In Collaboration with the University of Manitoba
the Health Sciences Centre Winnipeg presents

THE 29th ANNUAL BUG DAY Abstracts

Health Sciences Centre Winnipeg
A Shared Health facility

Overall Program Objectives:

By attending this program, the attendee will be able to:

1. State the names of the key pathogens that have been clinically and socially relevant over the past 29 years.
2. State how the determinants of health influence a person's risk for infection
3. State how to modify risk factors for the acquisition of infection

Thursday, October 23, 2025

Join us digitally by registering before Oct 22, 2025
at: **www.hsc.mb.ca/Bugday.html**

Bug Day Agenda

0800 - 0805	**Land Acknowledgment** Chris Christodoulou, MD, Shared Health
0805 - 0815	**Introduction to Bug Day/Grand Rounds** John Embil, MD, Winnipeg Regional Health Authority
0815 - 0830	**Alexander Fleming:** **A Chance Discovery that Changed Society** Kevin Brown, MA, National Health Services, UK
0830 - 0845	**Florence Nightingale:** **A Pioneer in Infection Prevention and Control** Melissa Wert, MA, Florence Nightingale Museum, UK
0845 - 0900	***Neisseria gonorrhoeae:* Cross Canada Checkup** Todd Hatchette, MD, Dalhousie University
0900 - 0915	**Questions and Answers**
0915 - 0930	**The Manitoban Impact on Global Infectious Disease Research: The Nairobi, Kenya Case** Keith Fowke, PhD, University of Manitoba
0930 - 0945	**Human Papilloma Virus and Other Sexually Transmitted Infections** Lyle McKinnon, PhD, University of Manitoba
0945 - 1000	**Why do We Care about Hormones when Studying the Immune System?** Julie Lajoie, PhD, University of Manitoba
1000 - 1015	**Questions and Answers**
1015 - 1030	**Break**
1030 - 1045	**Influenza: Always Rearing its Ugly Head** Jared Bullard, MD, University of Manitoba
1045 - 1100	**Sepsis: A Call for Action** Gloria Vazquez Grande, MD, University of Manitoba
1100 - 1115	**Measles: Neither Gone nor Forgotten** Santina Lee, MD, University of Manitoba
1115 - 1130	**Questions and Answers**
1130 - 1200	**Lunch**
1200 - 1300	**Medical Grand Rounds:** **Xeno Transplantation: The Future or Fantasy** Julie Ho, MD, and Armelle Villalobos, MD, University of Manitoba
1300 - 1315	**Organizing Chaos –** **The Incident Command System in Healthcare** Jeff Martin, BA, Shared Health
1315 - 1330	**Opportunities (and Challenges) for Improved Diagnosis and Prevention of Syphilis** Mara Goodyear, PhD, University of Victoria
1330 - 1345	**Controlling Legionella in the Healthcare Environment: Facilities Water Management** Craig Doerksen, P Eng., Shared Health
1345 - 1400	**Questions and Answers**
1400 - 1415	**Hyperbaric Oxygen: Facts and Myths** Yoav Keynan, MD, University of Manitoba
1415 - 1430	**First Use of Bacteriophage (Phage) Therapy in Canada for the Treatment of a Periprosthetic Joint Infection** Marisa Azad, MD, University of Ottawa
1430 - 1445	**What do the Germs Know?** **Life Lessons from the Microbial World** Sarah Forgie, MD, University of Saskatchewan
1445 - 1500	**Questions and Answers**
1500 - 1515	**Break**
1515 - 1530	**What's Biting You?** **A Primer on Tick-Borne Diseases** Philippe Lagacé-Wiens, MD, Shared Health
1530 - 1545	**Walking Pneumonia…** **Is it Still Walking Amongst Us?** Wayne Ghesquire, MD, University of British Columbia
1545 - 1600	**Where to Next? The Effects of Excess on Human Health** Pierre Plourde, MD, Winnipeg Regional Health Authority
1600 - 1615	**Questions and Answers**

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Alexander Fleming: A Chance Discovery that Changed Society

Kevin Brown, MA
Alexander Fleming Laboratory Museum, Imperial College Healthcare NHS Trust
National Health Services, United Kingdom

Abstract:
The discovery of penicillin by Alexander Fleming in 1928 revolutionised the practice of medicine and improved the health of mankind. Was the discovery the product of chance or were other factors at play? Was Fleming lucky or prepared to make a discovery of importance to the world? How did his observation of the inhibition of bacteria by a mould become a lifesaving drug?

Objectives
By attending this session, the attendee will be able to:

1. State the importance of penicillin for the development of modern medicine
2. State how chance events favor only the prepared mind
3. Compare the role of the individual and of teamwork in scientific discovery

Multiple Choice Questions (Select the best answer)

1. Where was penicillin discovered?
   a. St Bartholomew's Hospital, London
   b. The Radcliffe Infirmary, Oxford
   c. St Mary's Hospital, Paddington
   d. London School of Hygiene and Tropical Medicine

2. What did Fleming discover in 1921 before penicillin?
   a. Influenza vaccine
   b. Lysozyme
   c. Phagocytosis
   d. Insulin

3. Who was the biochemist who share a Nobel Prize with Fleming for penicillin?
   a. Ernst Chain
   b. Dorothy Hodgkin
   c. Paul Ehrlich
   d. Gerhardt Domagk

Florence Nightingale: A Pioneer in Infection Prevention and Control

Melissa Wert, MA
Florence Nightingale Museum, United Kingdom

Abstract:
Florence Nightingale is often referred to as the 'Mother of Modern Nursing'. Not only did she save countless lives nursing the wounded at Scutari Hospital, but she was also a pioneer in evidence-based healthcare, leading to widespread changes and reforms. By using statistical data, she was able to notice previously unrecognized links and gain respect within the male dominated spaces of medicine and statistics. This data allowed for the implementation of methods that directly resulted in the decrease in the spread of disease and fatality rates.

Objectives
By attending this session, the attendee will be able to:

1. State the vital role Florence Nightingale played in decreasing casualties during the Crimean war
2. State what evidence-based healthcare is and how medicine is closely related to statistics
3. State how Florence Nightingale revolutionized healthcare

Multiple Choice Questions (Select the best answer)

1. What was the name of the theory Florence Nightingale believed in during the Crimea War before germ theory became popularized?
   a. Chaos Theory
   b. Miasma Theory
   c. Cleaning Theory
   d. Hydration Theory

2. How many people signed Florence Nightingale's nomination to the Royal Statistical Society?
   a. 4
   b. 10
   c. 11
   d. 5

3. How was the Nightingale Training School initially funded?
   a. Government support
   b. Personal wealth
   c. The Nightingale Fund/ Public Collection
   d. Tuition fees

Neisseria gonorrhoeae: Cross Canada Checkup

Todd Hatchette, MD
Department of Medical Microbiology
Dalhousie University

Abstract:
Gonorrhea (GC) is a sexually transmitted infection (STI) caused by Neisseria gonorrhoeae, that remains a major public health concern. The rates of infection in Canada are climbing and increasing resistance rates are a growing public health concern. The Sexually Transmitted and Blood Borne Infections Advisory Committee has recently undated their treatment guidelines for GC.

Objectives
By attending this session, the attendee will be able to:

1. State the epidemiology of GC in Canada
2. State the resistance patterns of GC
3. Provide the recommended treatments from the new PHAC guidelines

Multiple Choice Questions (Select the best answer)

1. The current preferred treatment option for GC in Canada is:
   a. Ceftriaxone 250 mg IM + Azithromycin 1 g
   b. Doxycycline 100 mg bid x 78 days followed by moxifloxacin 400 mg daily x 7 days
   c. Ceftriaxone 500 mg IM
   d. Gentamicin 240 mg IM and azithromycin 1 gm

2. Which of the following describes multi drug resistant GC?
   a. Resistance o cephalosporins
   b. Resistant to azithromycin and decreased susceptibility/resistance to cephalosporins plus resistance to two other antimicrobials.
   c. Resistance to azithromycin and ciprofloxacin
   d. Either decreased susceptibility to the cephalosporins or resistance to azithromycin plus resistance to at least two other antimicrobials.

3. Which of the following statements is true?
   a. Gonorrhea is the most common bacterial STI in Canada
   b. Rate of infection are greatest in the port cities of Atlantic Canada
   c. It is possible to get infection form a toilet seat
   d. Testing throat and rectal specimens increased the rate of detection

The Manitoban Impact of Global Infectious Disease Research: The Nairobi, Kenya Case

Keith Fowke, PhD
Department of Medical Microbiology and Infectious Diseases
University of Manitoba

Abstract:
The University of Manitoba (UM) has been working in Nairobi, Kenya since 1980, first on bacterial sexually transmitted infections (STI) and then onto viral infections, when, in 1986, the Human Immunodeficiency Virus (HIV) was found among 66% of the women from a female sex worker cohort. Today, HIV treatments reduced plasma viral loads thereby enabling people to live with their HIV infections longer and although there are fewer new infections, the incidence of HIV remains too high. The University of Manitoba has been developing novel approaches to identifying the correlates of susceptibility and protection to various STIs including HIV. This talk will present the background of UM work in Kenya, how strong community partnerships were developed and describe some new approaches for HIV prevention.

Objectives:
By attending this session, the attendee will be able to:

1. State the African nation with whom the University of Manitoba has had a long-term collaboration
2. Name two cellular proteins or markers that HIV utilizes to enter a host cell
3. State how inflammation increases the risk of infection with HIV

Multiple Choice Questions (Select the best answer)

1. In which year did University of Manitoba first establish a research collaboration with the University of Nairobi?
   a. 1960
   b. 1980
   c. 2000
   d. 2020

2. Why does inflammation in the genital tract increase the risk of acquiring HIV?
   a. It doesn't
   b. It involves activated T cells which are highly susceptible to HIV infection
   c. It causes an influx of HIV target cells to the genital tract
   d. b and c

3. Describe what the acronym "STI" stands for in the infectious disease field.
   a. Standard Time Interval
   b. Staphylococcus To Influenza ratio
   c. Streptococcus intermedius Infection
   d. Sexually Transmitted Infection

Human Papilloma Virus and other Sexually Transmitted Infections

Lyle McKinnon, PhD
Department of Medical Microbiology and Infectious Diseases
University of Manitoba

Abstract:
Vaccination is a cornerstone of infectious disease prevention, but success against sexually transmitted infections has been more muted. Human papilloma virus (HPV), the causative agent of cervical cancer, is an exception; prophylactic vaccines against HPV have demonstrated exemplary efficacy in clinical trials and emerging real-world evidence of effectiveness. Despite these successes, for various reasons there has been limited access and uptake of HPV vaccines in lower- and middle-income countries that bear the greatest burden of cervical cancer, limiting their global public health impact. Unlike the Human Immunodeficiency Virus (HIV), naturally clearance of HPV is common, and immunological studies suggest that a therapeutic vaccine that increases clearance of HPV and/or regression of pre-cancerous lesions is actively being pursued. Prophylactic and therapeutic vaccine strategies against HPV are thought to rely on different arms of the adaptive immune response, generating protective humoral and adaptive responses, respectively. In collaboration with colleagues in Nairobi, Kenya, several members of the Department of Medical Microbiology and Infectious Diseases (MMID), University of Manitoba, are working on understanding the biological correlates of natural HPV clearance. Another STI in need of better control is *Neisseria gonorrhea*, where access to effective diagnostics is limited and antimicrobial resistance is increasing. Here, evidence that vaccination against a related pathogen, *N. meningitidis*, provides cross-protection against *N. gonorrhea*, has re-invigorated efforts to develop prophylactic vaccines against this STI.

Objectives:
By attending this session, the attendee will be able to:

1. State the natural history of HPV infection and how this can progress to cervical cancer
2. Distinguish between prophylactic and therapeutic HPV vaccines and their underlying immunology
3. State the evidence underlying the renewed interest in prophylactic vaccines against *Neisseria gonorrhea*

Multiple Choice Questions (Select the best answer)

1. The following statement captures what is known about the natural history of HPV infection:
   a. The virus is rapidly acquired upon exposure but is very difficult to clear
   b. The virus is difficult to acquire upon exposure and is very difficult to clear
   c. The virus is rapidly acquired upon exposure and is also rapidly cleared
   d. The virus is difficult to acquire upon exposure and is also very difficult to clear

2. Prophylactic HPV vaccines accomplish the following
   a. Induce antibody responses that are much higher than natural infection
   b. Prevent HPV acquisition in those who are not yet exposed
   c. Protect against multiple HPV strains
   d. Protect against cervical intraepithelial neoplasia regardless of cause
   e. All of the above

3. The protective effect of *Neisseria meningitidis* against *N. gonorrhea*:
   a. Has only been observed in one study from New Zealand
   b. Is also observed for *Chlamydia trachomatis*
   c. Applies only to meningococcal vaccines that contain the outer membrane vesicle
   d. Is fake news created by left-wing propaganda designed to destroy America

Why do We Care about Hormones when Studying the Immune System?

Julie Lajoie, PhD
Department of Medical Microbiology and Infectious Diseases
University of Manitoba

Abstract:
Women are more susceptible to infection with the Human Immunodeficiency Virus (HIV) compared to men. While numerous sociodemographic factors help explain this increased risk, biological factors also play an important role as contributors. One of these biological factors is sex hormones. In women, the expression of sex hormones (estrogen and progesterone) cycles during their reproductive years and decreases until women reach post-menopause. Estrogen and progesterone are important in controlling or driving inflammation and the immune response. However, sex hormone expressions are often forgotten while studying the immune response. This talk will discuss how sex hormones influence the immune response and how they can affect susceptibility to infectious diseases like HIV and HPV.

Objectives:
By attending this session, the attendee will be able to:

1. State how sex hormones (endogenous and exogenous) are important drivers of the immune response
2. State if hormonal contraception influences the immune response and susceptibility to HIV
3. State what is the impact of post menopause on the immune response

Multiple Choice Questions (Select the best answer)

1. How sex hormones affect the immune response
   a. Sex hormones contribute to the development and activity of the immune response
   b. Sex hormones modify the inflammatory environment
   c. Sex hormone expressions can change the microbiome
   d. All these answers are true

2. Why post-menopausal women may be at higher risk of HIV infection?
   a. Decrease in estrogen is associated with a higher proportion of HIV target cells at the genital tract
   b. They are less likely to have protective sex because they don't need to worry about pregnancy
   b. A decrease in estrogen leads to immunosuppression of the immune response, and they can't fight new infection as well as younger women
   c. They have more sex so there is more risk

3. Do men and women build the same immune response to vaccines or pathogen?
   a. No, Women produce more antibodies the men
   b. No, Women have more innate cells and activated T cells the men
   c. No, Men flu is real; pathogens are more virulent in men
   d. Yes, the immune response comprises the same cells and therefore build the same response regardless of sex
   e. All are true
   f. a,b,and c are true

Influenza: Always Rearing its Ugly Head

Jared Bullard, MD
Department of Pediatrics and Child Health
University of Manitoba

Abstract:
Influenza has long been a respiratory viral pathogen of great concern due to its ability to spread rapidly, cause significant disease and modify its antigenic properties with every respiratory viral season. Significant clinical, public health and infection prevention and control resources are dedicated to influenza to mitigate and reduce the impact each year. Influenza also has the potential to have such significant antigenic shift that a pandemic can result (the H1N1 pandemic in 2009 is the most recent example). The cross species and zoonotic potential of influenza is also a significant threat allowing this virus to cross over to humans and cause severe disease. The efforts to monitor H5N1 and highly pathogenic avian influenza (HPAI) will be highlighted in this talk.

Objectives
By attending this session, the attendee will be able to:

1. State the clinical presentation, complications and prevention/treatment of influenza
2. State factors contributing to the variation in severity of the annual influenza seasons
3. State the potential risk to humans for avian influenza

Multiple Choice Questions (Select the best answer)

1. Seasonal trivalent influenza vaccine contains what 3 components?
   a. H3N2, H5N1, H1N1
   b. Influenza B, Influenza C, Influenza A
   c. H1N1, H3N2, Influenza B
   d. Influenza B, H5N1, H1N1

2. Common potential zoonotic vectors for influenza include all EXCEPT:
   a. Muskrat
   b. Geese
   c. Poultry (chickens)
   d. Pigs

3. Which bacteria is commonly associated with secondary infections post-influenza?
   a. *Staphylococcus aureus*
   b. *Streptococcus pyogenes* (Group A streptococcus)
   c. *Streptococcus pneumoniae*
   d. *Staphylococcus epidermidis*

Sepsis: A Call for Action

Gloria Vazquez Grande, MD
Section of Critical Care, Department of Medicine
University of Manitoba

Abstract:
Sepsis remains a worldwide concern and a leading cause of death, responsible for 20% of global deaths. It mainly affects children in lower- and middle-income countries. The burden of sepsis goes beyond the acute infectious phase, causing prolonged post-sepsis syndromes regardless of the social determinants of health. Despite years of research, access to care, prevention, and education remain major actionable approaches to treating sepsis. Sepsis is not only a Critical Care/Intensive Care Unit problem, it starts in the community. As clinicians and scientists, we can all make a difference in sepsis. What will you do?

Objectives
By attending this session, the attendee will be able to:

1. State the global impact of sepsis
2. State the impact of post-sepsis syndrome
3. Advocate for an integrative approach to fight sepsis

Multiple Choice Questions (Select the best answer)

1. What intervention has had the broadest impact on sepsis treatment globally in the last 60 years?
   a. Oral hydration
   b. Vaccines
   c. New antimicrobials
   d. Hand washing

2. Post-sepsis syndrome
   a. Is irrelevant
   b. Impacts the patient shortly after the infection
   c. Impacts the patient's life, their families and their future productivity
   d. Has no impact on society

3. What is the most impactful investment to reduce sepsis mortality?
   a. Basic science
   b. Advocacy
   c. Physician education in sepsis
   d. Send girls to school

Measles: Neither Gone nor Forgotten

Santina Lee, MD
Department of Pediatrics and Child Health
University of Manitoba

Abstract:
Canada achieved elimination status for measles in 1998, meaning there is no sustained endemic transmission. However, since then, we have continued to see sporadic cases, mostly brought in through travel from other countries where measles is circulating. At times, these sporadic cases have led to outbreaks, particularly in communities with low immunization rates. Measles is not just any other virus that causes respiratory disease, it is one of the most contagious infectious diseases that can affect humans. One person with measles infection can infect up to 18 other people who are not immune. It also has some severe complications including death, but we have a very effective prevention tool in the form of vaccines! However, in the post-COVID-19 global pandemic era where routine immunization programs were disrupted and there is lots of misinformation and distrust in the system, immunization rates are not at the targeted 95% required for herd immunity.

Objectives
By attending this session, the attendee will be able to:
1. State the epidemiology of measles In Canada.
2. State the clinical presentation of measles and its differential diagnosis.
3. State when to suspect measles and how to manage a person with measles.

Multiple Choice Questions (Select the best answer)
1. Which of the following individuals does **not** meet criteria for presumptive measles immunity
   a. Health care worker born before 1970
   b. Child with two documented doses of measles containing vaccine
   c. Adult with history of laboratory confirmed measles infection
   d. Individual with positive measles IgG

2. Individuals with measles are considered contagious:
   a. Two days before symptoms begin
   b. From four days before rash onset until four days after rash onset
   c. For a week after symptoms begin
   d. Four days after rash onset

3. If you see a patient with suspected measles you should:
   a. Consider testing to confirm measles with a nasopharyngeal swab for measles PCR and measles serology.
   b. Use routine practice, airborne precautions and perform an assessment to determine if droplet and contact precautions are required.
   c. Notify public health right away and advise the patient to stay home and avoid contact with others until the test results are back.
   d. All of the above

Medical Grand Rounds:
Xenotransplantation: The Future or Fantasy

Julie Ho, MD[1] and Armelle Villalobos, MD[2]
Sections of Nephrology[1] and Infectious Diseases[2], Department of Medicine
University of Manitoba

Abstract:
Xenotransplantation, the transplantation of organs or viable cells from nonhuman species into humans, offers a potential solution to the shortage of human organs. Interest has grown due to the prolonged function of pig-to-nonhuman primate xenografts using clinically relevant immunosuppressive regimens, the development of genetically modified swine with improved immunologic and microbiologic traits, and recent transplantation of porcine kidneys and orthotopic porcine cardiac xenotransplantation.

Despite its promise, xenotransplantation presents the risk of infectious diseases transmitted from animals to humans, also known as zoonoses. These infections, categorized under terms like xenosis, direct zoonosis, and xenozoonosis, pose significant challenges, particularly when the recipient is immunosuppressed. The risk of exposure to swine-derived pathogens must be carefully monitored. A benefit of xenotransplantation is the ability to screen donor animals for human pathogens before organ procurement, which addresses the time limitations of allotransplantation. Additionally, swine cells show resistance to human pathogens, including Human Immunodeficiency Virus, hepatitis B and C viruses, and cytomegalovirus. However, the safety of xenotransplantation requires ongoing research into the infectious risks posed by xenografts. Effective surveillance and management strategies are essential to minimize these risks, ensuring the safety of both recipients and the broader population.

Objectives
By attending this session, the attendee will be able to:
1. State the fundamentals of xenotransplantation
2. State key infectious risks associated with xenotransplantation
3. Explore microbiologic safety in xenotransplantation

Multiple Choice Questions (Select the best answer)
1. What is the definition of xenotransplantation?
   a. Transplantation of organs between genetically identical individuals
   b. Transplantation of viable cells, organs, or tissues between species
   c. Transplantation of artificial organs into humans
   d. Transplantation of human organs into animal models for research

2. Which factors contribute to the infectious risk in xenotransplantation?
   a. The infectious exposures of the source animal and the recipient
   b. The intensity of immunosuppressive therapy
   c. The risk of both opportunistic infections and zoonotic pathogens
   d. All of the above

3. Which pathogens are most commonly associated with the need for surveillance after xenotransplantation?
   a. Viruses (porcine and human)
   b. Parasites
   c. Bacteria
   d. Yeast and mold

Organizing Chaos: The Incident Command System in Healthcare

Jeff Martin, BA
Shared Health

Abstract:
Emergency Management Systems provide standardized organizational structures, functions, processes, and terminology for use at all levels of emergency response and recovery. It may also be referred to as an Incident Management System (IMS) or an Incident Command System (ICS) - (Health Standards Organization Global Standard 9002:2020(E)).

The ICS was originally developed in the 1970s in the United States as a standardized approach to managing wildland fires, but its structured, scalable framework was later adopted across sectors—including healthcare. In Canada, ICS gained prominence in healthcare during the early 2000s, especially after public health crises like the SARS outbreak in 2003, which exposed gaps in coordination, communication, and response within the system. Recognizing the need for a consistent emergency management model, Canadian health authorities began integrating ICS principles into hospital and regional response plans. Over time, ICS became foundational in healthcare emergency preparedness and response, with widespread adoption across provinces and territories. It has since been used to manage complex health events such as H1N1, the COVID-19 pandemic, mass casualty incidents, and environmental disasters, providing a flexible yet disciplined structure for cross-functional coordination, resource management, and unified command in times of crisis.

Health Care in Manitoba utilizes the ICS across all Health Authorities (HA) at three levels; site (e.g. HSC), HA (e.g. WRHA), Provincial (e.g. Unified ICS > 1 HA and / or Government directed). Many would recall ICS activations for Code Orange events, most recently the Carberry Bus Crash, or the Provincial Shared Health/GOM activation for the recent MAHCP labor action response, and who can forget COVID?

Objectives
By attending this session, the attendee will be able to:
1. Describe what health care ICS is and when we use it.
2. Identify how an ICS response is activated.
3. Describe the ICS operational cycle when responding to an unplanned incident.

Multiple Choice Questions (Select the best answer)
1. Why would a healthcare facility activate the ICS?
   a. To support an activated emergency response/contingency plan
   b. Enable a structured scalable response to events that disrupt normal operations
   c. Escalation of direction from the Health Authority or Government for coordinated system - level response
   d. All the above

2. Which of the following events would a unified ICS response be likely?
   a. Evacuation of a large northern indigenous community
   b. Multi-vehicle Mass casualty incident
   c. A returning scientist from the National Microbiology Lab requiring specimen testing for a high consequence pathogen exposure
   d. All the above

3. When an unplanned incident takes place, what is the first action in the ICS operational cycle?
   a. Activation of ICS
   b. Incident briefing
   c. Branch Leads meeting
   d. Notification

Opportunities (and Challenges) for Improved Diagnosis and Prevention of Syphilis

Mara Goodyear, PhD
Department of Biochemistry and Microbiology
University of Victoria

Abstract

With the number of infectious and congenital syphilis cases rapidly expanding in Canada and around the world, slowing the spread of this disease will require the development of both a prophylactic vaccine and a definitive point-of-care diagnostic test to complement public health control endeavors. No vaccine exists for syphilis, and available serology-based diagnostic tests are unable to differentiate active from past infection, diagnose congenital syphilis, or attain sufficient sensitivity in early and late disease. Comprehensive proteomic investigations performed on the bacterium that causes syphilis have allowed the identification of novel diagnostic biomarkers of infection and uncovered effective vaccine targets. The current status of pre-clinical syphilis vaccine trials and development of a direct diagnostic test for syphilis will be described.

Objectives

By attending this session, the attendee will be able to:

1. State the epidemiology of syphilis in Canada and around the world
2. State the limitations associated with current syphilis diagnostic tests
3. State the current innovative approaches to syphilis vaccine and diagnostic test development

Multiple choice questions (select the best answer):

1. Syphilis is caused by a:
   a. Bacterium
   b. Virus
   c. Parasite

2. From 2018-2022, the percent increase in congenital syphilis cases in Canada was:
   a. 23%
   b. 42%
   c. 599%

3. The first reported case of syphilis was in:
   a. 1945
   b. 1495
   c. 1856

Controlling Legionella in the Healthcare Environment: Facilities Water Management

Craig Doerksen, P Eng.
Shared Health

Abstract:
The saying "you can't manage what you don't measure," is often attributed to management guru's Drucker or Demming. From this, the principle of "Plan, do, study, act" also known as PDSA, processes are borne as essential to management and improvement. Building water systems can transport and amplify many waterborne pathogens, however *Legionella spp* creates a specific hazard due to easy growth and transmission conditions. Unfortunately, *Legionella spp* thrives in the same temperatures at which our domestic hot water systems and evaporative cooling towers operate. Aerosolization of domestic water occurs in healthcare buildings through handwashing, showering, decorative fountains, other water spraying activities and on evaporative cooling towers on larger air conditioning systems.

Without being able to eliminate all occurrences of water aerosolization, it is crucial to eliminate, or at least control, the presence of pathogens, like legionella in our water systems. A full water management plan is necessary to ensure an understanding of which healthcare buildings require control measures, based on the risks at that particular site. The water management plan must ensure that the control measures program, including temperature monitoring, bacteriological testing, response and reporting measures are effective, measured, reviewed and revised as necessary. Water management plans must be endorsed by facility management and clinical and infection prevention leadership.

An effective plan will avoid the situation which Drucker said "There is nothing so useless as doing efficiently that which should not be done at all." Understanding the P of a PDSA will create solid and informed water management plans.

Objectives
By attending this session, the attendee will be able to:
1. State the causes of legionella contamination and patient infection
2. State legionella monitoring and testing methods
3. State the legionella control methods

Multiple Choice Questions (Select the best answer)
1. What types of healthcare buildings should regularly test for Legionella?
   a. Only hospitals with immunocompromised patients
   b. All hospitals and personal care/long term care facilities
   c. Any building operated by a health authority
   d. Healthcare buildings where the risk assessment of the plan identifies testing
   e. Buildings which have evaporative cooling towers

2. How is a water management plan developed?
   a. Follow the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 188 Legionella water management standard and complete the templates
   b. Purchase Legionella control products and install them in every healthcare building
   c. Have a multi-disciplinary team assess each healthcare building for risks
   d. Develop a healthcare region standard plan to apply equally to all facilities
   e. Hire a consultant to develop the plan and complete all risk assessments

3. What's the most effective Legionella water treatment method?
   a. Keeping water outside of the growth range, that is below 25 C and above 45 C
   b. Flush domestic water pipes regularly
   c. Chemically treat all cooling towers to prevent legionella growth
   d. Follow the inspection and monitoring plan based on the site-specific water management plan
   e. a, b, and c

Hyperbaric Oxygen: Facts and Myths

Yoav Keynan, MD
Section of Infectious Diseases, Department of Medicine
University of Manitoba

Abstract:
Hyperbaric oxygen refers to the use of oxygen at a pressure exceeding normal air pressure. The use relies on several physical properties, most importantly the inverse relation between bubble size and the pressure applied to it and the amount of dissolved oxygen is correlated with the pressure applied. These principles make hyperbaric oxygen appealing when trying to decrease bubble size to alleviate obstruction and in conditions where increased tissue oxygenation is needed

Hyperbaric pressure can cause barotrauma to ears, sinuses and lungs and oxygen at high pressure is combustible and, therefore, facilities need to take precautions to minimize these risks.

Objectives
By attending this session, the attendee will be able to:
1. State key principles of physiology of hyperbaric oxygen therapy (HBOT)
2. State the mechanism of action and medical indications
3. State potential risks of HBOT

Multiple Choice Questions (Select the best answer)
1. Hyperbaric oxygen therapy refers to:
   a. Any form of administration of oxygen
   b. Administration of oxygen with flow of greater than 2L
   c. Aadministration of oxygen at higher than normal air pressure
   d. Generally reserved to diving

2. The ability of oxygen to treat decompression illness relies on the following principle
   a. Newton's first law
   b. Oxygen binds to toxic metals and neutralizes them
   c. The volume of gas is inversely proportional to the pressure exerted by the gas
   d. Bubbles grow when under high pressure

3. Hyperbaric oxygen is used for the following indications, with excellent results:
   a. Myocardial ischemia
   b. Chronic back pain
   c. Decompression illness
   d. Curing septic shock while sparing antibiotics

First Use of Bacteriophage (Phage) Therapy in Canada for the Treatment of a Periprosthetic Joint Infection

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Abstract:
This presentation will describe the first use of phage therapy in Canada for the treatment of a life-threatening periprosthetic joint infection (PJI), with successful outcome. PJI is a devastating complication of joint replacement surgery, with high morbidity and mortality. Our patient presented with early sepsis from a chronic recalcitrant multidrug-resistant (MDR) *Staphylococcus epidermidis* hip PJI which had repeatedly failed standard therapy. She had previously undergone 10 operations of the right hip, and only three weeks after completing a prolonged course of daptomycin following her most recent hip revision, she developed a draining sinus tract. Given the high burden of disease, inability to achieve surgical source control, and lack of antibiotic treatment options for long-term suppressive phage therapy was pursued. The patient underwent irrigation and debridement with complex flap reconstruction: intraoperative tissue cultures again yielded MDR *S. epidermidis*. We developed a novel phage protocol for this patient, with twice daily, intra-articular and intravenous phage delivery over a 14-day course. Complete healing of the wound with cessation of drainage occurred within one month after treatment. A marked improvement in right hip pain and mobility occurred within three months after treatment. Ten months following phage treatment, there is normalization of serum inflammatory markers with diminished pain, increased mobility, and no recurrent surgery. Our patient continues to improve and is currently living independently at home, with sustained clinical control of infection.

Objectives:
By attending this session, the attendee will be able to:

1. State phage physiology, and their potential applications for the treatment of osteoarticular infections.
2. State that phage therapy protocols are currently non-standardized and must be adapted to each case.
3. Address questions surrounding phage safety and misinformation.

Multiple Choice Questions (Select the best answer):

1. Which of the following best describes a bacteriophage (phage)?
   a. A type of predatory bacteria
   b. A virus that infects specific bacteria
   c. A protein produced by bacteria
   d. A type of antibiotic

2. What is the term for a phage that has integrated its DNA into the host cell's genome?
   a. Temperate phage
   b. Virulent phage
   c. Prophage
   d. Lysogen

3. Are phage generally considered safe by Health Canada?
   a. No
   b. Yes
   c. Unsure

4. What is a potential drawback of using phages for treating osteoarticular infections?
   a. Phage can cause resistance in bacteria, similar to antibiotics
   b. Phage can often be too expensive to be used for widespread treatment
   c. Phage clinical treatment is limited by a paucity of clinical data and phage libraries
   d. The widespread use of phage therapy is limited by local and national regulatory hurdles
   e. All of the above

What do the Germs Know: Life Lessons from the Microbial World

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Abstract

Bacteria provide life lessons that extend beyond the microbial world including:

1. Diversity is more than just presence—it's about purpose. Each microbe in your gut plays a specific role, and the vast diversity of bacteria ensures balance; without it, systems can break down.
2. Create environments where everyone can flourish. Some bacteria such as *Helicobacter pylori* transform hostile environments in ways that help other organisms thrive.
3. Communication fosters community. Through quorum sensing chemical signals, bacteria communicate, forming organized groups that act together—like social networks.

By the end of the session, we will demonstrate how these microbial survival strategies can inspire us to navigate our complex world a little bit better.

Objectives

By attending this session, the attendee will be able to:

1. State the impact of microbial diversity
2. Apply life lessons from microbial behavior
3. State how microbes can be models for innovation

Multiple Choice Questions: (Select the best answer)

1. What does "Microbial diversity is not just about presence, it is about purpose" mean?
   a. Microbial diversity has little impact on human health
   b. Each microbe has a specific role, and without diversity, things break down
   c. Diversity only matters in terms of number of microbes present
   d. Purpose is more important than diversity in microbial communities

2. What is one-way *Helicobacter pylori* bacteria support the proliferation of other organisms in the stomach lining?
   a. *Helicobacter pylori* allow other organisms to use nutrients
   b. *Helicobacter pylori* produce acid to support other bacteria
   c. *Helicobacter pylori* produce urease, which neutralizes stomach acid and creates a more hospitable environment
   d. *Helicobacter pylori* avoid interacting with other microbes to maintain bacterial diversity

3. What life lesson does quorum sensing teach us about communication?
   a. Communication is optional when working in teams
   b. Acting independently is more efficient than coordinating with others
   c. Clear, shared communication helps build stronger, more unified communities
   d. Leadership should be determined by who speaks the most

What's Biting You? A Primer on Tick-Borne Diseases

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Shared Health

Abstract:
Currently encountered tick-borne diseases, include Lyme borreliosis, anaplasmosis, babesiosis, tularemia, Rocky Mountain spotted fever, and alpha-gal syndrome. This presentation will briefly review the epidemiology, diagnostic approaches, and treatment strategies for these diseases, with a focus on their increasing prevalence in endemic regions. Additionally, the emerging concern of alpha-gal syndrome, a delayed allergic reaction to red meat linked to tick bites, will be discussed.

Objectives

By attending this session, the attendee will be able to address the following 4 objectives for the For the following tick-borne diseases: Lyme borreliosis, anaplasmosis, babesiosis, tularemia, Rocky Mountain spotted fever and alpha-gal syndrome:

1. Name the vectors and describe the geography
2. State the most common clinical presentations.
3. Explain what, if any, diagnostic tests can be used to assist in the diagnosis
4. In broad terms describe the treatments.

Multiple Choice Questions (Select the best answer)

1. Which of the following tick-borne illnesses is caused by a parasite?
   a. Anaplasmosis
   b. Babesiosis
   c. Rocky Mountain spotted fever
   d. Tularemia

2. Alpha-gal syndrome is most accurately described as:
   a. A bacterial infection of the gastrointestinal tract
   b. A delayed hypersensitivity reaction to mammalian meat
   c. An autoimmune response to tick salivary proteins
   d. A chronic inflammatory disease affecting cartilage

3. Which of the following statements regarding Lyme disease is TRUE?
   a. It is caused by *Borrelia recurrentis*
   b. Cardiac involvement typically occurs during early localized disease
   c. The primary reservoir is the white-tailed deer
   d. Oral treatments are usually sufficient for the majority of presentations

Walking Pneumonia...Is it Still Walking Amongst Us?

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Abstract:
Atypical pneumonia, also known as “walking pneumonia” is a lung infection caused by different bacteria than typical pneumonia. Symptoms are usually milder than typical pneumonia and can include low-grade fever, headaches, cough and malaise. Many people can still function and “walk about”. More recently we have seen a significant resurgence with more severe cases requiring hospitalization, not only in older but also younger patients and children. Appropriate antibiotic therapy is essential to cure this infection. This session will discuss the epidemiology and treatment approach.

Objectives:
By attending this session, the attendee will be able to:

1. State the epidemiology of atypical pneumonia ie “walking pneumonia”
2. State the clinical presentation of Walking Pneumonia
3. State the empirical treatment for pneumonia

Multiple Choice Questions (Select the best answer)

1. What bacteria is not the cause of “atypical” or “walking pneumonia”
   a. *Mycoplasma pneumoniae*
   b. *Chlamydophilia pneumoniae*
   c. *Streptococcous pneumoniae*
   d. *Legionella pneumophila*

2. Walking or atypical pneumonia can be easily diagnosed with blood or sputum cultures?
   a. True
   b. False

3. Which antibiotic listed below would be the best treatment for “atypical” or “walking pneumonia?
   a. Amoxicillin
   b. Cefuroxime
   c. Azithromycin

Where to Next? The Effects of Excess on Human Health

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Abstract

Following annual global wealth growth rates of 3-4% between 1995 and 2021, the top 1% captured almost 40% of all wealth growth, whereas the bottom 50% were left with only 2%. And amid unheard-of levels of wealth, many continue to live in abject poverty. This is insane! Rather than a "trickle down" effect from the "haves" to the "have nots", this huge wealth gap is directly linked to human and environmental exploitation on an unprecedented scale, resulting in a global material footprint that has far outstripped our planetary capacity. Consequently, we are in the midst of devastating adverse planetary impacts including global warming, ocean acidification, and land degradation. The resultant numerous adverse human health impacts are well described. If there is any hope of making a positive impact on slowing or reversing such adverse global trends, we need to adopt Indigenous ways of knowing such as "two-eyed seeing" and "all my relations" thinking as frameworks toward changing our personal lifestyles and attitudes. Are we going to be able to transition from exploitation to reciprocity, from the individual good to the common good, from hoarding to sharing, from independent to interdependent, and from wounding to healing before it is too late?

Objectives

By attending this session, the attendee will be able to:

1. Describe the pitfalls of limitless economic growth and its ultimate adverse impacts on human health
2. Using Indigenous concepts of "two-eyed seeing" and "all my relations", develop a personal strategy for adopting a more modest lifestyle
3. Advocate for reciprocity, replenishment, sharing, interdependence and healing over and against exploitation, hoarding, independence and wounding

Multiple Choice Questions (Select the best answer)

1. Which of the following are worsened by climate change and environmental degradation?
   a. Malaria
   b. Asthma
   c. Diarrheal diseases
   d. Injuries
   e. All of the above

2. Which of the following is true?
   a. We are approaching a global material footprint of 100 billion tons, which is near the maximum capacity that our planet can handle
   b. We are on track to reaching a global temperature increase of 1.5 degrees Celsius by 2030
   c. Acid rain continues to contribute to soil degradation which has resulted in >80% loss of insect biomass in many parts of the world
   d. The majority of climate change effects due to uncontrolled fossil fuel emissions originates in low- and middle-income countries
   e. None of the above

3. Which of the following could make a positive impact on slowing or reversing adverse global trends?
   a. Adopting a "two-eyed seeing" approach to tackling challenges
   b. Considering all of one's colleagues and patients as part of "all my relations" and treating them as such
   c. Advocating for the decolonization and Indigenization of health care services
   d. Making a commitment to live one's life in simplicity
   e. All of the above

Answers to Multiple Choice Questions

1. **Alexander Fleming: A Chance Discovery that Changed Society**
    1. c
    2. b
    3. a

2. **Florence Nightingale: A Pioneer in Infection Prevention and Control**
    1. b
    2. c
    3. c

3. ***Neisseria gonorrhoeae:* Cross Canada Checkup**
    1. c
    2. b
    3. d

4. **The Manitoban Impact Global Infectious Diseases Research: Nairobi, Kenya Case**
    1. b
    2. d
    3. d

5. **Why do We Care about Hormones when Studying the Immune System?**
    1. d
    2. a
    3. f

6. **Human Papilloma Virus and Sexually Transmitted Infections**
    1. c
    2 e
    3. c

7. **Influenza: Always Rearing its Ugly Head**
    1. c
    2. a
    3. b

8. **Sepsis: A Call for Action**
    1. a
    2. c
    3. d

9. **Measles: Neither Gone nor Forgotten**
    1. a
    2. b
    3. d

10. **Medical Grand Rounds: Xeno Transplantation: The Future or Fantasy**
    1. b
    2. d
    3. a

11. **Organizing Chaos – The Incident Command System in Healthcare**
    1. d
    2. d
    3. d

12. **Opportunities (and Challenges) for Improved Diagnosis and Prevention of Syphilis**
    1. a
    2. c
    3. b

13. **Controlling Legionella in the Healthcare Environment: Facilities Water Management**
    1. d
    2. c
    3. d

14. **Hyperbaric Oxygen: Facts and Myths**
    1. c
    2. c
    3. c

15. **First Use of Bacteriophage (Phage) Therapy in Canada for the Treatment of a Periprosthetic Joint Infection**
    1. b
    2. c
    3. c
    4. e

16. **What do the Germs Know? Life Lessons from the Microbial World**
    1. b
    2. c
    3. c

17. **What's Biting You? A Primer on Tick-Borne Diseases**
    1. b
    2. b
    3. d

18. **Walking Pneumonia...Is it Still Walking Amongst Us?**
    1. c
    2. b
    3. c

19. **Where to Next? The Effects of Excess on Human Health**
    1. e
    2. c
    3. e