1 **HOT TOPICS IN INFECTION CONTROL**

2 **WHAT WE WILL COVER**

- Today's safety standards in perspective
- Basic tenants of infection control & prevention
- Rules, guidelines & best resources
- What works best? Hierarchy of safety protocol
- Respiratory protection update
-

3 **SAFETY IN PERSPECTIVE**

4 **SARS-COV-2 HAS CHANGED DENTAL SAFETY STANDARDS**

- Consider everyone infectious for ALL types of diseases, including aerosol-transmitted diseases
  - Cannot rely on screening
- Plan for safer buildings, more air management
- Upgrade traditional PPE
- Exposure response
- Apply today's lessons to your healthy future!

5 **CHAIN OF INFECTION**

6

7 **STANDARD PRECAUTIONS**
MINIMUM STANDARDS FOR ALL PATIENTS

Review & optimize:

- Hand hygiene
- PPE
- Respiratory hygiene / cough etiquette
- Sharps safety
- Safe injections
- Instrument, device sterilization
- Environmental asepsis cleaning, disinfection, barriers

8 **STANDARD PRECAUTIONS**

- Proven effective for controlling
  - Bloodborne diseases
  - Contact diseases
  - Droplet diseases
-
- Not effective for airborne diseases

9 **INFECTIOUS DISEASES**

- Bloodborne diseases are critical, but….
- 80% of common infections (colds, flu, diarrhea) – spread by contact, air, water, food, fomites
- Now: COVID-19, respiratory syncytial virus (RSV), flu, pox
- Stay informed: CDC.gov, OSHA.gov, OSAP.org

10 **IC 101**

- Treat everyone as if infectious: (bloodborne, droplet, contact & airborne diseases)
- Isolate & separate
- Clean before disinfect / sterilize
- How do microbes die?
  - Heat (how hot?)
  - Chemicals (Which ones? What concentrations? What contact time? How toxic?)
  - Is resistance likely?
- Are your systems working?
  - How do you know?
  -

11 **EVOLVING RULES, RECOMMENDATIONS:**

- Continue to follow CDC's updated Interim Recommendations – Increase safety precautions over Standard Precautions
- Recommendations change & evolve
- Laws take time to reflect research
- Healthcare is excluded from CDC rec's for public

12 **HIERARCHY OF RULES**

- OSHA: Occupational Safety & Health Administration laws
  - Based on CDC, NIOSH, ANSI recs
- State Board laws
  - Include CDC & OSHA & ADA standards
- Civil & Health Dept.... laws
- FDA, EPA laws
- Instructions for use
- CDC Recommendations
  - Based on research
  - Set standards, not "laws" unless by reference
- Consensus standards
  - NIOSH, ANSI used to determine "appropriate" to meet OSHA general industry safety standards
  - Expert statements, ADA, OSAP (compliance = common, voluntary)
- Competition, marketing, reputation

13 **OSHA REG'S**

Bloodborne Pathogen standard
(29 CFR 1910.1030)
(BBP does not address respiratory secretions)
Personal Protective Equipment

(29 CFR 1910.132 & 133)
Respiratory Protection standards
(29 CFR 1910.134)
Recordkeeping
(29 CFR 1904)

OSHA incorporates CDC, ANSI, NIOSH rules by reference

14 ☐ **UPDATE & EDIT YOUR IC PLAN**

- Add addendum to Injury & Illness Prevention Program
  - Written COVID-19 prevention & resp. Protection plans
  - Employee risk categories include ATD exposure
- ATD screening & plan (Aerosol Transmitted Diseases)
- CDC updates & IC recommendations

15 ☐ **OUR RECENT SAFETY CONCERN: COVID-19**

16 ☐ **MOST OF US HAVE SOME IMMUNITY**

- ~95% in U.S. Have some immunity
- Recent reduced public safety recommendations:
  - Indoor masking
  - 6' distancing
  - Quarantining after exposure
- Still mask 10 days after onset if sick
- Worldwide: ~ ½ mil. COVID cases / day, 1700 deaths/day (Sept. 2022)
- Dose impacts infection & severity
-

17 ☐ **COVID CONCERNS**

- Omicron – milder, more transmissible
  - Upper respiratory (Delta – prefers lungs)
- Reinfections & relapses
- Long COVID????
  - Fatigue, neuralgias, cardio dysfunctions, brain-fog, sleep disruption, pulmonary & GI dysfunctions….
- https://www.health.ny.gov/press/releases/2022/2022-09-21_long_covid_website.htm
- N.Y.Dept of Health Long COVID hotline 202-621-2090

-

18 ☐ **COVID CONCERNS**

- SARS-CoV-2 linked to newly diagnosed diabetes & heart damage & attacks, arrythmias, strokes, clots
  - > 30 days after infection
  - Young & old! (Not just <18)
- Post-COVID (even mild); screen for:
  - Frequent urination, increased thirst & hunger, weight loss, fatigue, stomach pain, nausea,

vomiting
- Arrythmias, heart attack & stroke symptoms
- Ask patients & be self-aware

19 **SARS-COV-2 / COVID-19 IN PERSPECTIVE**
- Alpha – Delta <1% case fatality ratio (Omicron = less)
- 2 new flu varieties in China –
  - H7N9 (avian) 30% case fatality ratio
  - G4 (swine) ?%
  - Human-to-human transmission not known
- Next pandemics?
-

20 **EMERGING RESISTANT FUNGAL DISEASES**
- Aspergillosis
  - Aspergillus (mold) – inhaled, usually over time
  - 60% mortality rate
  - Damp buildings, soil, seeds, damp, decaying vegetation
- Candidiasis
  - Candida auris
  - Hospital infection – breathing, feeding tubes, IV lines

21 **AIRBORNE TRANSMISSION OF SARS-COV-2**

22 **COVID-19 AEROSOL RISK**
- Aerosols are primary mode of transmission
- Infective dose = unknown
  - Much less for Omicron
- Rules vary for "aerosolizing procedures"
-

23 **AGP: AEROSOL GENERATING <u>PROCEDURE</u> OR <u>PEOPLE</u>!**

24 **CRITERIA FOR DETERMINING RISK**
IS IT SAFE????
- Disease activity locally
  - Specific pathogen features (mode of transmission, transmissibility, severity)
- Mitigation strategies in place
  - Eliminate/reduce contact & exposure
    - Tele-dentistry, distancing, barriers
  - Engineered safety devices / technology
    - Suction, HVAC, Air filtration & changes
  - Rules, protocol, management (screening, source control…)
  - PPE
- Vaccination status + immune profile
- Aerosol generating procedures

25 **VARIOLATION (IMMUNIZATION)**

- Unprotected susceptible population gets very sick - fast
- Study shows value of public masking
  - Imperfect mask protection slows exposure
- Inhalation of small viral doses due to wearing masks builds immunity
- Smallpox variolation – 18th century: deliberate exposure to small doses of live virus – less severe disease but robust immunity
- Helps reduce severity of respiratory pandemics
-

26

27

28 **ELIMINATION & SUBSTITUTION**

- Tele-dentistry (inform, assess, pre-screen, treat pts – phone) prior to appt & on arrival
- Discontinue close gathering in reception area
  - Remove fomites: magazines, TV remote, pens….
- Reduce aerosolization
  - Hand instrumentation, low spray, high suction

29 **STILL SCREEN FOR COVID-19**

- Due to immune responses, truly asymptomatic cases = reduced
- ~95% in U.S. Have some immunity
- Typically mild cases have runny nose, headache, malaise, fever?, sore throat, cough…
- Do NOT treat active (COVID) patients
-

30 **COVID-19 SCREENING**

Check blood oxygen
Take temperature!
COVID testing
-
-

31 **DENTAL WORKER COVID-19 SCREENING**

- HCW's self-assess temp. daily even if asymptomatic (100.0°F!) Symptomatic workers must be evaluated promptly
- If ill, mask & dismiss
- No work until MD clears or 2 (-) COVID tests 24 hrs apart, symptoms improve

32 ☐ **IN-OFFICE SCREENING TESTING**

- Molecular (PCR) tests detect viral genetic material
  - Most sensitive, best diagnostic tool, delayed results
- Antigen tests detect viral proteins
  - Specific to virus, less sensitive: may get false (-)
  - Repeat & increase frequency
- Antibody (serological) lab tests detect immune response, NOT for active infection diagnosis

33 ☐ **NEWEST TEST**

- FDA authorized new breathalyzer test for COVID
- InspectIR COVID-19 Breathalyzer
- Detects 99% of (-) cases, 91% of (+) cases
- Similar efficacy to home tests, slightly better
- Must be administered by trained operator
- Extremely short supply
-

34 ☐ **STORAGE OF HOME TESTS**

- Avoid temperature extremes (denatures sensitive proteins in test)
- Keep tests between 35 ° & 86° F.
- Do not store outside or in hot cars or freeze
- Keep dry
- Conduct test between 65 ° & 85 ° F
- Read directions, read results @ 15 min.
  - Too soon: false (-), too late: false (+)
- Home tests = ~80% accurate

35 ☐ **OTHER AIRBORNE DISEASES**

Primarily aerosol – transmitted:

- Measles
- Varicella (including disseminated zoster)
- Tuberculosis

Aerosol & droplet transmitted:

- Flu, SARS, Pertussis, mumps, meningitis
- Do NOT treat without special precautions
-

36 ☐ **TUBERCULOSIS POLICY**

- MDR TB = worldwide risk
- Develop TB program appropriate to risk
- Screen patients:
  - History of TB?

- Look for active cases of TB
- Dental workers: Tuberculin skin (TST) or blood (IGRA) test when hired & per risk

37 **EMERGING DISEASES**

- "Controlled, or eradicated" diseases:
  - Polio: Africa, Middle East, Indonesia, U.S.
  - Measles: (droplet, air) endemic most countries
  - Malaria: spreading, resistant
  - Pertussis: vaccines may not last 10 years
  - MPX (Monkeypox)

38 **POLIO**

-
- 1980's – eradicated in U.S.
  - July/August, 2022: 1 w/ paralysis
  - Tip of the iceberg
  - Don't forget iron lungs
  - Unvaccinated children!
- Oral-fecal transmission

39 **WILD-TYPE VS. VACCINE-DERIVED POLIO**

- Wild virus is not vaccine related
- Vaccine-derived polio virus:
  - Outside U.S.: oral (Sabin) polio vaccine – live attenuated virus
  - Can become contagious, infect unvaccinated people
  - Low cost, no needles, robust immunity, administered to mouth, portal of entry
- U.S. Uses injectable (Salk) inactivated virus since 2000
  - 3-4 shots before age 6 = 99% effective vs. paralysis
  - Boosters now recommended to healthcare & wastewater workers
  - ALL unvaccinated people should get vaccinated

40 **RESPIRATORY SYNCYTIAL VIRUS (RSV)**

- Incubation: 4-6 days
- Symptoms:
  - Runny nose
  - Cough, sneezing, wheezing
  - Fever
  - Low appetite
- Common under 1 yr of age
- Recently in all ages, may be more serious
- No treatment (relieve symptoms)

41 **INFLUENZA SIGNS & SYMPTOMS**

- Fever & chills – sudden onset (102 – 106 degrees)
- Cough (loose, then dry)
- Breathing difficulty
- Sore throat

- Intense body aches, skin sensitivity
- Headache, sinus / nasal pain
- Diarrhea, vomiting

42

43 **SCREEN FOR ALL ATD'S**
TB, FLU & OTHER ATD'S

1
- TB
  - Fever, cough….
- Flu
  - Fever?
  - Body aches?
  - Runny nose?
  - Sore throat?
  - Headache?
  - Nausea?
  - Vomiting or diarrhea?
- COVID
  - Fever….
-

Fever = 100.0ºF

If yes, re-appoint, refer

2
- Pertussis, measles, mumps, rubella, chicken pox, meningitis
  - Fever, respiratory symptoms +
  - Severe coughing spasms
  - Painful, swollen glands
  - Skin rash, blisters
  - Stiff neck, mental changes

44 **CHRONIC RESPIRATORY DISEASES**
(NOT ATD'S, NO FEVER)

- Asthma
- Allergies
- Chronic upper airway cough syndrome "postnasal drip"
- Gastroesophageal reflux disease (GERD)
- Chronic obstructive pulmonary disease (COPD)
- Emphysema
- Bronchitis
- Dry cough from ACE inhibitors

45 **MONKEYPOX**
MPX
"MPOX"

46 **MPX – ZOONOTIC PATHOGEN**

- Endemic in West Africa – prior to now: direct exposure to bush meat & rodents, limited person – person transmission

- 2017-2020 increased cases in Nigeria linked to:
  - Deforestation, exposure to forest sources
  - Waning smallpox immunity (1970's vaccinations)
- 2022: world transmissions – novel event
- First U.S. cases contracted internationally
- Now spreading domestically, (intimate contact, children, pets)
- U.S. Has largest MPX outbreak in world (>28,000 cases)
- 6 U.S. Deaths, several encephalomyelitis cases

47 **MPX**

48 **MPX VIRUS**

- Signs / symptoms: fever, chills, headache, muscle ache, lymphadenopathy, then rash, vesicles, pustules, umbilication, crusts - on face, hands, trunk, genitals
- Some recent cases start with rash, seen in gay community
- Spread by body fluids, close & intimate contact, close-up respiratory droplet exposure (throat lesions shedding), surfaces, materials (bedding)
- Port of entry: broken skin, mucosal /ocular absorption
- Most infectious phase = rash, lesions: confused with STD's: herpes, syphilis, varicella zoster

49 **MPX**
INFECTIOUS UNTIL LESIONS TOTALLY RESOLVED: NEW SKIN FORMED

50 **SMALLPOX VACCINE**

- Attenuated virus
- Only effective prior to symptoms
- Multiple puncture technique with bifurcated needle
- Adverse effects common:
  - Papule at vaccination site (2-5 days)
  - Inadvertent inoculation of other sites
- Requires boosters
  -
-
-

51 **WHAT ABOUT VACCINES?**

HOW DO WE COMBAT
FEAR & DIS-INFORMATION?

52 **WITH SCIENCE & LOGIC**
VACCINE BASICS:

- All vaccines: ~5-10% of vaccinated may not respond (or weakly)
- Vaccines assist immunity,
  - Build antibodies ~ 2 weeks
- Host's immune system determines the strength of both recovered (convalescent) & vaccine immunity

- Immunocompromised likely to have less & shorter immunity

53 **SCIENCE & LOGIC: VACCINE BASICS**

- Vaccines do not make PPE unnecessary
  - Vaccines are specific to one pathogen
  - What about the others?
-

54 **"NEW" TYPE OF VACCINES**
RESEARCHED FOR DECADES, "NEW" TO US

- mRNA vaccines teach body to make proteins or partial proteins that trigger immune response to SARS-CoV-2 spike protein
  - No live virus
  - mRNA does NOT enter our cell nucleus
  - Can be made quickly, standardized, scaled up, modified for variants, combined
  - Other mRNA vaccines studied: flu, Zika, cytomegalovirus, rabies & cancer

55 **MAKE SURE YOU ARE PROTECTED!**

1
- HBV
- HAV
- Influenza
- Measles
- Mumps
- Rubella
- Varicella-Zoster
- Polio
- COVID
-
- www.CDC.gov: new adult vaccine recs
- OSHA policies:
  - New hires & employees
-

2
- Tetanus, diphtheria
- Pertussis
- Pneumonia
- Meningitis
- HPV

56 **BUILDING SAFETY STANDARDS**

- U.S. medical settings must meet healthcare building codes
  - (-) pressure, filtered air for sterilization, storage & changing PPE
  - Air changes / hour (ACH) – set for medical hospitals
  - Ex: gen room (no procedures) requires 12 ACH (dental???)
- Dental is under business codes currently. Will change.
- Schools – separate building codes
- IAQ matters (healthy vs. Sick buildings)
  - Airborne diseases

- Legionella, viruses, molds
- Indoor chemical pollutants – high during operating hours
  - VOCs, C02, particulates
- Odors affect experience
- Allergies, illness

57 **ENGINEERING CONTROLS**

Room air management

- Optimize building HVAC fresh air changes, cycles, filtration (Heating, Ventilation, and Air Conditioning)
  - Know your mechanical system
  - MERV 13 ("minimum efficiency reporting value", ASHRAE rating) = best
  - Most HVAC systems – limited to Merv 8-9
  - Install HEPA filters only if HVAC = designed for HEPA filtration (HEPA = MERV 17)
- Building maintenance (ducts, filters)
- Filters may impede airflow, burn out VC
- Fit matters! Bypass airflow is not filtered

58 **WHAT ACH RATE IS RECOMMENDED FOR DENTAL OFFICES?**

59 **WHAT ACH RATE IS RECOMMENDED?**

- "ACH" = air changes/hour

60 **ENGINEERING CONTROLS**

- Separate HEPA air cleaners
- Goals:
  - > circulation, air movement
  - Controlling airflow direction
  - Filtration
  - Source capture (external suction)
- Consider moist aerosols
- HEPA filtration units can recycle or exhaust air (creating (-) pressure)
- Validate equipment claims

61 **SOURCE CAPTURE EQUIPMENT**

GOAL: Contain aerosols as much as possible, as close to the source as possible

- Saliva ejectors remove fluids, not aerosols
- High Volume Evacuation (HVE)
  - More effective on larger droplets than aerosols – but remove some air
  - Rebalance system: hygiene HVE = operative HVE power
- Extraoral suction
  - More effective on aerosols

62 **ROOM AIR CONTROL: PHYSICAL MODIFICATIONS?**

- Space dividers, walls, screens, windows, curtains (must tolerate disinfection & NOT stagnate air flow)
-
-
-

63 ☐ **ULTRAVIOLET GERMICIDAL IRRADIATION (UVGI)**

- Targets air & surfaces
- Directional (shadows)
- Must vacate room at higher doses
- Efficacy requires specific dosage, airflow, time
- Lights degrade over time

64 ☐

65 ☐ **INTERIM COVID-19 DENTAL RECOMMENDATIONS ROOM AIR CONTROL**

- Optimize direct suction, evacuation protocol
- Single operatories, spaced apart
- Vacate room after procedure – air exchange
  - 15 min. (CDC)??
  - Droplets settle
  - Ventilation of aerosols – site-specific
- Open windows?

66 ☐ **FANS & AIR MOVEMENT**

- Place in windows, doors on exhaust mode
- Roof fans: exhaust to outside
- Defeat auto efficiency settings: run fans 24/7
- Open windows (even slightly)
- New HEPA filters can minimize air resistance
- Air direction: dirty-to-clean, away from operator
- Consult industrial hygienist, HVAC or structural engineer
-

67 ☐ **AIR FOGGING?**

- EPA cleared disinfectant
- Used on airplanes since COVID-19
- Electrostatic particles improve penetration & surface binding
- Oxidizers, hydrogen peroxide, hypochlorous acid
- Caution: corrosion & damage to eyes, lungs
- Dangerous to add chemicals to remove particles

68 ☐ **AVOID / MANAGE AEROSOLS**

69 ☐ **HVE REQUIRED!**
SALIVA EJECTORS = INADEQUATE

70

71 **HIGH VOLUME SUCTION**

- Control at the source
- Draws air into mouth
- Depends on power of suction
  - 7-10 cubic ft/min
- Maximize suction: balance fluid & air
- Factors:
  - Size of vacuum, # of users
  - Piping configuration: bends, curves, distance
  - HVE tubing size
  - Location near source
-

72 **MAXIMIZE HVE**

- Plan for increased use
- Calculate for hygiene HVE use (same as operative)
- Larger cannulas allow more air flow
- Use saliva ejectors to remove fluid
- Use HVE & extraoral suction to remove aerosols
- Clogged tubes/ pipes limit flow
- Pick up fluid cleaner & air together to get vortex effect
-

73 **DENTAL STUDY: VIRAL REDUCTION**

- IADR study: sampled droplets & suspended virus
- Electric handpieces – significantly reduced aerosols
  - No DUWL
- Rubber dams, HVE, HVAC also provided significant reduction
- External suction less important than electric handpieces

74 **SOURCE CONTROL & PROTECTION**

75 **PRE-PROCEDURAL RINSES – LIMITED, TRANSITORY:**

- Repeat rinses
  - 1-1.5% hydrogen peroxide
  - 0.2% povidone
  - Dilute bleach (corrosive)
- SARS CoV-2 = sensitive to oxidizing products
- Chlorhexidine (CHX)?

76 **ADMINISTRATIVE CONTROLS**

- Rules to maintain elimination & substitution strategies
- Respiratory hygiene / cough etiquette, hand hygiene
- Manage visitors, limit points of entry
- Scheduling: isolate & separate patients in time & space

- Universal source control – face coverings for all
- New employee roles: Infection control coordinator, "floater", screeners, escorts
- Add respiratory protection program
  - ADA, OSHA

77 **OSHA WITHDRAWN**
ETS: EMERGENCY TEMPORARY STANDARD

- ETS is unenforceable by Fed OSHA
  - BUT: Some cities still require
  - General Duty Clause holds DDS responsible
- Follow CDC guidelines, best practices
  - Employer must provide respirators & masks & training
  - Select PPE based on risk
  - Cloth masks are NOT PPE
- Must update written addendum to IIP
- N.Y. COVID In The Workplace Hotline: 202-621-2090
- N.Y. PESH (Public Employee Safety & Health) free consults 716-847-7133
- N.Y. Dental Board recourses: https://www.nysdental.org/novel-coronavirus-(covid-19)
-
-

78 **UPDATED CDC RECOMMENDATIONS FOR DENTISTRY**

- https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html
- Based on higher immunity, & availability of prevention strategies & treatments:
- Vaccination status - no longer used to inform source control, screening testing, or post-exposure recommendations
- Relaxed use of source control, universal masking & testing
- Changed recommended timing for testing asymptomatic people due to faster onset & higher transmissibility of new variants
- Discretionary testing of asymptomatic workers, but test symptomatic workers ASAP
-

79 **UPDATED CDC RECOMMENDATIONS FOR DENTISTRY**

- https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html
- Optimize IAQ: area dividers, air flow & filtration, isolation precautions
  - Guidelines for Environmental Infection Control in Health-Care Facilities
  - American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) resources for healthcare facilities, which also provides COVID-19 technical resources for healthcare facilities
  - Ventilation in Buildings, which includes options for non-clinical spaces in healthcare facilities
-

80 **OSHA RETURN-TO-WORK RULES**
(RECOVERED CASES)

All COVID (+) employees may end isolation:

- After fever resolved without meds AND
- Symptoms improved:
- Either: 10 days after 1st symptoms or (+) test,
- OR at 5 days with (-) test. Antigen test preferred.
- Workers should report exposure to employer
- Patients should be alerted if possible exposure occurred

81 ☐ **RESPIRATORY HYGIENE / COUGH ETIQUETTE**

82 ☐ **MASKS & SANITIZER FOR PATIENTS**

83 ☐

84 ☐ **INFECTION CONTROL COORDINATOR**

- Assign a person
  - Safety Manager
  - Must be a leader
  - Qualified, trained, empowered
  - Any of us might qualify!
- Get certified
  - DANB.org, osap.org
  - https://www.osap.org/page/RoleofICPC? – OSAP initiative
  -

85 ☐ **ORGANIZATION FOR SAFETY, ASEPSIS, AND PREVENTION**

Why join?

- "Go to" source for all infection prevention and patient safety questions.
- New, robust website includes best practices, tool kits, and member forums allowing you to network with global infection prevention leaders.

Code for 25% discount: Nancy25
join today!

86 ☐ **OPERATORY ASEPSIS**

2 CHOICES:

COVER IT OR DISINFECT IT

87 ☐ **USE FDA CLEARED MEDICAL GRADE BARRIERS**

(TESTED FOR VIRAL & BACTERIAL PENETRATION)

88 ☐ **ENVIRONMENTAL ASEPSIS (UNSEEN DROPLETS)**

- EPA intermediate level disinfectant - operatories
- Extend frequent disinfection protocol - all touch / transfer surfaces
- EPA list of SARS CoV-2 disinfectants
- Weekly deep cleaning – remove chemicals, dry biofilms
-

89 ☐ **CHEMICAL CLEANING & DISINFECTION**
FOLLOW LABEL DIRECTIONS

- Clean (surfactant) before disinfecting
  - High alcohol fixes proteins to surfaces
- Proteins neutralize disinfectants
- Wear Utility gloves

90 ☐ **MICROBIAL RESISTANCE TO KILLING**

- Prions
- Bacterial endospores
- Fungal spores
- Mycobacteria - *Mycobacteruim tuberculosis*
- Nonlipid or small viruses (Non enveloped) - *Polio virus, enteroviruses*
- Fungi - *Trichophyton spp.*
- Vegetative bacteria - *Pseudomonas aeruginosa, Staphylococcus aureus*
- Lipid (enveloped) or medium-sized viruses - *Herpes simplex virus, hepatitis A, B & C virus, HIV, Ebola, SARS CoV-2* (CDC)

91 ☐ **CLEAN & DISINFECT – 2 STEPS!**

CLEANING	**DISINFECTION**	
Spray	Wipe	Spray

92 ☐ **CLEAN BEFORE DISINFECTING**

93 ☐ **"SINGLE-STEP CLEANER-DISINFECTANT"**

94 ☐ **LEAVE FOR STATED TIME**

95 ☐ **CAVIWIPES 2.0 OPTIMIZATIONS**

96 ☐ **BLOODBORNE DISEASES**
(BLOOD & FLUIDS = INFECTIOUS)

EXAMPLES: HIV, HEPATITIS

97 ☐

MOST LIKELY DENTAL EXPOSURES

- Percutaneous
  - Needles
  - Burs
  - Instruments, files
- Compromised skin

- Mucosal exposure
- HBV = efficiently transmitted directly & indirectly (survives on surfaces – 7 days)
- Other pathogens (ex: HCV) can remain infectious on surfaces – 1 month

98 **SAFE INJECTION PRACTICES**

99 **SAFE RE-CAPPING**

- Only recap needles using:
  - Scoop technique
  - Mechanical devices designed to
  - hold needle sheath
  - eliminate need for 2 handed capping

§1005 (b) (9)

100 **SAFETY NEEDLE**

101 **SHARPS DISPOSAL**

(MIXED) = MOST COMMON

102 **SHARPS & WASTE**

- Follow OSHA rules
- Dispose of <u>all sharp items</u> in puncture resistant containers
- Dispose of pharmaceutical waste as per EPA
- Dispose of contaminated solid waste as per EPA

103 **DENTAL WATER QUALITY**

104 **2 STANDARDS FOR WATER SAFETY**

- Sterile - for surgery, (cutting bone, normally sterile tissue)
  - 0 CFU/mL of heterotrophic water bacteria
- Potable - for non- surgical procedures -
  - 500 CFU/mL of heterotrophic water bacteria (meets EPA safe drinking water standards)
  - CDC, OSAP, EPA, Dental Board

105 **HOW TO MEET 2 WATER STANDARDS**

- Surgical Standard: USP sterile water & sterile delivery system
  - Bulb or other syringe
  - Peristaltic pump, sterile lines
  - Aqua-Sept
- http://www.cdc.gov/oralhealth/infectioncontrol/questions/oral-surgical-procedures.html

§1005 (b) (18)

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106 **HOW TO MEET**
2 WATER STANDARDS

- Non-surgical dentistry: Potable (500 CFU/mL)
  - Chemical treatment
    - Reservoirs
    - Cartridges
- §1005 (b) (18)
  -

107 **FOR POTABLE WATER**
YOUR OFFICE SHOULD:

- Flush lines in AM for 2 min./line (handpieces off)
- Flush lines between patients for 20 sec.
  - (Flushing does not remove attached biofilm)
- Add antimicrobial product to patient treatment water
- Shock periodically – remove attached biofilm
- Follow Manufacturer's directions for use (dental unit & DUW product)
- Monitor water (test)

108 **WATERLINE TREATMENT OPTIONS**

- Chemical "Shock" - removes biofilm
  - Sterilex, (bleach not approved)
  - Caustic, may injure tissue. Rinse !
- Continuous chemical "maintenance" - prevents biofilm, keeps CFU's low.
  - DentaPure 1 /year (dry bottle at night)
  - BluTube 2/year
  - BluTab (Silver ions) – ProEdge (keep bottle on)
  - Team Vista - HuFriedy

109 **DETACHABLE EQUIPMENT ASEPSIS**

110 **HOW DO YOU KNOW YOUR WATERLINES ARE SAFE?**

- Loma Linda University Waterline Testing
- ProEdge Waterline Testing
  - 1-day results
- Test quarterly, rotating lines (empiric evidence, not regulated)

111 **QUICKPASS™ IN-OFFICE WATER TEST**

- Specific to DENTAL water
- 48-72 Hour Incubation
- Neutralization formula within the paddle
- Incubate @ room temp.
- Colonies easier to see & count
- Go To: ProEdgeDental.com/FreeQP
-

112 ☐ **COVID-19 NOTICE:**
DURING CLOSURES

- Empty waterlines & bottles
- Re-attach bottles
- Shock & rinse when re-open office
- "straw" users: remove "straw", use "dummy" straw to shock, replace "straw"

113 ☐ **TREAT, SHOCK, AND TEST ALL WATERLINES**

114 ☐ **INSTRUMENT PROCESSING:**
HIGHEST LEVEL OF ASEPSIS

115 ☐ **INSTRUMENT PROCESSING**
"TRAFFIC FLOW"

116 ☐ **PRE-CLEANING & HOLDING/SOAKING:**
AVOID SCRUBBING LATER

117 ☐ **ENZYME PREVENTS DEBRIS ADHERENCE**

118 ☐ **ONLY SCRUB IF DEBRIS REMAINS AFTER CLEANING….**

119 ☐ **ULTRASONIC CLEANING:**
ALLOW BUBBLES TO WORK

120 ☐ **INSTRUMENT WASHERS & CASSETTES**

- Safer – less handling of sharps
- More efficient:
  - Saves ~ 1 hour / 9 pt. Set-ups
  - Space management:
- Less space needed for instrument cleaning, sorting, ultrasonic, drying
- Software sends error messages to dealer & office
- 40 min. Cycle (dry)
- Waste water safely disposed; reduces aerosols
-

121 ☐ **COMMON CLEANING ERRORS**

1 Ultrasonic

2
- Insufficient time
- Detergent concentration
- Ineffective cavitation
- Inappropriate temperature
- Overloading

3 Washer-Disinfector

4
- Wrong cycle ("rinse-hold")
- Inadequate water spray: spray impingement
- Clogged spray arms
- Pump/line clog or malfunction
- Overloading

122 ☐ **CHECK ULTRASONICS OR WASHERS WITH WASH-CHECKS**

123 ☐ **WEAK LINKS**

124 ☐ **SOMETIMES INSTRUMENT PROCESSING ISN'T THE ANSWER**

125 ☐ **IF YOU DON'T CLEAN IT:**

- You can't disinfect it
-
- You can't sterilize it

126 ☐ **DENTAL ADVISOR STUDY**
J. A. MOLINARI, P. NELSON (DENTAL ADVISOR, 2012)

- ~10% of used & sterilized metal tips showed microbial contamination
- Visual debris was found

127 ☐ **SINGLE-USE DISPOSABLES**

128 ☐ **HANDPIECE STERILIZATION**

- ALL handpieces must be sterilized between each use
  - Must have FDA clearance & validated instruction for re-use
- "Sterile" is absolute: either it is or is not!
- Steam sterilization requires
  - Saturated steam
  - Required temp
  - Direct contact with all load surfaces
  - Required time
-

129 ☐ **STEAM MUST REPLACE AIR & WATER**

130 ☐ **CLASS B PRE- AND POST-VACUUM STERILIZER**

131 ☐ **DIAMOND COATED DEVICES = SINGLE-USE**

- FDA: There are NO FDA-Cleared diamond coated burs or devices with approval for re-use
- Diamond surface cannot be cleaned
- Sterilization instructions are for first-time use

132 ☐ **WHAT'S WRONG?**

133 ☐ **STERILIZER MONITORING**

- Indicators: per package
  - Heat
- Type 5 indicators: per load or pack
  - Time, temperature, pressure
- Biological Monitors: weekly
  - Non - pathogenic spores

- Keep written reports
  §1005 (b) (17)

134 **CHEMICAL INDICATORS**

TYPE 5 **TYPE 4**

135 **ARE THESE STILL STERILE???**

- Event related storage: "sterile" until an event:
  - Water, oil, tear / puncture
  - Packaged opened
- Time related storage
  - Facility protocol
  - Product instructions
  - Most wraps = 6 months

136 **2 STERILIZATION LOGS**

- 1: Log of each cycle for each sterilizer
  - Class 5 Indicator strip results
    - Sterilizer
    - Date
    - Indicator pass/fail
    - Initial
  - Machine print-out
    -
- 2: Biological test results

137 **PPE:**
TRANSMISSION-BASED PRECAUTIONS FOR DROPLET, CONTACT & AEROSOL TRANSMITTED DISEASES
(ATD'S)

138 **ALTERING SEQUENCES**

DROPLET, CONTACT & AIRBORNE PRECAUTIONS

- Glove when entering room
- Remove gloves when leaving room
- Immediate hand hyg.
  - Antimicrobial or alcohol agent
- No bare- handed contact w/ pt., items

139 **ALTERING SEQUENCES**

DROPLET, CONTACT & AIRBORNE PRECAUTIONS

- Gown before entering room, remove immediately when leaving room
- Disinfect &/or barrier re-used non-critical re-usable equip.
  - BP cuff
  - X-Ray shields
  - Thermometers

- Disposables

140 ☐ **ALTERING SEQUENCES**

DROPLET, CONTACT & AIRBORNE PRECAUTIONS

- Private room, close door for airborne pathogens
- Maintain ≥ 6 ft. Between pts.
- Optimize air handling
- Mask to enter room, & ≤ 6 ft. of pt.
- Move pt out of room only if essential, mask on pt.

141 ☐ **RESPIRATORY & EYE PROTECTION**

142 ☐ **MASKS AT WORK**

- Masks while in office appropriate to exposure
  - Cloth is not PPE
- Respirators for aerosols
- Respirators (or masks & face shield ?) for non-aerosol pt. Care
- Consider "surge", air management, susceptibility

143 ☐ **PPE: SURGICAL MASKS**

- Masks are bi-directional physical barriers
- Mostly keep germs in – protect others!
- Limited protection for user
- Single-use
-

144 ☐ **NEVER RE-USE SURGICAL MASKS!**

145 ☐ **KNOW MASK LIMITS**

- Level 3 filters most bacteria - No viral claims
- Mask degrades from;
  - Perspiration
  - Talking
  - Sneezing
  - Length of time mask is worn
  - Dust, spray
- Shield may lengthen use-life
- 20 min - 1 hour! (normal conditions)
-

146 ☐ **RESPIRATORS (VS. MASKS)**

- Only respirators protect against airborne chemicals, fumes, vapors, infectious pathogens
- N-95 masks filter ≥ 95% particles
- Look for label on outside
- Effectiveness = highly dependent on fit & use

147 ☐ **N95 IS NOT A STRAINER**

148 ☐ **PARTICLES STICK TO MASK FIBERS BUT HAVE TO TOUCH THEM**

149 ☐ **N95 MASKS CAPTURE PARTICLES WITH ELECTRICAL CHARGE**

150 ☐ **WET, DAMP MASKS LOSE CHARGE**

151 ☐ **HOW MANY TIMES CAN A RESPIRATOR BE USED?**

- Interim extended-use crisis recs = ended
- IFUs for respirators: single patient – single shift, 5 donnings
- Fit may be compromised with repeated donning
-

152 ☐ **POOR FIT: WEAKEST LINK**

153 ☐ **FACIAL HAIR & RESPIRATOR SEAL**

154 ☐ **SEALED EDGES**
NO FOGGING!

READIMASK.COM

155 ☐ **N95 WITH FOAM ON NOSE RIDGE**

156 ☐ **SO MANY PRODUCTS AVAILABLE!**

VANIMAN N95, KN95 MASKS

157 ☐

158 ☐

RESPIRATORY PROTECTION PROGRAM

- Fit-tested respirators
  - N-95, N-100, elastomeric Half-Mask and Full Facepiece
  - Powered Air-Purifying Respirators (PAPR)
  - R & P-95 to 100 respirators
- Initial fit test required (qualitative)
- Health screening questionnaire (determine safety for user)
- Training

159 ☐ **N95 ALTERNATIVES**

- PAPR – re-usable battery-powered blower provides (+) airflow through a filter, cartridge, or canister to a hood or face piece.
- Loose-fitting, avoids fit-testing, OK with facial hair
- NOT source control (exhaled air forced out)
- Elastomeric half-face respirators: re-usable, seal required
- 2 brands have filtered exhalation valves (good source control)
  - Mine Safety Appliance . https://us.msasafety.com/advantage290
  - Dentec Safety Specialists https://www.dentecsafety.com/respiratory_protection_page_1.htm
  -

160 ☐ **KN95 RESPIRATORS**

- Consider when respirators are otional
- KN95 = Chinese designation of filtration (N95 = U.S.)
- Same filtration
- KN95 – earloops, slightly more seal leakage

161 ☐ **RESPIRATORS & MASKS WITH EXHALATION VALVES**

- Do not provide source control
- Breath can contaminate surgical site
- Cover with surgical mask if used

162 ☐ **USER SEAL CHECK – EACH TIME**

163 ☐ **LOOK OUT!**
PROTECT YOUR EYES!

164 ☐ **2 ISSUES: PARTICULATE INJURY & INFECTIOUS FLUIDS**

165 ☐ **EYE HAZARDS**

- Dental drilling generates debris @ 50 MPH
  - Blood & oral fluids: pathogens
  - Tooth material
  - Calculus
  - Pumice
  - Broken dental burs
  - Restorative material pieces
  - Aerosols not addressed by previous regs

166 ☐ **IS THIS OK?**

167 ☐ **BOTTOM GAP**

168 ☐ **EYEWEAR**

Eyewear is <u>essential</u> for aerosolizing procedures
Eyewear must have side protection, fit closely

- Remove, reprocess eye/face shields when soiled
- Discard disposable eyewear, face shield after use
- Treat as contaminated (touch precautions)
- Leave pt care area to remove eye/face shields
-

169 ☐ **LASER RESPIRATORY PROTECTION**

- Plume extends far beyond "safe" beam distance
- N95 / N100 respirators
- Facial fit = vital
- Fluid resistance
- Wide HVE, <u>≤</u> 2" from source
- Eye protection – close fitting

170 ☐ **LASER WARNINGS**

- Laser fiber: sterilize whole fiber: blood found 4" up channel on fiber
- Post & remove laser use sign so it is noticed

171 ☐ **CLINIC ATTIRE**

- Protective attire
- PPE = barrier
- Comply with OSHA regs
- Change / pt.
- SARS viable on uniforms
  - Polyester ~72 hours
  - Cotton/poly ~ 48 hrs
  - Cotton ~ 24 hrs
- Hot water & detergent!
-

172 ☐ **PPE**

- Gloves, gown
  - Change gown if soiled. Discard in dedicated container in care area. Launder cloth gowns after each use.
  - Use disposable gowns for only 1 patient (surge)
- N-95 respirator
  - Remove & discard disposable respirator after exiting operatory
-

173 ☐

- https://www.cdc.gov/HAI/pdfs/ppe/ppeposter1322.pdf
-

174 ☐ **SHOES**

- Shoes shown to carry infective SARS CoV-2 virus
- Isolation / separation & disinfection recommended
- Washing: >140°F, soap, water bleach (UK NHS)
- 70% alcohol & water (CDC)
- Surface disinfectant wipes?
- Do not take work shoes home
- Touch & storage precautions

175 ☐ **HAND HYGIENE ≥ 20 SECONDS OF LATHERING**

Focus on…..

- Fingernails
- Cuticles
- Webs
- Thickened skin
- Damaged skin
- Thumbs

• Wrists

176 **MOST RECOMMENDED:**
COMBINED PROTOCOL

1 • Plain soap – routine handwashing
2 • Antimicrobial / alcohol hand rub on unsoiled hands
• No triclosan!

177 **HOW LONG SHOULD THE ALCOHOL SANITIZER STAY WET ON YOUR HANDS?**

• 5 seconds
• 8 seconds
• 15 seconds
• 20 seconds
•

178 **IS WATERLESS HAND-RUB EFFECTIVE?**

• Should have ethanol, not isopropyl alcohol
  • Less drying to skin
  • More effective vs. Viruses
• Must have enough emollients for heavy clinical use
• FDA cleared for medical use
  • "Safe and effective"
  • Must have > 60% ETOH
• Contact time: 15 sec.

179 **COMMON MISTAKES**
(THAT HARBOR ORGANISMS &
MAY DAMAGE GLOVES)

• False nails, Nail polish & applications
• Un-manicured nails
• Jewelry
• Petroleum-based products

180 **HAND INJURIES, INFECTIONS**

181

Broken skin management:
• Protect skin openings
• Finger cots, double glove
• Change dressings often

182 **HOW LONG ARE GLOVES INTACT DURING USE?**

2 • No exact data
• Change per patient & when compromised
• No longer than 1 hour
• Do you trust your gloves?
• 4% may leak
  • Buy quality
• Gloves do not replace hand hygiene

- §1005 (b) (8)
-

183 **RESPECT GLOVE LIMITS!**
WHAT DESTROYS GLOVES?

- Soap & water
- Oils – all types
- Petroleum, lanolin, mineral, palm & coconut oils
  - Emollients in products
  - Make-up
- Sweat, dental materials
- Stretching, donning, removing
- Use!!!-

CDC MMWR 2003

184 **CHOICES WITHIN REACH BUT AEROSOL-PROTECTED**

185 **COVID-19: GREATEST IMPACT**

Include respiratory diseases in your safety standard:
"Consider everyone infectious"

No going back
After HBV vaccine: still using gloves!
After COVID: respirators

186

HOT TOPICS IN
INFECTION CONTROL