Infection prevention and control: Whose role is it anyway?

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Who Are the Players?

• Local
• Regional
• Provincial
• Federal
• Worldwide
Local

- Hospitals
- Health care workers
- Physicians
- Administrators
- Acute care/long-term care
- Public health units
- Community health centres
- Municipal governments
Regional

- LHINs
- RICNs
- Public health units
- Regional authorities
- Unions/professional bodies
- IPAC Canada Chapters
- Home care institutions
Provincial

- Ministry of Health and Long-Term Care (MOHLTC)
  - Infectious Disease Branch
  - Drugs Program Branch
- CMOH
- ADMs and DM
- Ministry of Labour
- Ministry of the Environment
- Health care associations e.g., Ontario Hospital Association (OHA)
Provincial Bodies

• Public Health Ontario; PIDAC
• Health Quality Ontario
• Council of Medical Officers of Health (COMOH)
• Unions: health care groups
• Professional associations: medical, dental, midwifery, etc.
• Professional colleges
• Council of Academic Teaching Institutions: hospital or university
• Social welfare /Ontario drug benefits
National

• Health Canada
• PHAC
• Drugs/Product Directorate
• FPT Health Council
• AMMI and IPAC Canada
• Accreditation Canada
• Canadian Patient Safety Institute
World

• World Health Organization (WHO)
• Centers for Disease Control and Prevention (CDC)
• European Centre for Disease Prevention and Control (ECBC)
Are You Confused Yet?

“Every system is uniquely and perfectly designed to produce the results it is currently producing.”

Peter Senge, MIT, Author of The Fifth Discipline

What should we expect from the system I just described?
What you can get is

SARS in Toronto

Ebola in Liberia
SARS

- Communications
- Leadership
- Data
- Lab capacity
- Epidemiology capacity
- Preparedness
- Jurisdictional issues: eg. SARS research funding
What have we learnt from SARS?

• OAHPP “Agency” – PHO scientific capacity, planning, data analysis,

• PHO does NOT make policy decisions.

• Gov’t may decide that policy decisions and science don’t always align. (see N95 in H1N1 or Ebola directives)

• PHOL has been bolstered with expertise to develop new assays as needed

• Alignment with the CMOH, EMB and MEOC
Public Health Ontario (PHO)

Infectious Diseases

Environmental and Occupational Health

Health Promotion and Chronic Diseases

Emergency Response

Public Health Ontario Laboratories

Knowledge Synthesis and Evaluation (Research)

Resources (tools, ICRTs ASP core competencies)

Regional Infection Control Networks (RICN)

IPAC Planning and Operations Support (POS)

K2A: Knowledge to action
EBOLA: What went wrong?

Infection Prevention and Control Guidance for Patients With Suspected or Confirmed Ebola Virus Disease (EVD) in Ontario Health Care Settings

The document has been updated as of August 22, 2014 to reflect the latest public health guidance on Ebola. This document is intended to provide guidance for health care providers and the public. For the most current information, please visit the Public Health Ontario website at publichealthontario.ca

CDC/NIAID
Reservoir and transmission to humans

- Fruit bats reservoir of virus - Drop partially eaten fruits
- Bats infect chimpanzees, gorillas, forest antelopes, porcupines
- Humans handle and eat bush meat (bats, chimpanzees, gorillas)
- Infected human passes from person to person
- Association with higher humidity and lower temperatures with outbreaks.

Centers for Disease Control and Prevention; Virus Ecology Graphic:
Pathogenesis of Ebola - transmission

- Among 173 household contacts of 27 patients with confirmed Ebola, the transmission rate was only 16% despite none of the standard infection control precautions routinely employed in U.S. hospitals being used.
- Of 78 contacts who reported no physical contact with the infected patient, none became infected.
- Among those who did have physical contact, risk for Ebola was highest after contact with the patients’ blood.
- Large HCW transmission in Sierra Leone associated with infected woman in labour.
Pathogenesis - transmission

- Fastest incubation period has been reported associated with needle stick injury.
- Viral load may correlate with disease severity and survival.
- This is NOT an airborne disease. Thus the pulmonary disease is hemorrhage and ARDS associated with severe sepsis.
- Ebola is NOT a novel pathogen!
Pathogenesis - how does Ebola cause disease?

- Virus enters the body via infected blood/body fluid in contact with a mucosal surface or a break in intact skin.
- Virus replicates preferentially in monocytes/macrophages and dendritic cells which facilitate dissemination of the virus throughout the body via lymphatic system.
- Other cells are secondarily infected and there is rapid viral growth in hepatocytes, endothelial and epithelial tissues.
- There is strong cytokine/inflammatory mediator release of TNF-a and inflammatory cascade.
Pathogenesis - inflammatory response

- Leads to endothelial damage, increased vascular permeability and shock.
- This results in the end organ damage and multi-organ dysfunction
- Diffuse intravascular coagulopathy (DIC) with platelet and coagulation factor consumption which leads to hemorrhage.
- IgM starts forming in 2 day and IgG in 5-8 days post infection. Immunologic response correlates with survival.
- Thus the observation that those who live >1 week are more likely to survive.
Ebola

- Ebola is Viral septic shock
- With Multi-organ dysfunction
- DIC
- Proper use of PPE is the key
Immunity and Survival

- Treatment is supportive care
- IgG response appears to be protective by day 7
- Survivors may have persistent high antibody titres and associated sequelae of hepatitis, uveitis, muscle weakness etc.
- Previous observation was that serum from an Ebola survivor was therapeutic
- Anecdotal reports of Mab therapy being successful
- It does support the potential role of vaccination
- Aggressive resuscitation and support is highly effective
Ebola Outbreaks prior to 2014

- First identified in 1976, causing two outbreaks
  - One in Sudan
  - One in Democratic Republic of Congo (previously Zaire)
  - Both had several hundred cases

- Multiple, mostly limited outbreaks over the years since then
  - Over 20 outbreaks since the first in 1976
  - Only 5 with more than 100 cases
  - Mainly in countries in Central Africa

Context for outbreak

- Widespread on multiple fronts
- Affected large cities which is accelerating the epidemic
- Weak and fragile infrastructure
- Lack of knowledge of the disease
- Distrust of government and foreigners
- **Not seeking health care or health care not available**
- Social rituals / burial rituals
- Delayed response; more resources needed
Impact on social determinants of health

- Airline services have been curtailed
- Trading, industry, agriculture, tourism
- Worsening poverty
- Hunger
- Orphans
- Stigma
- School closures
- Other diseases not being treated
- Lack of preventive care: prenatal care, vaccination
Key Ebola Virus Disease Facts

- Only spread by direct contact with blood and body fluids; not airborne
- Incubation 2-21 days; usually 8-10 days
- Only infectious when symptomatic
- Increasingly infectious as get sicker
- After 72hrs all patients have positive PCR testing
Perspectives on risk assessment

- Ebola virus disease confined to well-defined geographic areas
  - Guinea, Sierra Leone
- Most infected individuals likely to have known exposures (not unrecognized exposures)
- Most infected individuals, other than aid and health care workers, not likely to travel to Ontario
- Common things are common
  - Malaria, typhoid fever, influenza, meningococcal, much more likely diagnoses
- Directives are inhibiting good patient care
Screening of a Returning Health Care Worker

- Where were they working?
- What contact did she/he have with infected patients?
- Was PPE used at all times?
- Was there possible exposure/contamination?
- Are there symptoms?

- Take a travel history
  - Weighing the risk determines the response required
  - Its all about IPAC exposure and protection
Panic Trumps Rationale

- N95 masking
- Goggles and face shields
- Wiping gloves with chlorhexidine/bleach
- No skin exposure
- One piece gowns and aprons
- PAPRs
- 21 step doffing procedure
IPAC Practices for EVD: Droplet + Contact Precautions

- Patient accommodation:
  - Single room with dedicated bathroom (minimum requirement); door closed
  - Consider use of an isolation room that has an anteroom for donning or doffing PPE

- PPE for all staff entering the room:
  - fluid-resistant, long-sleeved, cuffed gown
  - gloves
  - full face protection (face shield)
  - surgical or procedure mask

- Maintain log of all individuals entering the room; only essential people should enter the room
Risk Assessment for EVD

- Use risk assessment to determine the need for additional PPE; as the patient’s condition changes, the risk to HCPs may change.

- The procedure being performed and the presence of clinical symptoms impacts the decision of what PPE to wear.

- Clinical risks may include:
  - Large amounts of blood/body fluids: foot/leg coverings, head coverings, waterproof gowns, or biohazard suits
  - Aerosol generating procedures: N95 respirators
  - Phlebotomy: double gloves

- Ensure adequate training before adding unfamiliar PPE
What prompted panic

- Lack of understanding of the disease
- Lack of understanding of basic IPAC principles
- Lack of training - Lack of confidence
- CNN “space suits”
How to mitigate panic

- Just-in-time refreshers for PPE in unusual infections
- Skills wane with time and disappear with emotion
- PPE readily available at point of care if required
- PPE is the last line of defense
History repeats itself

• Deja vu all over again?
• Mixed messages confuse the public and health care workers
• Erosion in trust of Public Health Officials
• No trust in government or “Big Pharma”
• Seen in SARS, Pandemic H1N1, and Ebola
• Public trusts a former Playboy Bunny for health and vaccine advice????
Lessons learned: GOOD NEWS!!

• IPAC Practices worked in Ebola in N. America
• Proper hand hygiene and isolation practices prevented transmission
• IPAC practices in West Africa…. Reduced transmission
• Bad directives can be improved with persistence and applying science and IPAC principles of transmission
Lessons learned

• We can make the system work and work quickly and efficiently if we decide to work together.

• No matter how much preparation we do, we cannot anticipate all eventualities or questions. **USE FIRST PRINCIPLES**

• IPAC: risk assessment, personal protection and hand hygiene especially before any contact with the face

• If you are uncertain: Wash your hands again!

• Planning, communication, revising guidance as new info become available (version control)
Ebola in Africa

• 20 years ago, HCWs in mission hospitals no longer acquired Ebola by applying proper hand hygiene, and use of masks and gloves.
• Decreased community spread by educating locals about proper disposition of the dead.
• The spread to large centres had magnified the problem and the numbers.
• The lack of basic IPAC protection and HCWs, lack of planning, communication and leadership has made a bad situation worse.
• In 2015 in first world countries, mortality was small.
The Front Line: Dynamic and Uncertain

• Routine IPAC precautions are the best way to protect ourselves
• Almost all “novel” pathogens are transmitted in the same way
• Severity of illness does not equate with mode of transmission
• Hand hygiene is far and away the best protection for us in direct patient care
• Adopting a habitual routine of PPE and hand hygiene will be the best protection against the pathogens we know and those that may be novel
Front line: Protection!

• Hand hygiene
• Clean your hands
• When in doubt, clean them again
• PPE- masking, gloves, and gowns
• Vaccination: as adults we are not good in maintaining our own immunity
Infection prevention and control: *Whose role?*

- IPAC is everyone’s role and responsibility
- Responsibility for **personal protection**
- Responsible for patient **care** and **protection**
- Prevention of spread from HCW to patient, patient to HCW, patient to patient, to family members.
- IPAC is a **culture** of personal and mutual respect
- A culture of hand hygiene and personal behaviors and choices
- A culture that saves lives, prevents spread of disease
Why Infection Prevention and Control?

BECAUSE IT WORKS
Discussion and Comments