Public Health Ontario
PARTNERS FOR HEALTH

Santé publique Ontario
PARTENAIRES POUR LA SANTÉ

Infection prevention and control:
Whose role is it anyway?

Gary Garber, MD, FRCPC, FACP, CCPE

Medical Director, Infection Prevention and Control (IPAC)

Public Health Ontario

Ontario
Agency for Health Protection and Promotion
Agence de protection et de promotion de la santé

Who Are the Players?

@Istockphotos.com/Robert Churchill

- Local
- Regional
- Provincial
- Federal
- Worldwide

Public Health Ontario
PARTNERS FOR HEALTH

Santé publique Ontario
PARTENAIRES POUR LA SANTÉ

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

@Istockphotos.com/Steve Debenport

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

Public Health Agency of Canada
Agence de la santé publique du Canada

ipac Infection Prevention and Control Canada

AMMI™ Canada

cpsi icsp
Canadian Patient Safety Institute
Institut canadien pour la sécurité des patients

Health Canada Santé Canada

ACCREDITATION CANADA
AGRÉMENT CANADA
Driving Quality Health Services
Force motrice de la qualité des services de santé

World

- World Health Organization (WHO)
- Centers for Disease Control and Prevention (CDC)
- European Centre for Disease Prevention and Control (ECBC)

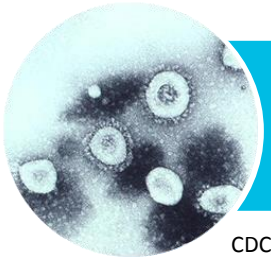
Are You Confused Yet?

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

Peter Senge, MIT, Author of The Fifth Discipline

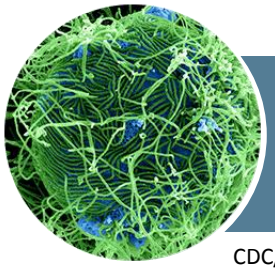
What should we expect from the system I just described?

What you can get is



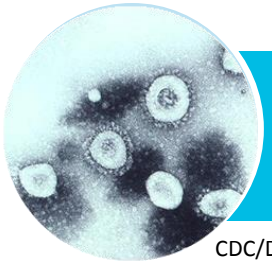
SARS in Toronto

CDC/Dr. Erskine Palmer



Ebola in Liberia

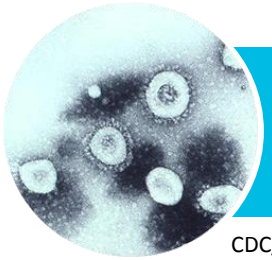
CDC/NIAID



CDC/Dr. Erskine Palmer

SARS

- Communications
- Leadership
- Data
- Lab capacity
- Epidemiology capacity
- Preparedness
- Jurisdictional issues: eg. SARS research funding



CDC/Dr. Erskine Palmer

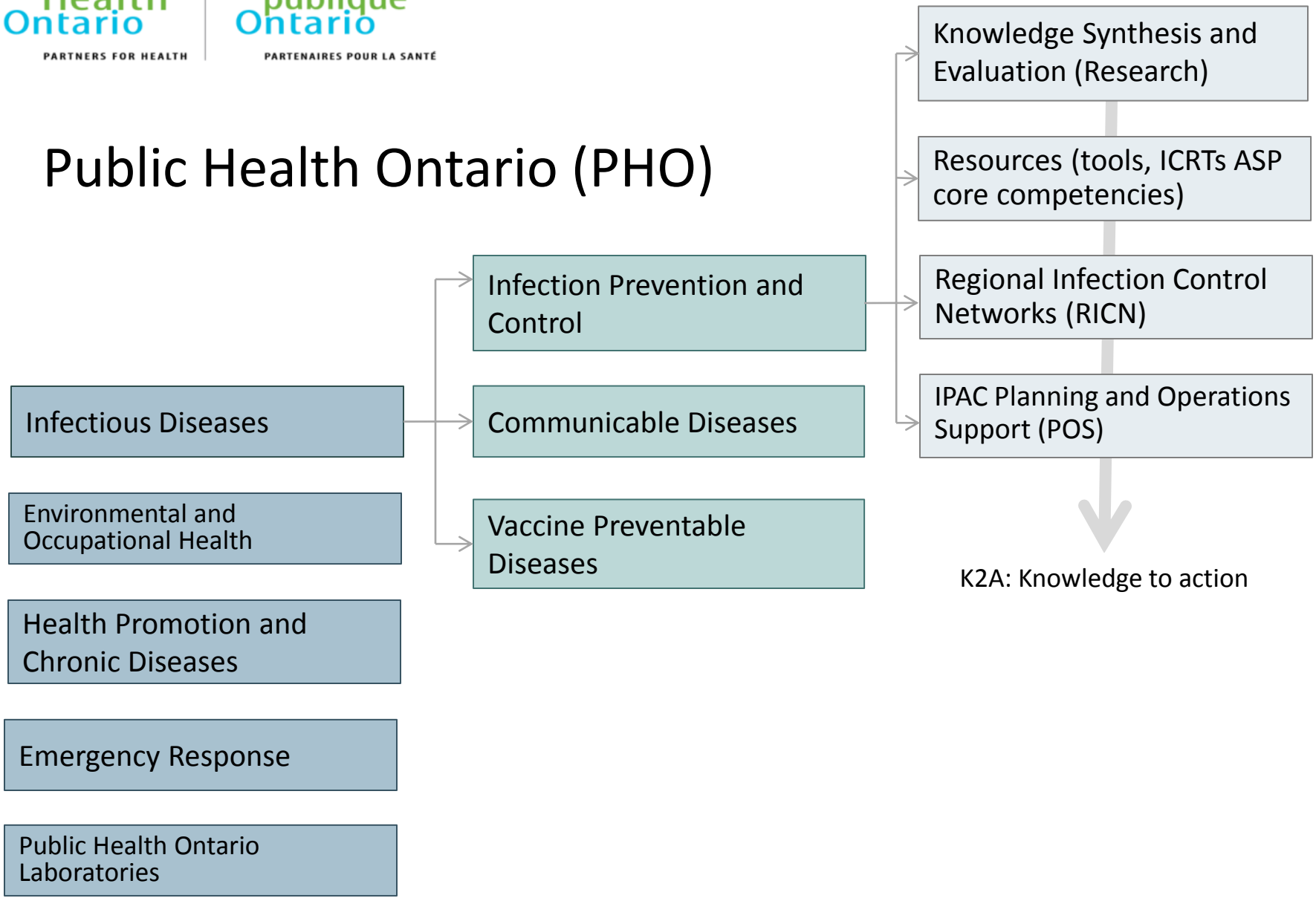
What have we learnt from SARS?

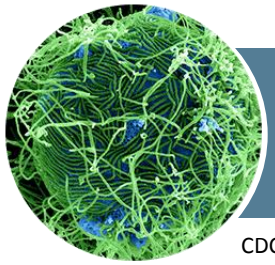
- OAHPP “Agency” – PHO scientific capacity, planning, data analysis,
- PHO does NOT make policy decisions.
- Gov’t may decide that policy decisions and science don’t always align. (see N95 in H1N1 or Ebola directives)
- PHOL has been bolstered with expertise to develop new assays as needed
- Alignment with the CMOH, EMB and MEOC

Public Health Ontario | Santé publique Ontario

PARTNERS FOR HEALTH | PARTENAIRES POUR LA SANTÉ

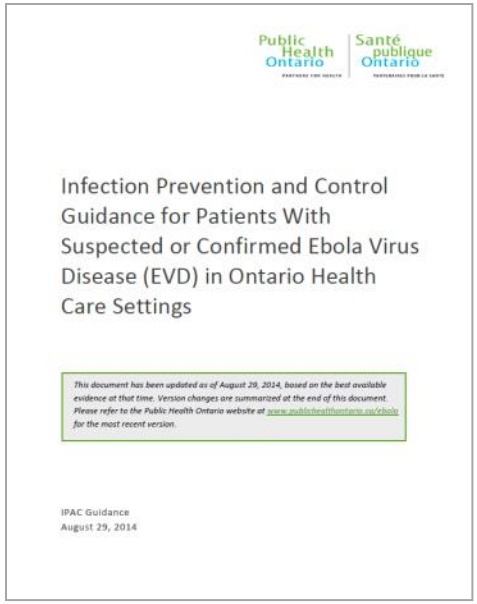
Public Health Ontario (PHO)





EBOLA: What went wrong?

CDC/NIAID

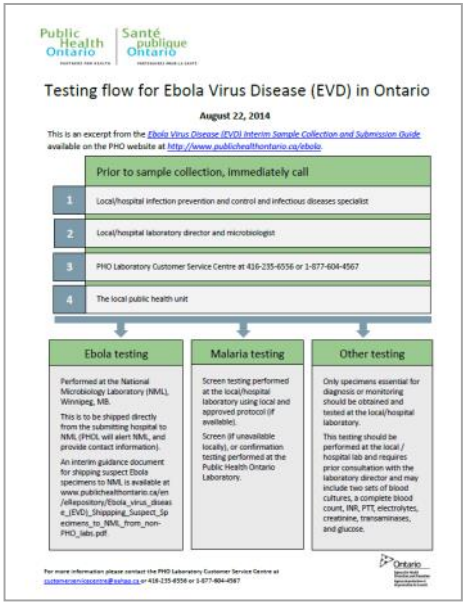


Public Health Ontario | Santé publique Ontario

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

This document has been updated as of August 29, 2014, based on the best available evidence at that time. Version changes are summarized at the end of this document. Please refer to the Public Health Ontario website at www.publichealthontario.ca/ebola for the most recent version.

IPAC Guidance
August 29, 2014



Public Health Ontario | Santé publique Ontario

Testing flow for Ebola Virus Disease (EVD) in Ontario

August 22, 2014

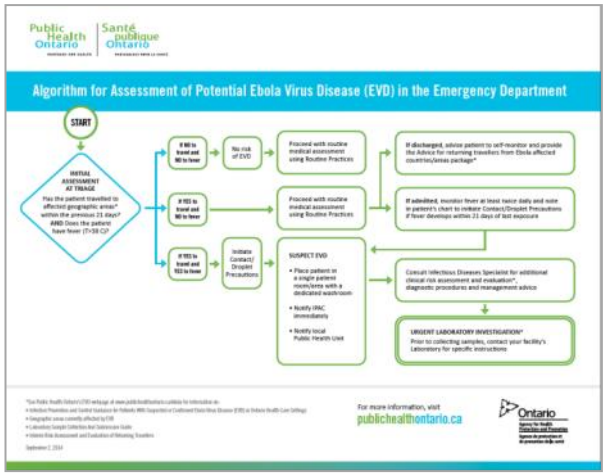
This is an excerpt from the *Ebola Virus Disease (EVD) Interim Sample Collection and Submission Guide* available on the PHO website at *http://www.publichealthontario.ca/ebola*

Prior to sample collection, immediately call	
1	Local/hospital infection prevention and control and infectious diseases specialist
2	Local/hospital laboratory director and microbiologist
3	PHO Laboratory Customer Service Centre at 416-235-6556 or 1-877-604-4567
4	The local public health unit

Ebola testing	Malaria testing	Other testing
Performed at the National Microbiology Laboratory (NML), Winnipeg, MB. This is to be shipped directly from the submitting hospital to NML (PHOL will alert NML, and provide contact information). An interim guidance document for shipping suspect Ebola specimens to NML is available at www.publichealthontario.ca/en/eRepository/Ebola_virus_disease_(EVD)_Shipping_Suspect_Specimens_to_NML_from_non-PHO_labs.pdf	Screen testing performed at the local/hospital laboratory using local and approved protocol (if available). Screen (if unavailable locally), or confirmation testing performed at the Public Health Ontario Laboratory.	Only specimens essential for diagnosis or monitoring should be obtained and tested at the local/hospital laboratory. This testing should be performed at the local / hospital lab and requires prior consultation with the laboratory director and may include two sets of blood cultures, a complete blood count, INR, PTT, electrolytes, creatinine, transaminases, and glucose.

For more information please contact the PHO Laboratory Customer Service Centre at customerservicecentre@oahpp.ca or 416-235-6556 or 1-877-604-4567

Ontario



Public Health Ontario | Santé publique Ontario

Algorithm for Assessment of Potential Ebola Virus Disease (EVD) in the Emergency Department

START

INITIAL ASSESSMENT AT TRIAGE
Has the patient travelled to affected geographic areas* within the previous 21 days?
AND Does the patient have fever (T>38 C)?

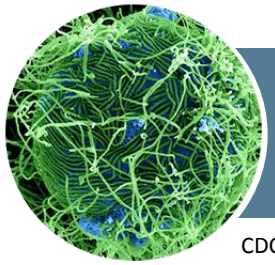
If NO to travel and NO to fever
No risk of EVD
Proceed with routine medical assessment using Routine Practices
If discharged, advise patient to self-monitor and provide the Advice for returning travellers from Ebola affected countries/areas package*

If YES to travel and NO to fever
Proceed with routine medical assessment using Routine Practices
If admitted, monitor fever at least twice daily and note in patient's chart to initiate Contact/Droplet Precautions if fever develops within 21 days of last exposure

If YES to travel and YES to fever
Initiate Contact/ Droplet Precautions
SUSPECT EVD
• Place patient in a single patient room/area with a dedicated washroom
• Notify IPAC immediately
• Notify local Public Health Unit
Consult Infectious Diseases Specialist for additional clinical risk assessment and evaluation*, diagnostic procedures and management advice
URGENT LABORATORY INVESTIGATION*
Prior to collecting samples, contact your facility's Laboratory for specific instructions

For more information, visit publichealthontario.ca

Ontario

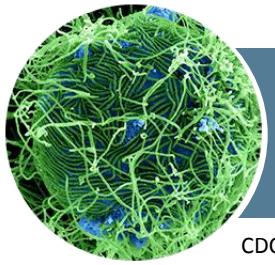


CDC/NIAID

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.

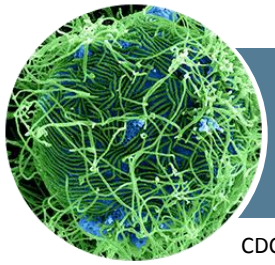
Centers for Disease Control and Prevention; Virus Ecology Graphic:
http://www.cdc.gov/vhf/ebola/resources/virus-ecology.html



CDC/NIAID

Pathogenesis of Ebola - transmission

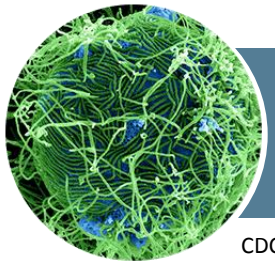
- Among 173 household contacts of 27 patients with confirmed Ebola, the transmission rate was only 16% despite none of the standard infection control precautions routinely employed in U.S. hospitals being used
- Of 78 contacts who reported no physical contact with the infected patient, none became infected
- 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



CDC/NIAID

Pathogenesis - transmission

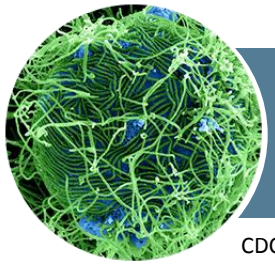
- Fastest incubation period has been reported associated with needle stick injury.
- Viral load may correlate with disease severity and survival
- This is NOT an airborne disease. Thus the pulmonary disease is hemorrhage and ARDS associated with severe sepsis.
- Ebola is NOT a novel pathogen!



CDC/NIAID

Pathogenesis - how does Ebola cause disease?

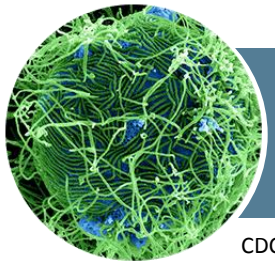
- Virus enters the body via infected blood/body fluid in contact with a mucosal surface or a break in intact skin.
- Virus replicates preferentially in monocytes/macrophages and dendritic cells which facilitate dissemination of the virus throughout the body via lymphatic system.
- Other cells are secondarily 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.



CDC/NIAID

Pathogenesis - inflammatory response

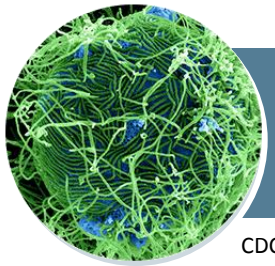
- Leads to endothelial damage, increased vascular permeability and shock.
- This results in the end organ damage and multi-organ dysfunction
- Diffuse intravascular coagulopathy(DIC) with platelet and coagulation factor consumption which leads to hemorrhage.
- IgM starts forming in 2 day and IgG in 5-8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



Ebola

CDC/NIAID

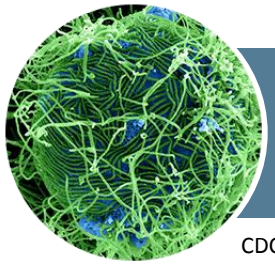
- Ebola is Viral septic shock
- With Multi-organ dysfunction
- DIC
- Proper use of PPE is the key



CDC/NIAID

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

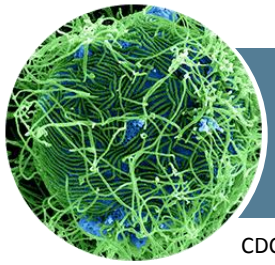


Ebola Outbreaks prior to 2014

CDC/NIAID

- 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

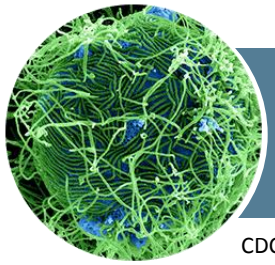
World Health Organization. Ebola virus disease [Internet]. Geneva: World Health Organization; 2014 [cited 2014 Aug 28]. Available from: http://www.who.int/mediacentre/factsheets/fs103/en/



CDC/NIAID

Context for outbreak

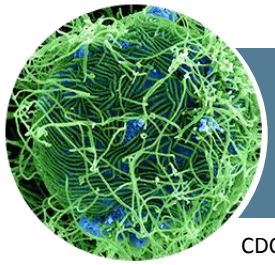
- Widespread on multiple fronts
- Affected large cities which is accelerating the epidemic
- Weak and fragile infrastructure
- Lack of knowledge of the disease
- Distrust of government and foreigners
- **Not seeking health care or health care not available**
- Social rituals / burial rituals
- Delayed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



CDC/NIAID

Impact on social determinants of health

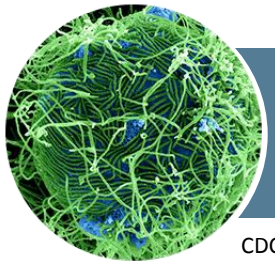
- Airline services have been curtailed
- Trading, industry, agriculture, tourism
- Worsening poverty
- Hunger
- Orphans
- Stigma
- School closures
- Other diseases not being treated
- Lack of preventive care: prenatal care, vaccination



CDC/NIAID

Key Ebola Virus Disease Facts

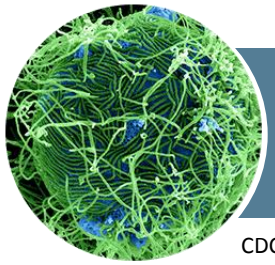
- Only spread by direct contact with blood and body fluids; not airborne
- Incubation 2-21 days; usually 8-10 days
- Only infectious when symptomatic
- Increasingly infectious as get sicker
- After 72hrs all patients have positive PCR testing



CDC/NIAID

Perspectives on risk assessment

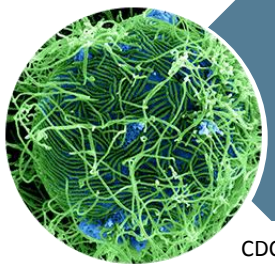
- Ebola virus disease confined to well-defined geographic areas
  - Guinea, Sierra Leone
- Most infected individuals likely to have known exposures (not unrecognized exposures)
- Most infected individuals, other than aid and health care workers, not likely to travel to Ontario
- Common things are common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



CDC/NIAID

Screening of a Returning Health Care Worker

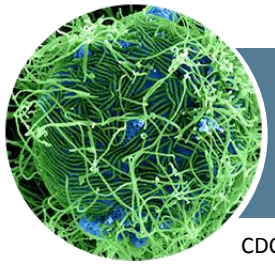
- Where were they working?
- What contact did she/he have with infected patients?
- Was PPE used at all times?
- Was there possible exposure/contamination
- Are there symptoms?
- Take a travel history
- Weighing the risk determines the response required
- Its all about IPAC exposure and protection



CDC/NIAID

Panic Trumps Rationale

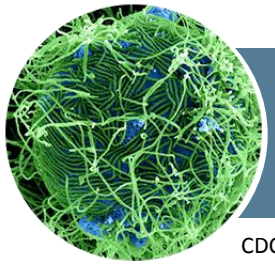
- N95 masking
- Goggles and face shields
- Wiping gloves with chlorhexidine/bleach
- No skin exposure
- One piece gowns and aprons
- PAPRs
- 21 step doffing procedure



CDC/NIAID

IPAC Practices for EVD: Droplet + Contact Precautions

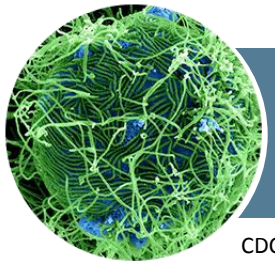
- Patient accommodation:
  - Single room with dedicated bathroom (minimum requirement); door closed
  - Consider use of an isolation room that has an anteroom for donning or doffing PPE
- PPE for all staff entering the room:
  - fluid-resistant, long-sleeved, cuffed gown
  - gloves
  - full face protection (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

CDC/NIAID

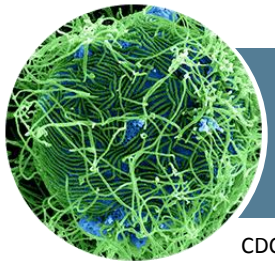
- Use risk assessment to determine the need for additional PPE; as the patient's condition changes, the risk to HCPs may change.
- The procedure being performed and the presence of clinical symptoms impacts the decision of what PPE to wear.
- Clinical risks may include:
  - Large amounts of blood/body 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

CDC/NIAID

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



CDC/NIAID

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