is there anything else that health care providers should be doing?

Ensure that Routine Practices are being followed.

Reinforce the 4 Moments for Hand Hygiene, Teach/promote and encourage patients, residents, visitors and staff to perform hand hygiene using either an alcohol-based hand rub (ABHR) or soap and water.

Clean and disinfect medical equipment between clients and use barriers appropriately to prevent the spread of infectious organisms.

10. What should a health care setting do if they believe a patient has NDM-1?

Consult with a physician with expertise in infectious diseases, arrange to send clinical specimens to the PHL to obtain molecular testing and place the patient on contact precautions

11. Is NDM-1 reportable to the Ministry of Health and Long-Term Care?

NDM-1 is an enzyme, a product of gene abnormality of a class of bacteria, not a disease, and can not be considered adding it to the reportable disease list under the HPPA. The public Health Laboratory of OAHPP is following the situation closely.

For Further Information Contact:

MOHLTC: Joann Braithwaite, 416 327-0157 /Joann.braithwaite@ontario.ca
OAHPP/PHL: Prasad Rawte 416-235-5703 or 416235-5874

Reference: QMPLS Newsletter May 2010

Alert: Potential emergence of new carbapenemase-producing organisms in Ontario, Canada

Roberto Melano, Jean Longtin and Dylan Pillai

Ontario Agency for Health Protection and Promotion

http://www.qmpls.org/pub_resources/publications/qmpls_news/pdf/qmplsnews150.pdf