



INFECTION PREVENTION AND CONTROL: THEN AND NOW

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AIFI May 5, 2024

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**Who Are
We?**

Approximately 250
members

Majority are nurses- recently
other professions being
considered

Certification process
through the Order of Nurses
of Quebec - Clinical Nurse
Specialist in Infection
Prevention and Control

Approximately 33 certified



As part of its mission, AIPI aims to promote and consolidate:

- ✓ A culture of excellence in the prevention and control of nosocomial infections in Quebec;
- ✓ The role of the IPAC nurse in improving the quality and safety of patient nursing care;
- ✓ The contribution of IPAC nurses to the advancement of this specialty at the local, regional, provincial, national and international levels.

slido

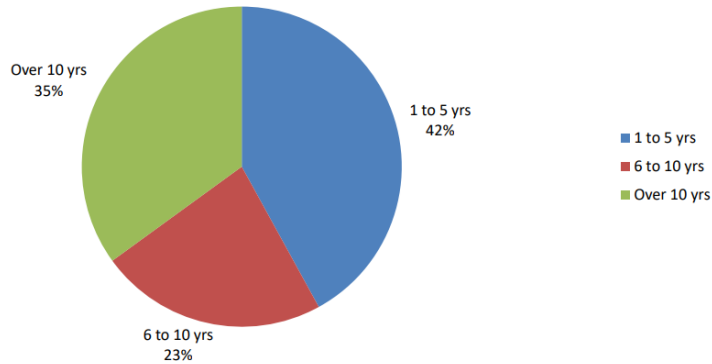


**How many years of
experience do you have as
an Infection Control
Professional?**

① Start presenting to display the poll results on this slide.

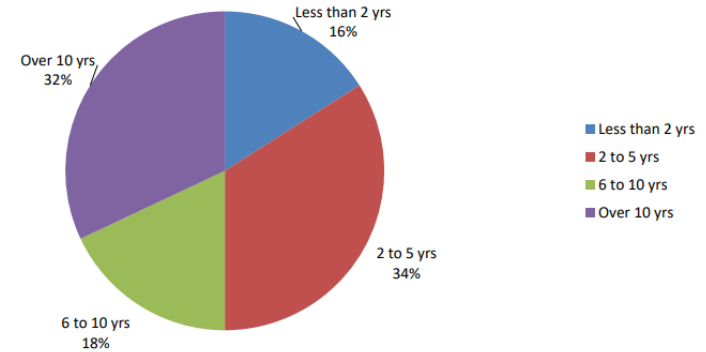
IPAC Canada 2019/2023

Members' Years of Experience in IPAC
as at November 1, 2019 (959 cumulative responses)



42% < 5 Years

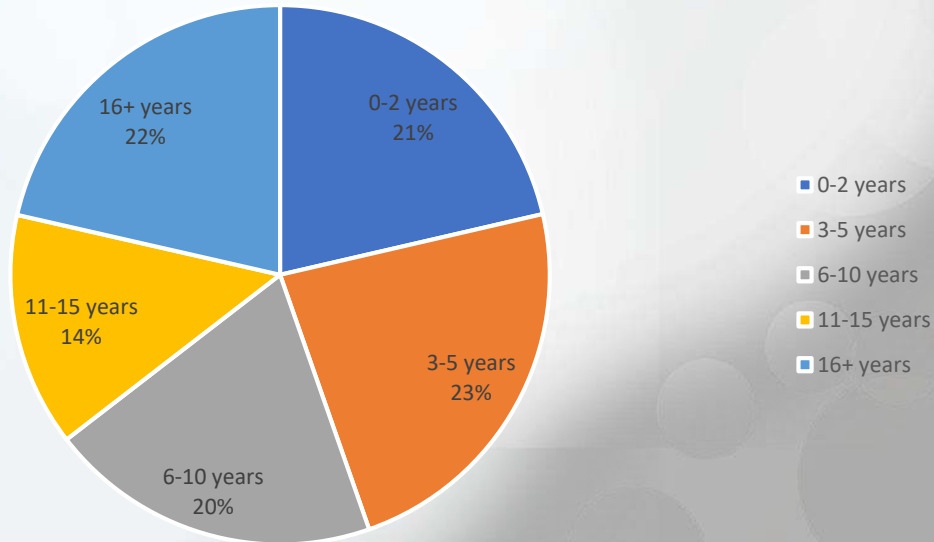
Members' Years of Experience in Infection Prevention & Control
as at November 1, 2023 (of 1254 cumulative responses)



50% < 5 Years

Apic Megasurvey 2020

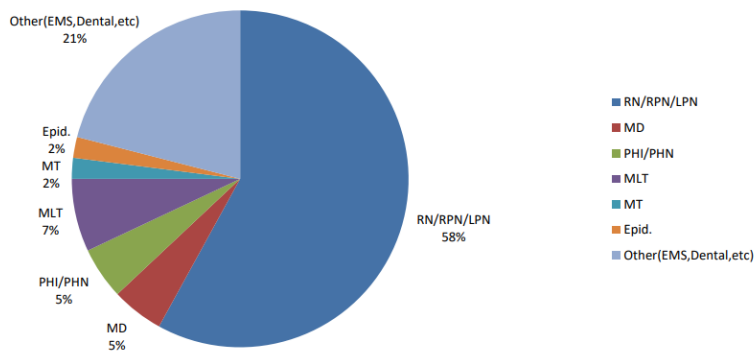
ICP Years of Experience



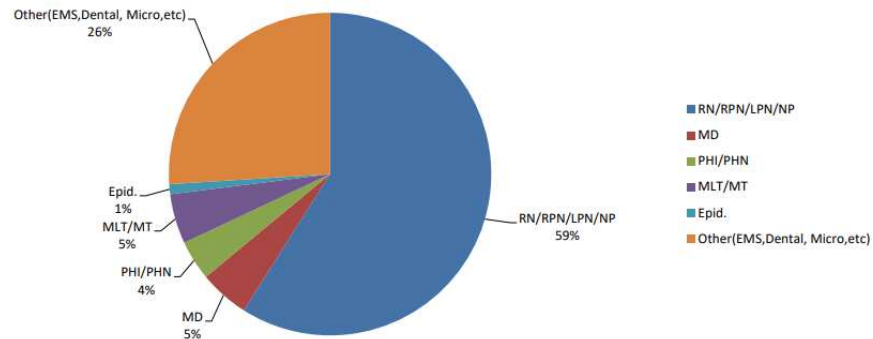
**44% < 5 years
experience**

IPAC Canada 2019/2023

IPAC Canada Members by Discipline
as at November 1, 2019

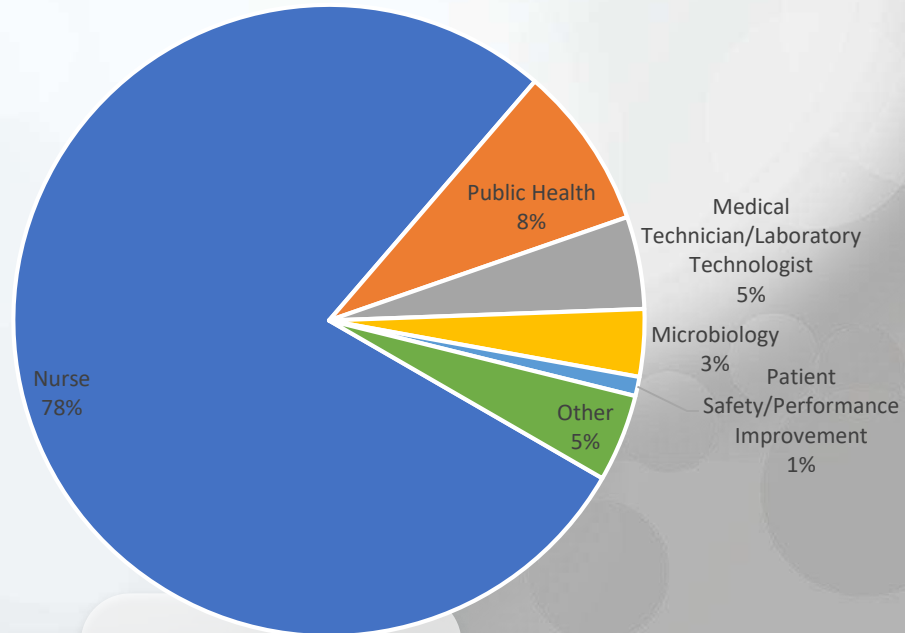


IPAC Canada Members by Discipline
as at November 1, 2023



Apic Megasurvey 2020

ICP Disciplines



Certification Board of Infection Control and Epidemiology (CBIC)

9,524:

Number of individuals Certified in Infection Control (CIC®).



403:

Number of individuals certified in Long-Term Care Certification in Infection Prevention (LTC-CIP).



589:

Number of individuals certified in Associate - Infection Prevention and Control (a-IPC).



Where in the world are CICs?



CBIC Certification Canada 2023



Number of IPAC-Canada Members: 2115

29% (618) CIC

0.02% (43) LTC-CIP

0.01% (22) a-IPC



01

History and Inception of Infection Prevention and Control

"History is not a burden
on the memory but an
illumination of the soul."
- Lord Acton

The Medieval Era (500-1500)

Prevalent Diseases

- Plague
- Smallpox (20-60% mortality)
- Dysentery
- Typhus
- Leprosy
- Tuberculosis

***First hospitals in Europe to care for the sick, insane and destitute (rich people received care at home)**



https://en.wikipedia.org/wiki/St_Bartholomew%27s_Hospital

Established in 1123,
London

The Medieval Era (500-1500)

Control Measures

In 1300s, a third of ALL people in Europe died of bubonic plague



- Collection of the bodies of plague victims – left in streets, collected in carts and placed in mass graves outside of town
- Abandon the town!- some lost 2/3 of the population within a year
- Hang those who came from an epidemic region to an uninfected area
- Shut plague victims in their homes and burning clothing and bedding

The Medieval Era (500-1500)

Hypothetical Infection Control Committee Agenda

- **Review of infections and mortality**
 - **Hospital infection rate: 90%**
 - **Clean wound infection rate 80%**
 - **Hospitalization-associated death rate 40-70%**
- **Staffing problems**
 - **Many died of plague or smallpox**
 - **Inmates assisted patients**
- **Surveillance denominator (beds or patients???)**
 - **Multiple patients in a single bed-accounts of up to 6**
- **Hospital stench**
- **Policy for corpse removal- at times left for >24 hours in a bed with living patients**
- **Vermin in beds**



Hôtel-Dieu de Paris c. 1500. The comparatively well patients (on the right) were separated from the very ill (on the left).

Significant Historical Events:

Early Modern Era (1500-1800):

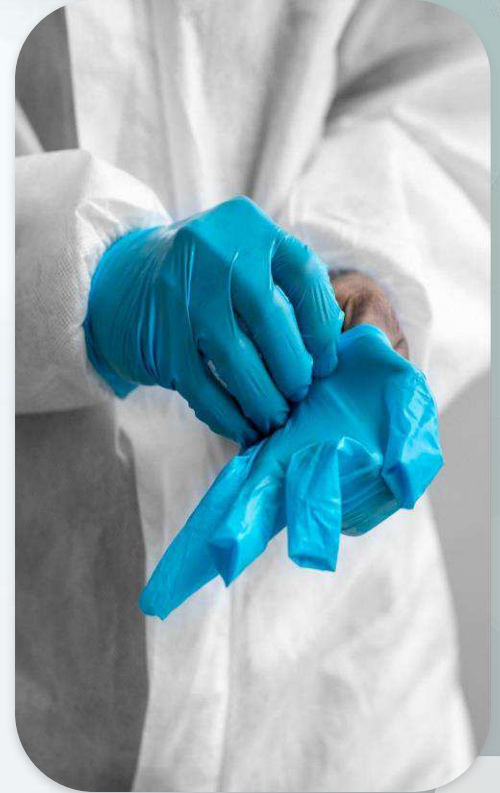
- First health departments established
- Hospitals continued to be built

Progressive Era (1890s-1920s):

- Semmelweis- handwashing
- Lister-surgical antisepsis
- Koch and Pasteur- germ theory

Post War Era (1940s-1950s)

- Antibiotics- penicillin given to septic patients
- Antibiotics- streptomycin used to treat TB



The Post War Era (1940s-1950s) Public Health



CDC circa 1946



CDC Today

- **1946- Centers for Disease Control and Prevention (CDC)**
 - **First report: 161 cases of poliomyelitis, 4 cases of smallpox, 229 cases of diphtheria, 25,041 cases of measles**
- **Hospitals were overall much safer**
- **First infection control nurses!!!**

Infection Prevention and Control Staffing and Programs

1960:

- Infection Control emerged as a separate discipline/specialty in nursing
- First IC course

1970:

- CDC establishes National Healthcare Safety Network (NHSN) formally NNIS to track and report healthcare associated infections

1972:

- APIC was founded

1976:

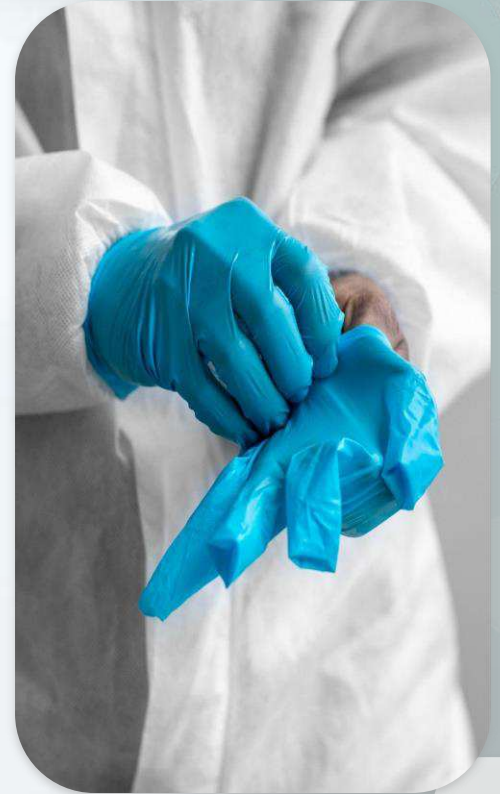
- IPAC-Canada was founded (formerly CHICA-Canada)

1978:

- **AIPI (formerly APPI 1978- 1999)**

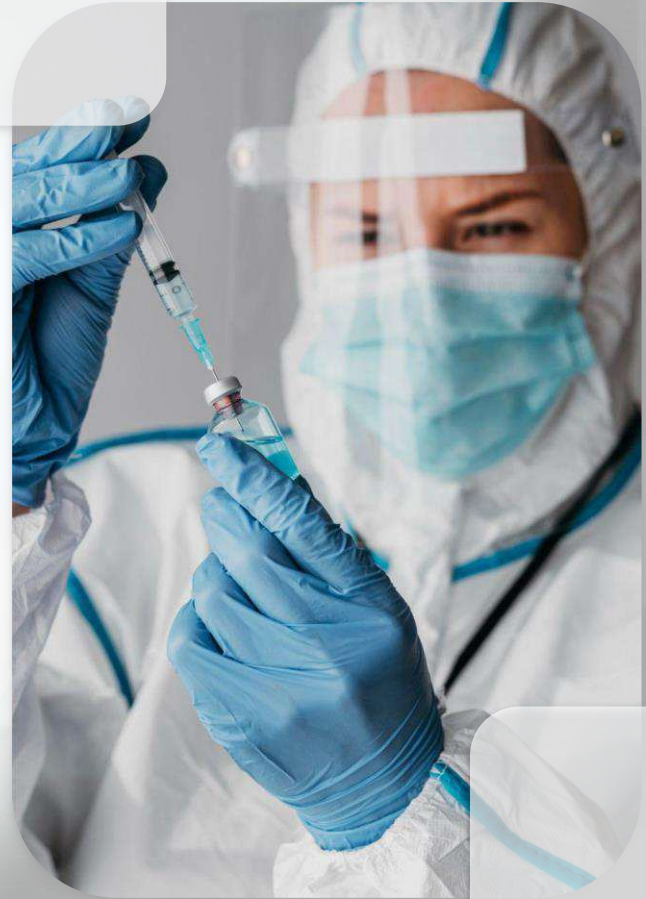
1982:

- Certification Board of Infection Control and epidemiology was established (CBIC)



02

**Events That
Significantly
Impacted Infection
Prevention and
Control...**



1981

First cases of an illness subsequently defined as acquired

First cases of an illness subsequently defined as acquired immunodeficiency syndrome (AIDS) is reported by healthcare providers in California and the CDC.



CENTERS FOR DISEASE CONTROL

June 5, 1981 / Vol. 30 / No. 21

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports	
249	Dengue Type 4 Infections in U.S. Travelers to the Caribbean
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Epidemiologic Notes and Reports

Pneumocystis Pneumonia — Los Angeles

In the period October 1980-May 1981, 5 young men, all active homosexuals, were treated for biopsy-confirmed *Pneumocystis carinii* pneumonia at 3 different hospitals in Los Angeles, California. Two of the patients died. All 5 patients had laboratory-confirmed previous or current cytomegalovirus (CMV) infection and candidal mucosal infection. Case reports of these patients follow.

Understanding AIDS

A Message From The Surgeon General

The brochure has been sent to you by the Government of the United States. In preparing it, we have consulted with the top health experts in the country.

If it is important that you have the best information now available for fighting the AIDS virus, a health problem that the President has called "Public Enemy Number One."

Receive AIDS in 90 seconds, your family and your loved ones.

Some of the issues involved in this brochure may not be things you are used to discussing openly. I can assure you that you will not be judged for them. We all must know about AIDS. Read this brochure and talk about it with those you love. Let friends, neighbors, schools, churches, synagogues, and community groups offer AIDS education activities.

I encourage you to practice responsible behavior based on understanding and caring personal values. This is what you can do to stop AIDS.



Richard D. D'Aquila
C. Everett Koop, M.D., Sc.D.
Surgeon General

Este folleto sobre el SIDA se publica en Español.
Para solicitar una copia, llame al 1-800-344-3114.

U.S. Department of Health
Public Health Service
Centers for Disease Control
1600 Clifton Road, NE
Atlanta, GA 30333

DMHA-81-0001

BULK RATE
CARDHOLDER'S BILL PAYEE
MAILING LIST
NAME OF CLIENT

2007.550.004a

POSTAL CUSTOMER

HIV Global Statistics

Table 1. Estimated number of people living with HIV, all ages, 2010, 2021 and 2022

WHO region	Estimated number of people living with HIV		
	2010	2021	2022
Global	31 500 000 [26 700 000–36 800 000]	38 700 000 [32 800 000–45 200 000]	39 000 000 [33 100 000–45 700 000]
African Region	21 500 000 [18 200 000–25 200 000]	25 500 000 [21 600 000–30 000 000]	25 600 000 [21 600 000–30 000 000]
Eastern and Southern Africa	16 500 000 [13 900 000–19 500 000]	20 400 000 [17 100 000–24 000 000]	20 400 000 [17 200 000–24 100 000]
Western and Central Africa	4 900 000 [4 300 000–5 700 000]	5 100 000 [4 500 000–5 900 000]	5 100 000 [4 500 000–5 900 000]
Region of the Americas	2 700 000 [2 400 000–3 100 000]	3 700 000 [3 300 000–4 200 000]	3 800 000 [3 400 000–4 300 000]
South-East Asia Region	4 100 000 [3 500 000–4 700 000]	3 900 000 [3 400 000–4 600 000]	3 900 000 [3 400 000–4 600 000]
European Region	1 600 000 [1 400 000–1 800 000]	2 900 000 [2 500 000–3 200 000]	3 000 000 [2 600 000–3 300 000]
Eastern Mediterranean Region	240 000 [210 000–300 000]	460 000 [390 000–560 000]	490 000 [420 000–600 000]
Western Pacific Region	1 400 000 [1 000 000–1 700 000]	2 200 000 [1 600 000–2 700 000]	2 200 000 [1 700 000–2 800 000]

Source: UNAIDS/WHO estimates, 2023.

Impact on Infection Prevention and Control

1985: Universal Precautions

- a new strategy for isolation following the epidemic of HIV, after needlestick injuries were documented as a source for healthcare workers being infected from the blood of positive patients.

1987: Body Substance Isolation

- focused on the isolation of all moist and potentially infectious body substances from all patients, regardless of their presumed infection status.

1996: Standard and Transmission Based Precautions (US)

1999: Routine Practices and Additional Precautions (Canada)



Changes to Laboratory Practices



Vydia (1990)



Changes to Laboratory Practices



Biological Safety Cabinet

Laboratory Technologist to Infection Control Practitioner

My first job as an Infection Control Practitioner:

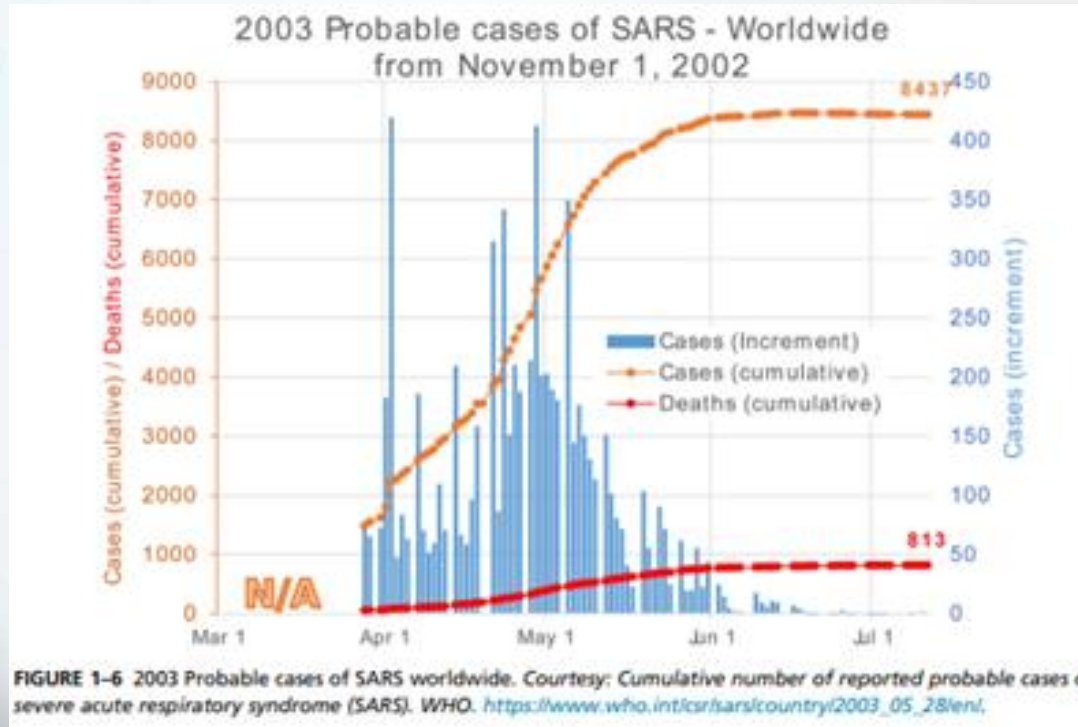
North York General Hospital
2001-2004

Acute Care/ Alternate Level
of Care/Long Term Care-
Toronto

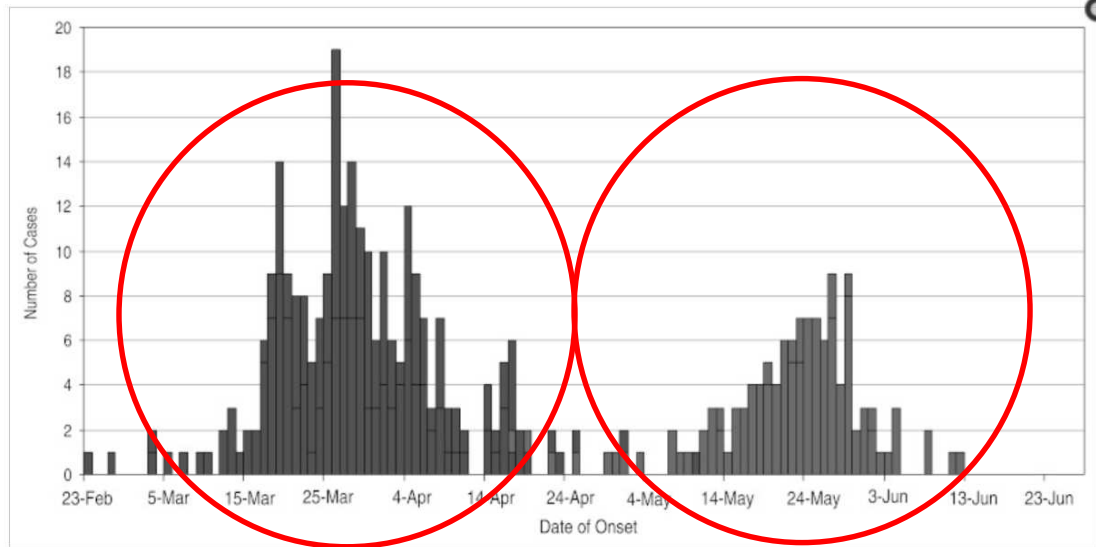
And then this happened...



Global Case Counts



SARS in Toronto



Toronto:
375 cases
169 HCWs
44 deaths

FIGURE 1-1 SARS Toronto: Phases I and II

The two SARS outbreaks that occurred in Toronto and the age distribution of cases. The majority of cases, which occurred between the ages of 18 and 64, were among health care workers, patients, and visitors to patients in hospitals.

SARS in Toronto- My Experience

Staffing at the time consisted of 2 ICPs for:

- 425 Acute Care beds
- 175 Alternate Level of Care (ALC) and Rehabilitation beds
- 200 Long Term Care (LTC) beds

Total: 800 beds



Nelia Laroza Memorial Garden, North York General Hospital, Toronto, ON

SARS in Toronto- My Experience

- ICPs from the US came to assist
- CDC did a site visit
- Public Health would not come onsite- I completed 10 day histories on suspect and confirmed cases
- PH quarantined my neighbour because he was “exposed” to me (I was not sick!!!)
- I could not safely be around my family
- Asked to participate in the Walker Panel- Ontario’s expert panel on SARS
- As part of a study post-SARS outbreak, I had serology testing done- I was negative



Impact on Infection Prevention and Control

Precautionary Principle:

“Where there is reasonable evidence of an impending threat to public health, it is inappropriate to require proof of causation beyond a reasonable doubt before taking steps to avert the threat.”

Proposed reforms to:

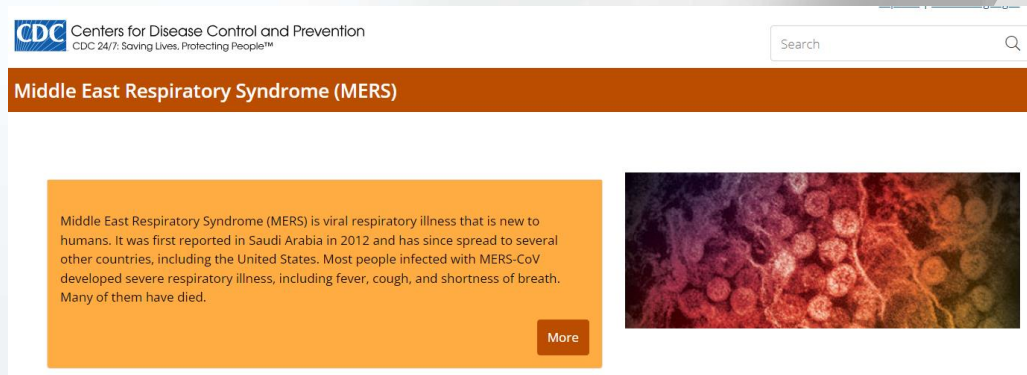
- Public Health in Ontario
- Occupational Health and Safety

Provincial Infectious Diseases Advisory Committee (PIDAC) was established in 2004 in response to the recommendations of the SARS expert panel
(I was a member 2016-2021)



Middle Eastern Respiratory Syndrome (MERS)

- First case 2012 now detected in 27 countries but majority of MERS-CoV cases continue to be reported from the Middle East
- Source points to dromedary camels in the Middle East as a reservoir from which humans sporadically become infected through zoonotic transmission
- Secondary human-to-human transmission has occurred, particularly within households and in healthcare settings.



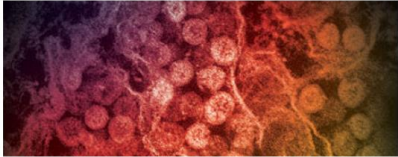
CDC Centers for Disease Control and Prevention
CDC 24/7. Saving Lives. Protecting People™

Search

Middle East Respiratory Syndrome (MERS)

Middle East Respiratory Syndrome (MERS) is viral respiratory illness that is new to humans. It was first reported in Saudi Arabia in 2012 and has since spread to several other countries, including the United States. Most people infected with MERS-CoV developed severe respiratory illness, including fever, cough, and shortness of breath. Many of them have died.

More



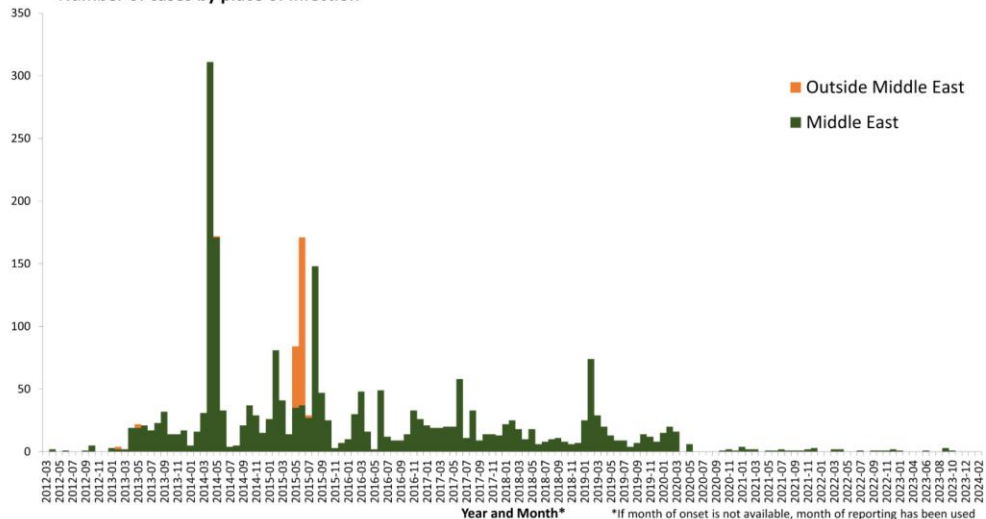
Case Counts
 - Total: 2600
 - Canada: 0
 - US: 2

Countries with Lab-Confirmed MERS Cases

Countries in or near the Arabian Peninsula that have reported MERS cases: Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE), and Yemen.

Countries outside of the Arabian Peninsula with travel-associated MERS cases: Algeria, Austria, China, Egypt, France, Germany, Greece, Italy, Malaysia, Netherlands, Philippines, Republic of Korea, Thailand, Tunisia, Turkey, United Kingdom (UK), and United States of America (USA).

Number of cases by place of infection



Impact on Infection Prevention and Control

Syndromic Surveillance:

A form of surveillance that generates information for public health action by collecting, analyzing and interpreting routine health-related data on symptoms and clinical signs reported by patients and clinicians rather than being based on microbiologically or clinically confirmed cases.

Utilizes data from telehealth triage systems, general practice and emergency departments



Covid-19- My Experience

IPAC Screening:

- Temperature >38C?
- Respiratory symptom screening
- GI symptom screening
- Close contact with someone who is sick?
- Travel outside of Canada in the last 21 days or contact with a sick person who has travelled outside Canada in the last 21 days
- Previous admission to hospital or long term care facility in the last 12 months?
- Encounters with the healthcare system outside of Canada in the last 12 months (i.e. dialysis, cumulative >12 hours of any kind of care)
- Have you been told that you have a multi-drug resistant organism such as MRSA, VRE or CPE?

IPAC Screening

Flowsheet Row

IPAC Screening

- Do you have a temperature over 37.8C?
- Do you have any of the following respiratory symptoms?
- Do you have any of the following GI symptoms?
- Do you have any other symptoms?
- Have you been confirmed to have COVID-19 or had close contact with a confirmed case of COVID-19 in the last 10 days?
- Have you travelled outside of Canada or been in contact with a sick person who has travelled outside of Canada in the last 21 days?
- Have you been admitted to a hospital or long term care facility in the last 12 months?
- Have you had any significant encounters with a healthcare system outside of Canada in the last 12 months (e.g. dialysis, cumulative 12+ hours of any kind of care)
- Have you been told that you have MRSA, VRE, or CPO?
- Have you had contact with someone who is a confirmed CPO patient?
- Do you live in a facility that is on outbreak?

Ebola (2014-2016)

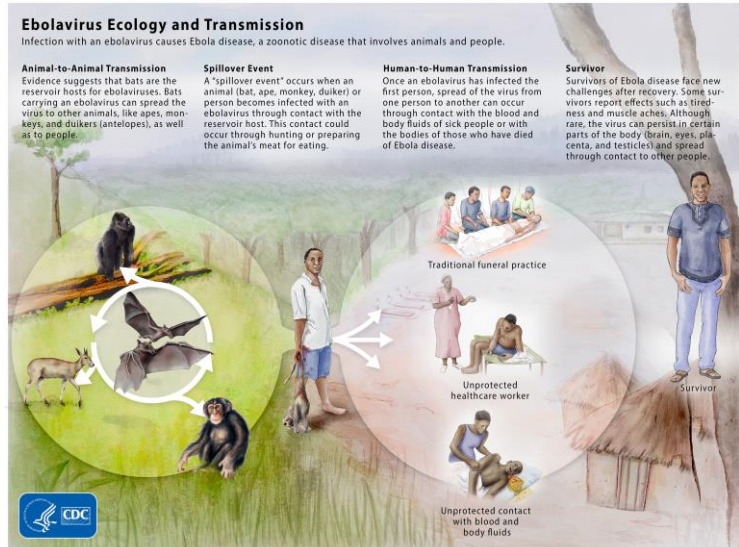
2014

The 2014-2016 Ebola Outbreak in West Africa begins.

The 2014-2016 Ebola Outbreak in West Africa begins.

In September 2014, the CDC confirmed the case of Ebola in the U.S. in a man who traveled from West Africa to Dallas, Texas. APIC members provide training to teams traveling abroad and serve on the ground in West Africa assisting with the response. APIC makes national headlines and [testifies before Congress](#) with its "Ebola Readiness Survey" which found that only 6 percent of IPs at U.S. hospitals indicated they were well-prepared to receive a patient with Ebola and that one in two hospitals have only 1 or fewer than 1 full-time IPs on staff.

Chicungunya-US travel associated cases total 2,799 represented risk for pregnant women.



Case Counts:

Total:

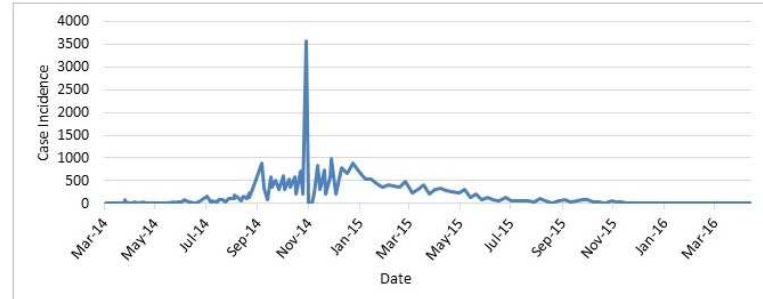
**28,616 with 11,310 deaths in
Guinea, Liberia and Sierra
Leone**

**36 with 15 deaths in other
countries**

Canada: 0

**US: 11 (9 travel related, 2
HCWs who cared for Ebola
patient)**

The Frequency of New Cases in Guinea, Liberia, and Sierra Leone during the Ebola Outbreak from March 25, 2014 to April 13, 2016



Impact on Infection Prevention and Control

Enhanced Surveillance:

- Symptom screening at hospitals
- Airport screening for travelers coming from high risk countries

Contact tracing and 21 day quarantine for contacts

Up to date and consistent P&P (evolved into Viral Hemorrhagic Fever policy)

PPE:

- Updated guidance
- Detailed instructions that include specifying that no skin should be exposed
- Extensive instructions for donning and doffing the equipment
- Added clarification that Ebola may spread through wet droplets such as sneezes



Covid-19- My Experience

- Selection of enhanced PPE (water-proof, completely covers all skin) with detailed protocols
- Extensive staff training on donning and doffing
- Selection of specific group of staff to manage a suspect/confirmed case of Ebola
- Identify flow of patient from emergency department to critical care
- Subsequently, hospitals were designated to manage Ebola cases. All others managed patients only in the emergency department



Covid-19

"Humans get viruses from wildlife - it's been true throughout our entire evolutionary history. The best thing we can do is separate ourselves from this wildlife and have better surveillance."

Tedros Adhanom Ghebreyesus,
director-general of the World Health
Organization

2019

Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province. A novel coronavirus is eventually identified.

December 31st: Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province. A novel coronavirus is eventually identified.

This Day In History

JANUARY | 20

Choose another date

M/D

2020

First confirmed case of COVID-19 found in U.S.



Photo Credit: Chris Semolka/Getty Images

US: first confirmed case January 20, 2020

A look back at Canada's first COVID-19 case

August 25, 2020



Dr. Jerome Leis, Sunnybrook's medical director of infection prevention and control.

On January 25, Canada's first case of COVID-19 was confirmed at Sunnybrook.

2020
WHO declares COVID-19 a global pandemic.
March 11th: WHO declares COVID-19 a global pandemic.

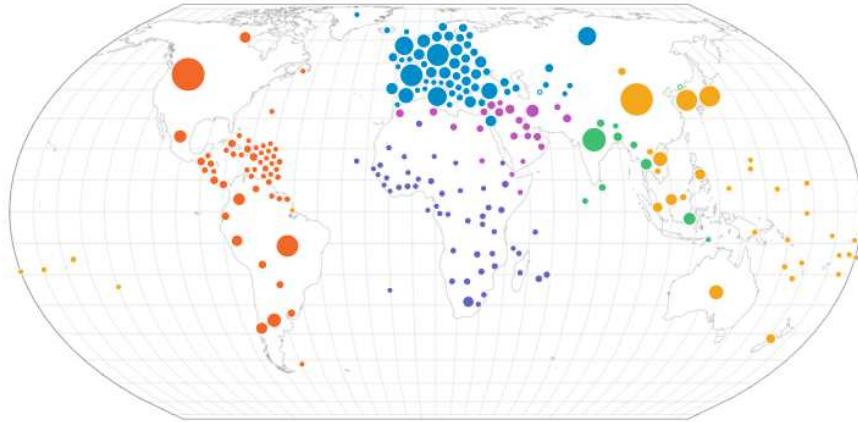


Canada: first confirmed case January 27, 2020

<https://apic.org/50th-anniversary-timeline/>

Number of COVID-19 cases reported to WHO (cumulative total)

World



WHO Regions

- Africa
- Americas
- Eastern Mediterranean
- Europe
- South-East Asia
- Western Pacific

Source: World Health Organization

774,834,251

Reported COVID-19 cases

3 March 2024

Number of COVID-19 cases reported to WHO (cumulative total)

World

Country	Cases
United States of America	103.4m
China	99.3m
India	45m
France	39m
Germany	38.4m
Brazil	37.5m

Show less

Covid-19- My Experience

Scarborough Health Network:

- Over 900 inpatient beds
- 3 Acute Care hospitals
- 8 Satellites
- One of the largest dialysis programs in North America

Staffing:

Pre-pandemic	Post-Pandemic
8 ICPs 1 Supervisor 1 Manager (me) 0.2 FTE Medical Director	Acute Care: 10 ICPs 1 Supervisor 1 Manager
	IPAC Hub: 4 ICPs 1 Supervisor



2ND HIGHEST

SHN saw the second-highest number of COVID-19 cases in Ontario

*January 2021: Highest number of admitted cases at 250

Covid-19- My Experience

- Had a pandemic plan but difficult to operationalize
- PPE stockpile could only sustain us for a few months (many facilities had expired stock!)
- Supplies became a concern especially N95 respirators
- Many rules were broken such as the extended/reuse of PPE



Covid-19- My Experience

Challenges- there were many!!!

- Changing guidance (with each new variant)
- Updating P&P and operationalizing the changes
- Increase in consultations (internal and external)
- Vetting of supplies (PPE, hand sanitizer)

Staffing:

- Increased workload (24/7)
- Inexperienced ICP staff
- Lack of time to properly train new staff
- Extended coverage to community left us short-staffed in acute care



Impact on Infection Prevention and Control

Preparedness- globally coordinated effort required led by the WHO/WHA

- to coordinate pandemic response to allow rapid mobilization of mitigation and control strategies at an international scale
- monitoring of emerging infectious diseases
- global surveillance and regulation of domestic and wild animal trade
- Bolster research and development of vaccines for ALL world regions

Intensify search for the origins of SARS-CoV2

- Unbiased, transparent work by international team



Quarantine



A mother and child rush past a quarantined home during a plague epidemic in this 19th-century illustration titled *The Quarantine* by Honoré Daumier. (Science Photo Library)

<https://www.cbc.ca/news/canada/newfoundland-labrador/apocalypse-then-marking-homes-1.6032272>



<https://www.nytimes.com/2021/03/10/us/politics/coronavirus-nursing-homes.html>

“I think it’s very healthy to spend time alone. You need to know how to be alone and not be defined by another person.” – Oscar Wilde



03

Overview of Key Organisms in Healthcare

Global Top 10 Organisms Causing Death

Rank	Pathogen	All-cause age-standardised mortality rate
1	<i>Staphylococcus aureus</i>	14.6
2	<i>E. coli</i>	12.6
3	<i>Streptococcus pneumoniae</i>	11.4
4	<i>Klebsiella pneumoniae</i>	11.4
5	<i>Pseudomonas aeruginosa</i>	7.4
6	<i>Acinetobacter baumannii</i>	5.8
7	<i>Enterobacter species</i>	4.2
8	Group B <i>Streptococcus</i>	4.4
9	<i>Enterococcus faecalis</i>	2.8
10	<i>Enterococcus faecium</i>	2.8
27	<i>Clostridioides difficile</i>	0.4

Global Report on Infection Prevention and Control, 2022

“HAIs are among the most frequent adverse events occurring in the context of health service delivery”



High Income Countries (HIC) HAIs in acute care: 7/100 patients

Low-Middle Income Countries (LMIC) HAIs in acute care: 15/100 patients

Up to 30% of patients in intensive care are affected by HAIs with 2-20 X higher incidence in LMICs than in HICs

Prevalent Organisms in Healthcare

Top 15 Healthcare Associated Infection (HAI) Pathogens Reported to the National Healthcare Safety Network, Adults 2018-2021

Pathogen	# Pathogens	% Pathogens	Rank
<i>Escherichia coli</i>	73,556	16.2	1
<i>Staphylococcus aureus</i>	51,131	11.3	2
<i>Enterococcus faecalis</i> ²	39,129	8.6	3
Select <i>Klebsiella</i> spp.	38,496	8.5	4
<i>Pseudomonas aeruginosa</i>	36,004	7.9	5
Coagulase-negative staphylococci	32,276	7.1	6
<i>Enterobacter</i> spp.	18,431	4.1	7
<i>Enterococcus faecium</i> ²	16,904	3.7	8
<i>Candida albicans</i> ²	16,458	3.6	9
<i>Proteus</i> spp.	13,953	3.1	10
<i>Bacteroides</i> spp.	11,602	2.6	11
Viridans group streptococci	9,962	2.2	12
Other <i>Candida</i> spp. ²	9,803	2.2	13
Other <i>Enterococcus</i> spp. ²	9,091	2.0	14
<i>Candida glabrata</i> ²	7,622	1.7	15
Other pathogen	68,522	15.1	
Total	452,940	100.0	

2022 SPECIAL REPORT COVID-19 U.S. IMPACT ON ANTIMICROBIAL RESISTANCE

COVID-19: U.S. Impact on Antimicrobial Resistance, Special Report 2022

COVID-19 Impacts on 18 Antimicrobial-Resistant Bacteria and Fungi Threat Estimates

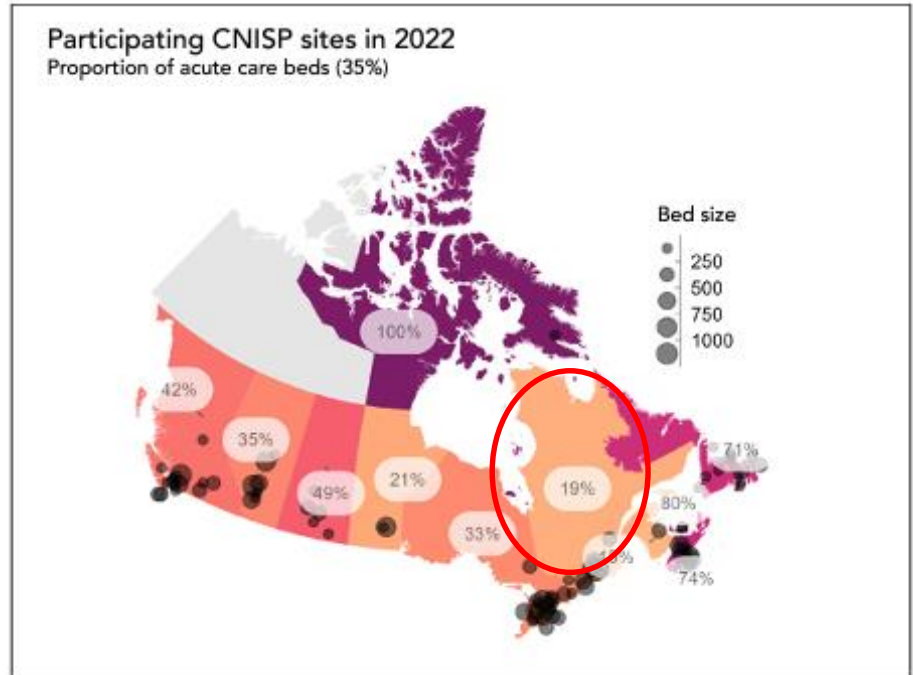
The following table summarizes the latest national death and infection estimates for 18 antimicrobial-resistant bacteria and fungi. The pathogens are listed in three categories—urgent, serious, and concerning—based on level of concern to human health identified in 2019.

	Resistant Pathogen	2017 Threat Estimate	2018 Threat Estimate	2019 Threat Estimate	2017-2019 Change	2020 Threat Estimate and 2019-2020 Change
URGENT	Carbapenem-resistant <i>Acinetobacter</i>	8,500 cases 700 deaths	6,300 cases 500 deaths	6,000 cases 500 deaths	Stable*	7,500 cases 700 deaths Overall: 35% increase* Hospital-onset: 78% increase*
	Antifungal-resistant <i>Candida auris</i>	171 clinical cases*	329 clinical cases	466 clinical cases	Increase	754 cases Overall: 60% increase
	<i>Clostridioides difficile</i>	23,900 infections 12,800 deaths	221,200 infections 12,600 deaths	202,600 infections 11,500 deaths	Decrease	Data delayed due to COVID-19 pandemic
	Carbapenem-resistant Enterobacterales	13,100 cases 1,100 deaths	10,300 cases 900 deaths	11,900 cases 1,000 deaths	Decrease*	12,700 cases 1,100 deaths Overall: Stable* Hospital-onset: 35% increase*
	Drug-resistant <i>Neisseria gonorrhoeae</i>	550,000 infections	804,000 infections	942,000 infections	Increase	Data unavailable due to COVID-19 pandemic
SERIOUS	Drug-resistant <i>Campylobacter</i>	448,400 infections 70 deaths	630,810 infections	725,210 infections	Increase	Data delayed due to COVID-19 pandemic 26% of infections were resistant, a 10% decrease
	Antifungal-resistant <i>Candida</i>	34,800 cases 1,700 deaths	27,000 cases 1,300 deaths	26,600 cases 1,300 deaths	Decrease*	28,100 cases 1,400 deaths Overall: 12% increase* Hospital-onset: 26% increase*
	ESBL-producing Enterobacterales	197,400 cases 9,100 deaths	174,100 cases 8,100 deaths	194,400 cases 9,000 deaths	Increase*	197,500 cases 9,300 deaths Overall: 10% increase* Hospital-onset: 32% increase*
	Vancomycin-resistant Enterococcus	54,500 cases 5,400 deaths	46,800 cases 4,700 deaths	47,000 cases 4,700 deaths	Stable*	50,300 cases 5,000 deaths Overall: 16% increase* Hospital-onset: 14% increase*

15

Canadian Nosocomial Infection Surveillance Program (CNISP)

Figure 2: Geographical distribution and characteristics of the Canadian Nosocomial Infection Surveillance Program participating hospitals across Canada^{a,b}



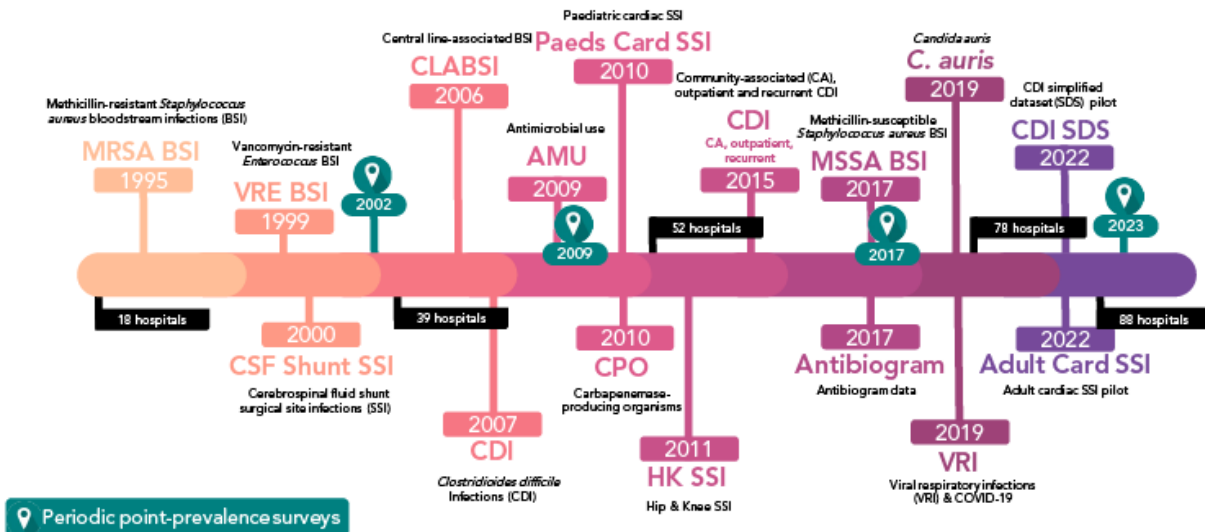
Abbreviation: CNISP, Canadian Nosocomial Infection Surveillance Program

^a Percentage labels represent the percentage of acute care beds within each province/territory captured by CNISP

^b Circles represent CNISP participating hospitals. The size of the circle is proportional to the hospital's bed capacity

Figure 1: Summary of the Canadian Nosocomial Infection Surveillance Program surveillance activities, 1995 to 2022

CNISP surveillance activities





04

Changing Dynamics of Infectious Diseases

Emerging (EID) and Re-Emerging (REID) Infectious Diseases

EIDs are:

- Outbreaks of previously unknown diseases
- Known disease that is rapidly increasing in incidence or geographic area in the last 2 decades
- Persistence of infectious diseases that cannot be controlled

REIDs are:

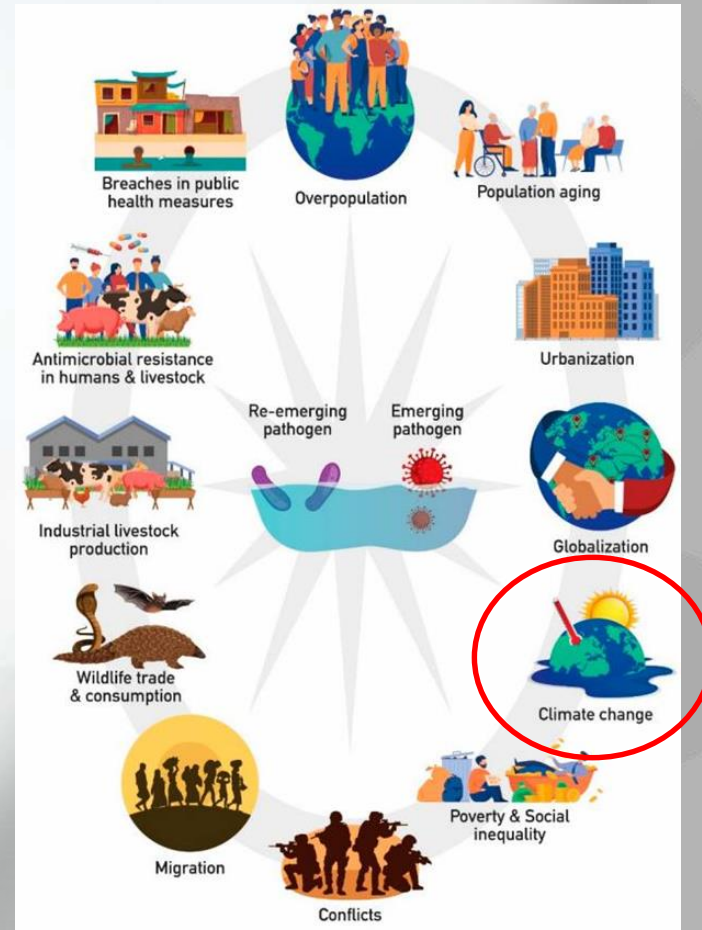
- Diseases that reappear after they have been on a significant decline

Re-emergence may happen because of:

- a breakdown in public health measures for diseases that were once under control
- new strains of known disease-causing organisms appear
- human behavior such as the return of vaccine preventable

Factors that Precipitate the Occurrence and Transmission of EIDs and REIDs...

Most EIDs and REIDs have a zoonotic origin, denoting that the disease has emerged from an animal and crossed the species barrier to infect humans



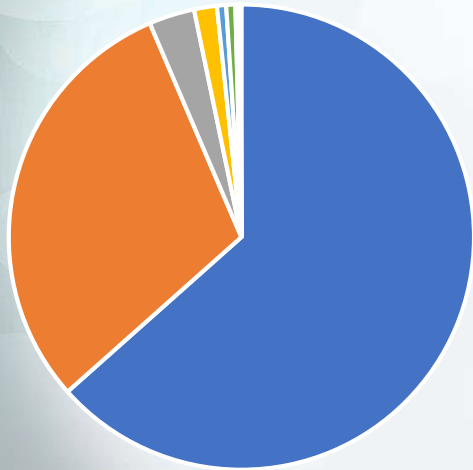
slido



What animal is the #1 killer of humans in the world?

ⓘ Start presenting to display the poll results on this slide.

Animals That Kill the Most Humans Number/Year

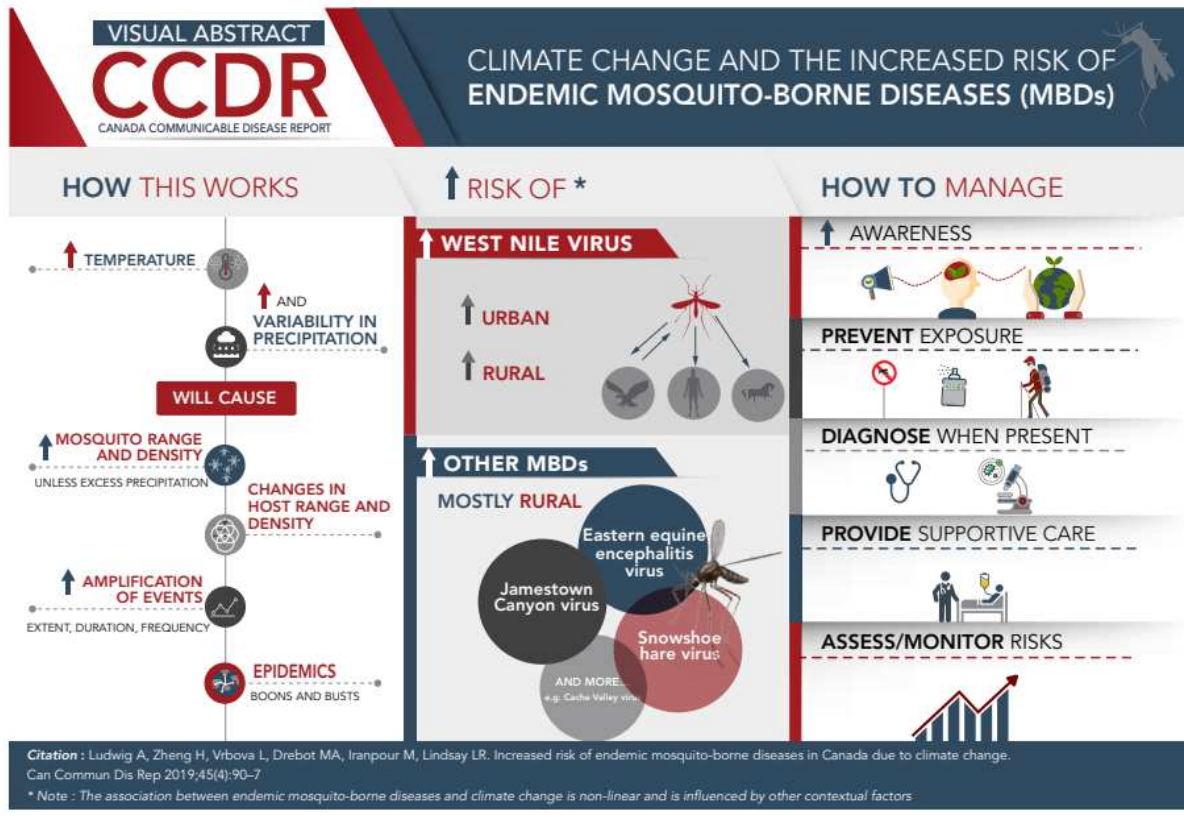


- Mosquito
- Human
- Snake
- Dog
- Tsetse fly
- Assassin bug
- Freshwater snail
- Ascaris roundworm
- Tapeworm
- Crocodile

1. Mosquitoes (~ 1,000,000 Deaths)



Mosquito-Borne Diseases Canada



OUR RISK FOR INFECTIOUS DISEASES

Is Increasing Because of Climate Change



These are just some of the infectious diseases that are on the rise and spreading to new areas of the United States. Milder winters, warmer summers, and fewer days of frost make it easier for these and other infectious diseases to expand into new geographic areas and infect more people.

<https://www.cdc.gov/ncezid/pdf/climate-change-and-infectious-diseases-H.pdf>

As the climate changes, the risk also increases for health threats such as:

- ▶ Anaplasmosis
- ▶ Anthrax
- ▶ Antibiotic-resistant infections
- ▶ Cryptosporidiosis
- ▶ Dengue
- ▶ Ehrlichiosis
- ▶ Fungal diseases like valley fever and histoplasmosis
- ▶ Giardiasis
- ▶ Hantavirus
- ▶ Harmful algal bloom-associated illness
- ▶ Lyme disease
- ▶ Plague
- ▶ Rabies
- ▶ Spotted fever rickettsiosis
- ▶ Salmonellosis
- ▶ Vibriosis
- ▶ West Nile virus disease

Recent Examples...

Ongoing avian influenza outbreaks in animals pose risk to humans

Situation analysis and advice to countries from FAO, WHO, WOAH

12 July 2023 | Statement | Geneva/Paris/Rome | Reading time: 6 min (1743 words)

The current outbreaks of avian influenza (also called “bird flu”) have caused devastation in animal populations, including poultry, wild birds, and some mammals, and harmed farmers’ livelihoods and the food trade. Although largely affecting animals, these outbreaks pose ongoing risks to humans.

The Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO), and the World Organisation for Animal Health (WOAH) are urging countries to work together across sectors to save as many animals as possible and to protect people.

Avian influenza viruses normally spread among birds, but the increasing number of H5N1 avian influenza detections among mammals—which are biologically closer to humans than birds—are—raises concern that the virus might adapt to infect humans more easily. In addition, some mammals may act as mixing vessels for influenza viruses, leading to the emergence of new viruses that could be more harmful to animals and humans.

AVIAN INFLUENZA, HUMAN - VIET NAM (02): (KHANH HOA) H5N1, FATAL

A ProMED-mail post

<http://www.promedmail.org>

ProMED-mail is a program of the
International Society for Infectious Diseases

<http://www.isid.org>

Date: Sat 23 Mar 2024

AVIAN INFLUENZA, HUMAN - CAMBODIA (04): (KRATIE) H5N1, FATAL

A ProMED-mail post

<http://www.promedmail.org>

ProMED-mail is a program of the
International Society for Infectious Diseases

<http://www.isid.org>

Date: Sat 10 Feb 2024

Important Updates on Locally Acquired Malaria Cases Identified in Florida, Texas, and Maryland

[Print](#)



Distributed via the CDC Health Alert Network

August 28, 2023, 2:15 PM ET
CDCHAN-00496

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Update to share new information with clinicians, public health authorities, and the public about locally acquired malaria cases identified in the United States. On August 18, 2023, a single case of locally acquired malaria was reported in Maryland in the National Capital Region. This case was caused by the *Plasmodium falciparum* (*P. falciparum*) species and is unrelated to the cases involving local transmission of *Plasmodium vivax* (*P. vivax*) malaria in Florida and Texas described in the [HAN Health Advisory 434](#) issued on June 26, 2023. As an update to that report, to date, Florida has identified seven cases and Texas has identified one case of locally acquired *P. vivax* malaria, but there have been no reports of local transmission of malaria in Florida or Texas since mid-July 2023.

Severe *Vibrio vulnificus* Infections in the United States Associated with Warming Coastal Waters

[Print](#)



Distributed via the CDC Health Alert Network

September 01, 2023, 12:30 PM ET
CDCHAN-00497

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory to:

- Notify healthcare providers, laboratories, and public health departments about recent reports of fatal *Vibrio vulnificus* (*V. vulnificus*) infections, including wound and foodborne infections.
- Urge healthcare professionals to consider *V. vulnificus* as a possible cause of infected wounds that were exposed to coastal waters, particularly near the Gulf of Mexico or East Coast, and during periods with [warmer coastal sea surface temperatures](#).
- Share important guidance for managing *V. vulnificus* wound infections.

World Health Organization: Prioritizing the World's Greatest Pathogen Threats

- 200 global experts are independently reviewing and shortlisting pathogens of pandemic concern
- Key Criteria to Shortlist:
 - How transmissible are they?
 - How virulent are they?
 - Are there sufficient vaccines or treatments in the event of a pandemic or epidemic?

2018 Priority List

- COVID-19
- Crimean-Congo haemorrhagic fever
- Ebola virus disease and Marburg virus disease
- Lassa fever
- Middle East respiratory syndrome coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS)
- Nipah and henipaviral diseases
- Rift Valley fever
- Zika
- "Disease X"*

The WHO list of priority pathogens of epidemic and pandemic threat is expected to be publicly release in the first half of 2024.

Disease “X”

- * Disease X represents the knowledge that a serious international epidemic could be caused by a pathogen currently unknown to cause human disease.

SUMMARY

- Infection Prevention and Control is a growing field
- This growth was accelerated by the pandemic
- We have a greater proportion of less experienced ICPs
- It is important to learn from history and to plan for future events both locally and globally



What's Needed to Enhance Future Response?

- Globally coordinated response
- Monitor potential threats- new list of pathogens in 2024
- Target research on diseases of greatest epidemic/pandemic threat
- New epidemiological surveillance tools using Artificial Intelligence (AI)
- Wastewater Surveillance
- Evolution of safe and rapid development of diagnostics and therapeutics
- Safe, efficient and fast vaccine production



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THANKS!

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References

GBD 2019 Antimicrobial Resistance Collaborators. Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2022 Dec 17;400(10369):2221-2248. doi: 10.1016/S0140-6736(22)02185-7. Epub 2022 Nov 21. PMID: 36423648; PMCID: PMC9763654.

Pogorzelska-Maziarz M et al., APIC Megasurvey 2020: Methodology and overview of results. *Am J Infect Control*. 2023 Mar;51(3):241-247. doi: 10.1016/j.ajic.2022.12.002. Epub 2022 Dec 17. PMID: 36535317.

Sachs J. et al., The Lancet Commission on Lessons for the Future from the Covid-19 Pandemic *Lancet* 2022; 400: 1224–80. [https://doi.org/10.1016/S0140-6736\(22\)01585-9](https://doi.org/10.1016/S0140-6736(22)01585-9).

Smith G. E. et al., Public Health England Real-time Syndromic Surveillance Team (2019). Syndromic surveillance: two decades experience of sustainable systems - its people not just data!. *Epidemiology and infection*, 147, e101. <https://doi.org/10.1017/S0950268819000074>

Spernovasilis N.et. al. Emerging and Re-Emerging Infectious Diseases: Humankind's Companions and Competitors. *Microorganisms* 2022, 10, 98. <https://doi.org/10.3390/microorganisms10010098>

Torriani F. et. al., History of infection prevention and control. *Infectious Diseases*. 2010:76–85. doi: 10.1016/B978-0-323-04579-7.00006-X. Epub 2012 Mar 21. PMCID: PMC7151947.