Emerging Pathogens and the Dental Practice
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Disclosures

Neither I, nor any member of my family have a financial arrangement or affiliation with any corporate organizations offering financial support or grant monies for this continuing dental education program, nor do I have a financial interest in any commercial products or services I will discuss in the presentation.

Outline Of Presentation

• Emerging pathogens- trends
• Definition of emerging & re-emerging diseases
• Factors contributing to emergence
• Recent Infectious diseases in the US
• Impact on the dental practice
Emerging Pathogens- Trends

- Last quarter of 20th century/21st century - New & Resurgent infectious diseases
- Unusually large numbers of Rotavirus, HIV/AIDS, Hantavirus, Lyme disease, Legionnaires disease, Chikungunya
- Measles, Mumps
- Ebola, Zika
- Hepatitis B
- Hepatitis C
- Parasites and Neglected parasitic infections

Definition

- Emerging infectious disease
  Newly identified & previously unknown infectious agents that cause public health problems either locally or internationally
- Re-emerging infectious disease
  Infectious agents that have been known for some time, had fallen to such low levels that they were no longer considered public health problems & are now showing upward trends in incidence or prevalence worldwide

Factors Contributing To Emergence

AGENT
- Evolution of pathogenic infectious agents (microbial adaptation & change)
- Development of resistance to drugs
- Resistance of vectors to pesticides
Factors Contributing To Emergence

HOST
- Human demographic change (migration)
- International travel (trade and tourism)
- Human behavior (sexual & drug use)
- Human susceptibility to infection (immunosuppression)
- Poverty & social inequality

Factors Contributing To Emergence

ENVIRONMENT
- Climate & changing ecosystems
- Economic development & Land use (urbanization, deforestation)
- Technology & industry (food processing & handling)

Could biological warfare make a comeback?
- Possible deliberate release of infectious agents
- Biological agents: easy to produce, difficult to detect, widespread panic, civil disruption, casualties
- Highest potential: B. anthracis, C. botulinum toxin, Y. pestis, Variola virus
- Likeliest route: aerosol dissemination
Candida auris: Institutional Spread, Updates & Guidance

- The emerging and often drug-resistant fungus Candida auris continues to spread in the US in hospitals/homes
- 2015: first seven cases of C auris reported in the US
- 2016: 77 patient cases
- 45 cases identified via close-contact screening May 12, 2017.
- Multidrug resistance/Difficult to identify by standard lab
- Associated mortality rate of 60%.
- CDC analysis shows 86% resistant to Fluconazole, 43% resistant to Amphotericin B, 3% resistant to Echinocandins.

Non-candida Fungal Infections of the Mouth

- Six non-candidal oral mycoses: aspergillosis, cryptococcosis, histoplasmosis, blastomycosis, paracoccidioidomycosis, and zygomycosis (mucomycosis)
- Subclinical infection, especially pulmonary infections.
- Immunocompromised persons at greater risk
- Oral lesions are most likely to manifest.
- Patients at greatest risk: leukemia, leukopenia, solid tumors, transplants, or HIV disease.
- Chronic oral ulceration, chronic maxillary sinus infection
- Bizarre mouth lesions

Genus Legionella: Legionnaires’ disease/Pontiac fever
- Legionella pneumophila (serogroup1)
- Natural, freshwater/plumbing of large buildings, water heaters, storage tanks, cooling towers, decorative fountains
- Legionella grow and multiply in ciliated protozoans
- Legionella invade and grow within alveolar macrophages
- Legionellosis outbreaks occur when two or more people are exposed to Legionella and get sick at the same time
- Dental Waterline safety
Clinical Manifestations

**Clinical features:**
- Fever/chills/cough/sputum/myalgia/confusion
- Diagnosis: Abnormal RFT/LFT/Electrolytes
- Lung Consolidation of lower lobes B/L

**High Risk Patients?**
- Patients who have failed outpatient antibiotic therapy
- Patients with severe pneumonia in intensive care
- Immunocompromised patients with pneumonia
- Patients with healthcare-associated pneumonia

Case history of Dental Waterline Contamination

- Lancet (2012) 82 yr woman’s death from Legionnaires’ disease through a contaminated dental unit waterline.
- Exposure: leaving home to visit her local dentist.
- Microbiological testing of water samples from her home and dental waterlines as well as the high-speed pump
- The woman’s home water tested negative for Legionella
- All water samples from the dental office tested positive
- The high-speed pump was found to have the highest level of L. pneumophila contamination.

Zika Virus

- Zika virus (ZIKV) Flavivirus genus by Aedes aegypti
- Rash, fever, arthralgia, and conjunctivitis.
- 2014-2016: French Polynesia, Central America, Caribbean, South America, Mainland USA
- Microcephaly in newborns of infected mothers
- Associated with Guillain-Barre syndrome
- January 2016: CDC issued travel guidance
- 10 cases reported since April 2017
- Singapore Confirms Two New Zika Cases on June 9th
Zika Virus Update for Miami-Dade County, Florida

- Residents who live in or travel to Miami-Dade County should remain aware of new reports of Zika transmission
- Should follow steps to prevent mosquito bites
- Zika virus can persist for months in semen
- Continuing risk for sexual transmission
- Men should consider condom use for at least 6 months, and women should consider having protected sex for at least 8 weeks from June 2, 2017.
- 2016: 1.5-square-mile area of South Miami Beach/ Little River area

Microcephaly

Seasonal Influenza

- When is the flu season in the United States?
- CDC monitors the progress of the flu season:
  - Laboratory-based viral surveillance
  - Outpatient physician surveillance for influenza-like illness
  - Mortality surveillance
  - Hospitalization surveillance
  - 145 laboratories, about 3,000 outpatient health care providers, vital statistics offices in 122 cities
  - Do other respiratory viruses circulate during flu season?
2016-2017 Influenza Update for Health Care Providers: Parotitis and Influenza

- 2014-2015 influenza season in the US- several hundred cases of confirmed influenza infection with parotitis were reported to CDC
- Influenza A (H3N2) virus responsible for influenza with parotitis
- CDC recommendation: clinicians evaluating a patient with acute parotitis not associated with a lab-confirmed mumps should include influenza in the differential diagnosis
- Mumps virus infection testing: buccal, oral, swab and blood test

Recommendations for Influenza Prevention

1. Promote and administer seasonal influenza vaccine
2. Take Steps to Minimize Potential Exposures
3. Monitor and Manage Ill Healthcare Personnel
4. Adhere to Standard Precautions including Droplet Precautions
5. Use Caution when Performing Aerosol-Generating Procedures
6. Monitor Influenza Activity
7. Train and Educate Healthcare Personnel
8. 2016-2017 season- only injectable influenza vaccines are recommended for use. Live attenuated influenza vaccine (nasal spray) not recommended due to lack of effectiveness.

What advice do I give my patients about the Flu?

- Encourage them to get vaccinated.
- Vaccination especially important for people at high risk for complications
- CDC recommends: Patients at high risk for complications should receive influenza antiviral drugs
- Children between 6 months and 8 years of age may need two doses of flu vaccine to be fully protected
- The two doses should be given 4 weeks apart.
Mumps Cases Surge in US

- Mumps cases nationally have hit 249 in the past 4 weeks
- Majority of these cases are in Texas
- US 2016: 3832 preliminary cases, the largest in 10 years
- 2,000 cases across 42 states since January
- Spread by close person-to-person contact
- Mumps virus attacks the salivary glands—parotitis
- Highly contagious in crowded settings
- Mumps vaccine may not always work.
- The CDC recommends that a child get two doses of the measles-mumps-rubella (MMR) vaccine, the first at 12 to 15 months old and the second at 4 to 6 years old.

Measles (Rubeola)

- Jan 1 to May 20, 2017: 100 people from 11 states (California, Florida, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New York, Pennsylvania, Utah, and Washington)
- 2016: 70 people from 16 states were reported to have measles.
- 2015: 188 people from 24 states were reported to have measles.
- Reemerging as a health problem where vaccination rates have fallen below 90-95%.
- 1-2 of every 1000 infected patients die of this disease

- Fever can peak as high as 103-105°F
- Patients experience respiratory symptoms cough and coryza (runny nose)
- May resemble a severe upper respiratory tract infection.
- Koplik spots are pathognomonic for measles. They are located on the buccal mucosa in the premolar and/or molar area.
- Intraoral lesions may persist for several days and begin to slough with the onset of the rash.
- The lesions are bluish grey plaque like or nodular and oval or round.
Measles (Rubeola)

- Paramyxovirus - survives for 2 hours in air and on surfaces.
- Measles is spread by direct contact via droplet infection.
- One of the most communicable infectious diseases
- Majority of people who got measles are unvaccinated.
- Measles is still common in many parts of the world including some countries in Europe, Asia, the Pacific, and Africa.
- Travelers continue to bring the disease into the US

Ebola Disease and VSV- EBOV vaccine

- The worst Ebola virus disease (EVD) outbreak in history has resulted in more than 28,000 cases and 11,000 deaths worldwide
- Vaccine Alliance, 'GAVI' signed a $5m deal for an Ebola vaccine
- Merck to keep 300,000 vaccines for emergency use
- Vesicular Stomatitis Virus-Ebola Virus (VSV-EBOV) is a live, attenuated recombinant, replication-competent vaccine
- Genetically engineered to express Ebola glycoproteins so as to provoke an immune response against the Ebola virus
- Clinical trial (Dec 2016) found the vaccine to be 70–100% effective
- Public Health Agency of Canada created Z Mapp for Rx of Ebola