

# Infection Control in the Dental Clinic

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# Educational Objectives

- Discuss the application of infection control laws, regulations, standards, and best practices.
- Review the bloodborne pathogen standard in the context of prisons and jails.
- Identify methods and equipment to reduce pathogenic microorganisms in the dental environment.



Let us discuss how to keep this space a safe environment.



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# Dental Infection Control and Prevention



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# The good news !

Dental care can be provided with a high degree of safety for the patient and Dental Health Care Worker (DHCW), provided that the principles of comprehensive infection control are adhered to.



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# Standard precautions versus Universal precautions

- Universal precautions are infection control measures to prevent exposure to blood and other bodily fluids.
- Standard precautions are infection control measures that extend beyond blood to include all bodily fluids, secretions, and excretions(except sweat)
- OSHA blood borne pathogen standard still refers to universal precautions but the more inclusive standard should be followed in the dental office.



# Dental Infection Control and Prevention

- Dental professionals must follow Standard precautions and treat every patient as being potentially infectious.
- Standard precaution means that the same infection control procedures are used for all patients.
- The dental team collectively must be aware of these precautions and should mandatorily follow the infection control protocol as presented in your facilities Infection control policies and procedures.





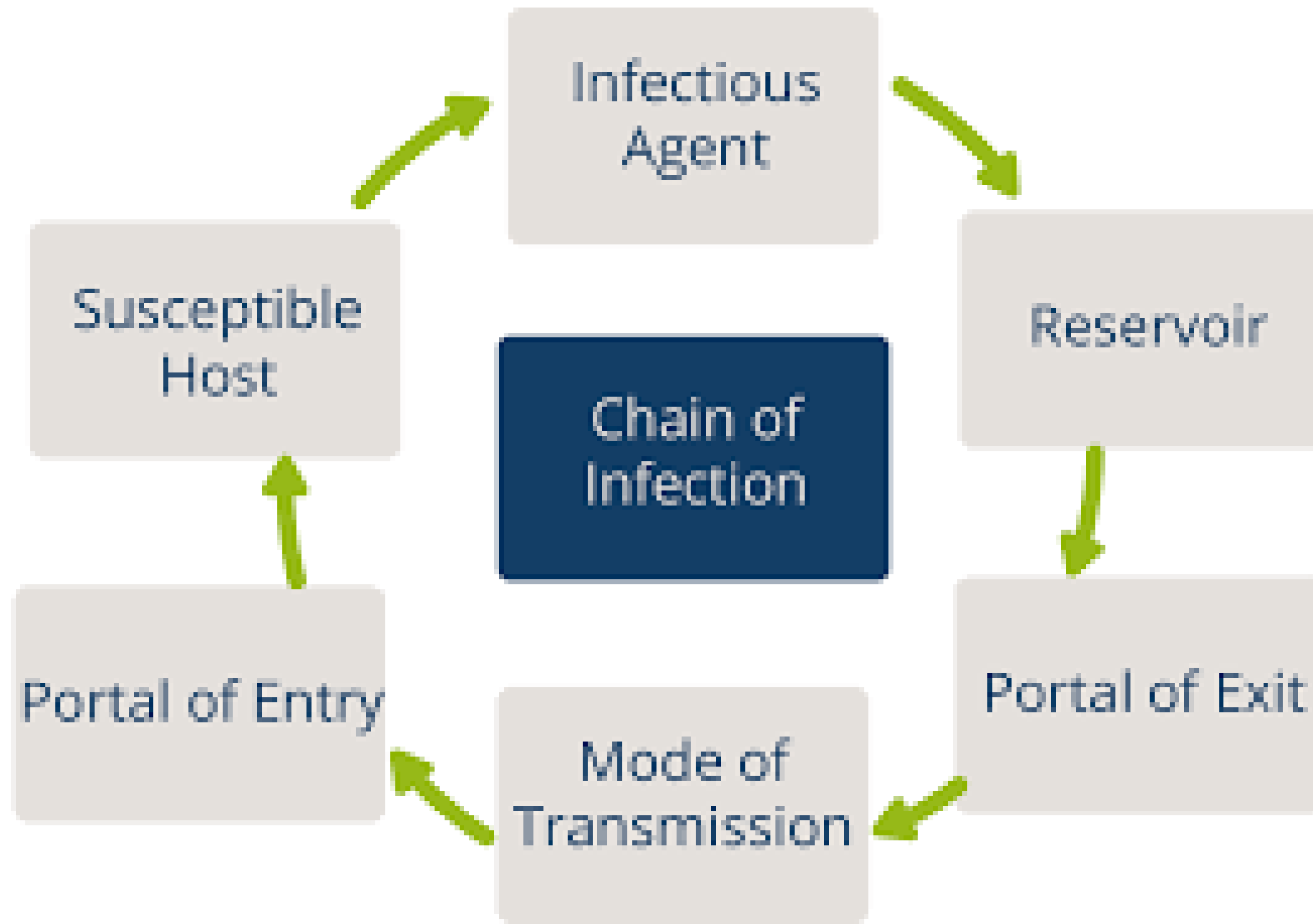
# The cycle of infection

Understanding how to break the cycle of infection



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# Preventing Infection Transmission (Breaking the Chain)



How do we achieve infection control in our  
environment?

Jails and Prisons



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# How do we achieve infection control in our environment?

- First all patients must be screened. This involves a thorough recording of medical history, soft tissue examination, screening of all allergies , drug reactions an overall assessment of the patient's health.
- You must recognize the importance of early diagnosis of disease and provide treatment of previously undiagnosed conditions.
- The dental team must be adept and making modification of infection control if the patient is medically compromised for example making certain that we have available sterile water for dental procedures and available test to screen for Covid-19.



## Medical History Questions

### **STANDARDIZED QUESTIONS FOR HEALTH HISTORY REVIEW**

Dentist reviews the following patient information in the EHRs:

Diagnosis and problems list

Medication list

Allergies

Relevant lab values

Dentist tells the patient “I see you have a history of [dentist specifies findings from the EHRs review]”

Dentist asks the patient the following questions:

Have I missed any health problem, issue, or medication?

Please describe any recent changes in your health or medications – fever, loss of taste

Please describe your general health?

Please describe any problems with prior dental treatment?



# COVID-19 screening protocol

The screening process is required to alert DHCP of the following sequelae of Covid-19

Symptoms may appear 2-14 days after exposure to the virus. People with these symptoms may have COVID-19:

Fever or chills

Cough

Shortness of breath or difficulty breathing

Fatigue

Muscle or body aches

Headache

New loss of taste or smell

Sore throat

Congestion or runny nose

Nausea or vomiting

Diarrhea

**Look for emergency warning signs for COVID-19. If someone is showing any of these signs, seek emergency medical care immediately:**

Trouble breathing

Persistent pain or pressure in the chest

New confusion

Inability to wake or stay awake

Pale, gray, or blue-colored skin, lips, or nail beds, depending on skin tone



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# How do we achieve infection control in our environment?

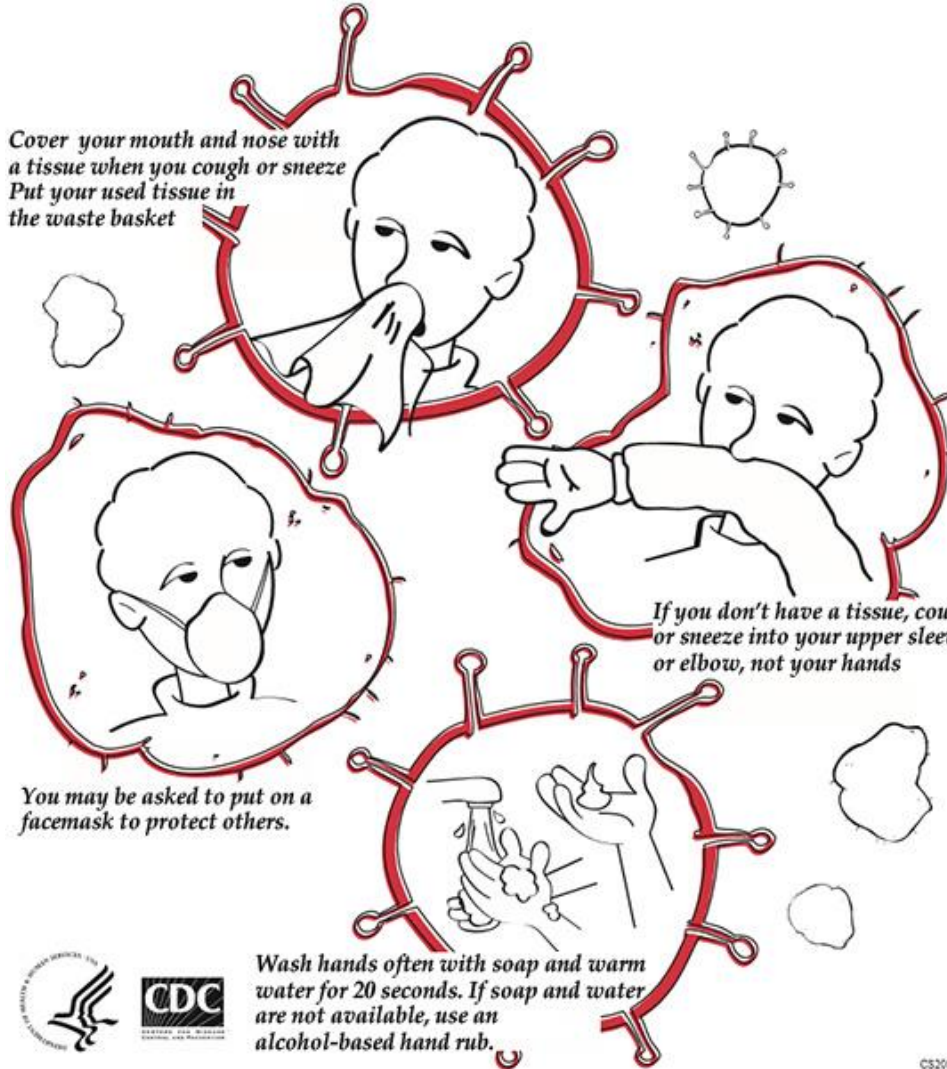
- Members of the dental team must stay healthy.
- Immunization: pre-exposure and post-exposure prophylaxis.
- All members must be vaccinated for hepatitis B, influenza, mumps, measles, tetanus, rubella , tuberculosis, whooping cough and SARS COVID-19.
- In case of exposure to a potential carrier, the dental professional must follow the post exposure prophylaxis.



# Cover your Cough

— Stop the spread of germs that can make you and others sick! —

Cover your mouth and nose with a tissue when you cough or sneeze. Put your used tissue in the waste basket.



If you don't have a tissue, cough or sneeze into your upper sleeve or elbow, not your hands.

You may be asked to put on a facemask to protect others.

Wash hands often with soap and warm water for 20 seconds. If soap and water are not available, use an alcohol-based hand rub.



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# INFECTION CONTROL IN THE DENTAL CLINIC



# OSHA COVID-19 Healthcare Emergency Temporary Standard

Coronavirus Disease (COVID-19) / COVID-19 Healthcare ETS

## EMERGENCY TEMPORARY STANDARD

### COVID-19 Healthcare ETS

#### Statement on the Status of the OSHA COVID-19 Healthcare ETS

(December 27, 2021)

On June 21, 2021, OSHA adopted a [Healthcare Emergency Temporary Standard](#) (Healthcare ETS) protecting workers from COVID-19 in settings where they provide healthcare or healthcare support services. 86 FR 32376. Under the OSH Act, an ETS is effective until superseded by a permanent standard – a process contemplated by the OSH Act to occur within 6 months of the ETS's promulgation. 29 U.S.C. 655(c).

OSHA announces today that it intends to continue to work expeditiously to issue a final standard that will protect healthcare workers from COVID-19 hazards, and will do so as it also considers its broader infectious disease rulemaking. However, given that OSHA anticipates a final rule cannot be completed in a timeframe approaching the one contemplated by the OSH Act, OSHA also announces today that it is withdrawing the non-recordkeeping portions of the healthcare ETS. The COVID-19 log and reporting provisions, 29 CFR 1910.502(q)(2)(ii), (q)(3)(ii)-(iv), and (r), remain in effect. These provisions were adopted under a separate provision of the OSH Act, section 8, and OSHA found good cause to forgo notice and comment in light of the grave danger presented by the pandemic. See 86 FR 32559.

With the rise of the Delta variant this fall, and now the spread of the Omicron variant this winter, OSHA believes the danger faced by healthcare workers continues to be of the highest concern and measures to prevent the spread of COVID-19 are still needed to protect them. Given these facts, and given OSHA's anticipated finalization of this rule, OSHA strongly encourages all healthcare employers to continue to implement the ETS's requirements in order to protect employees from a hazard that too often causes death or serious physical harm to employees.



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# Safety concerns for Dental Team, Dentist and Dental Hygienist



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let us look at some of the challenges of providing operative dentistry and periodontal procedures .



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## Safety concerns for Dental Hygienist

- Dental hygienists have a low rate of COVID-19, even though their jobs are considered high-risk. (OSHA)
- OSHA analyzed survey data collected in October from nearly 4,800 dental hygienists in all 50 states and Puerto Rico.
- Just 3.1% of hygienists said they had been diagnosed with COVID-19, and those who had had the illness weren't clustered in any single region, according to findings in the February issue of the *Journal of Dental Hygiene*.
- These initial findings were released Feb. 24 by the American Dental Hygienists' Association (ADHA) and the American Dental Association (ADA).
- The COVID-19 rate among dental hygienists is similar to that among dentists and far below that of other health professionals in the United States. It is slightly higher than that of the general population.



## Safety concerns for Dentist

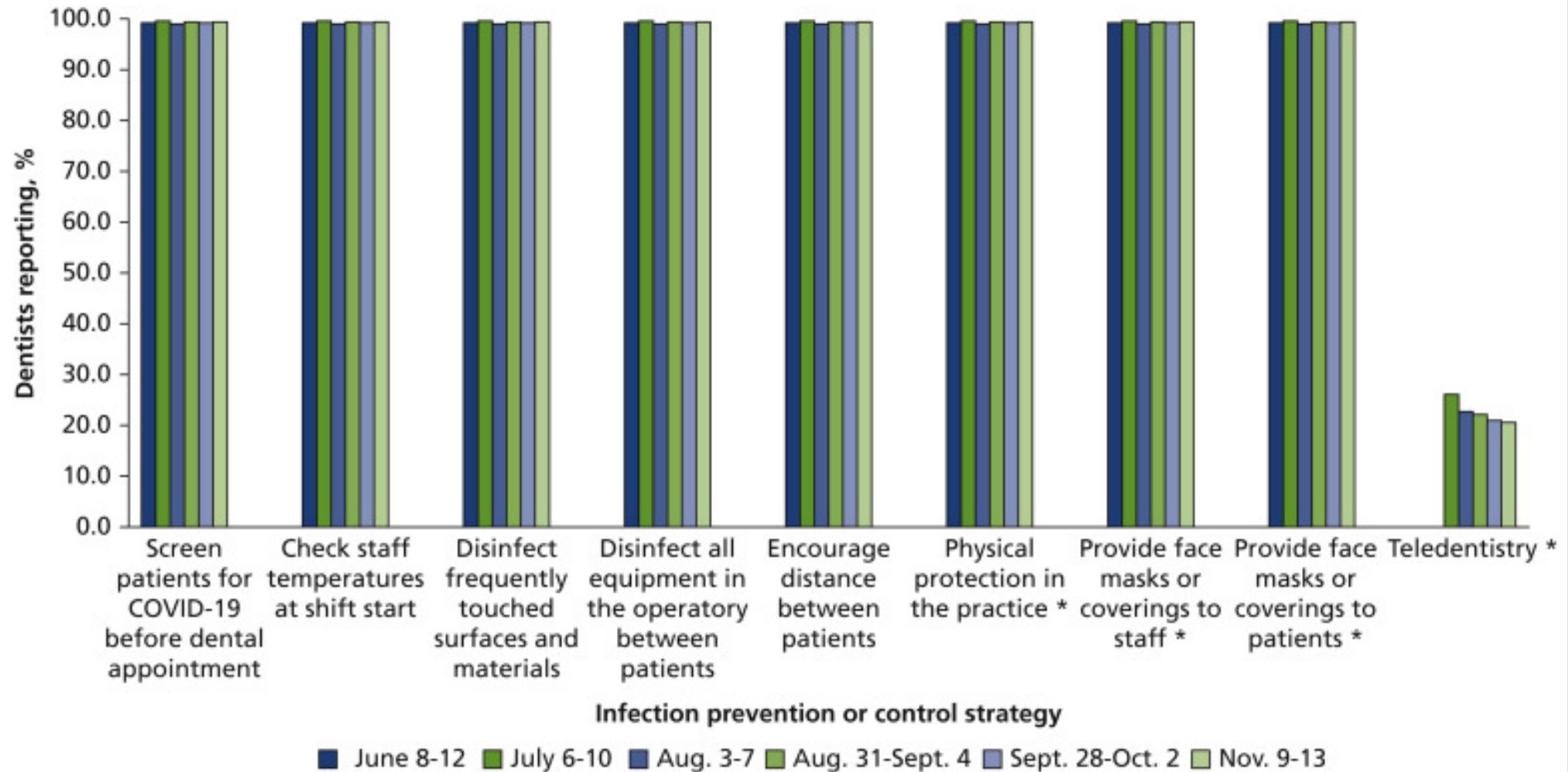
The level of adherence to enhanced infection control procedures in response to the COVID-19 pandemic continues to be high among US dentists.

The low rates of cumulative prevalence (2.6%) and monthly incidence ranging from 0.2% through 1.1% reflect the high level of self-care among dentists.

Oral health care is being delivered safely because dentists are showing adherence to a strict protocol for enhanced infection control, which should help protect their patients, their dental team members, and themselves.



## COVID-19 among dentists in the United States



Those Hands !!!



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How do we achieve infection control in our environment?

- Hand washing and hand care.
- Proper hand washing destroys pathogens, removes blood, debris and contaminating microorganisms and prevents accumulation of Health Care Acquired Infections (HAI).
- Surgical hand scrub –act fast and have a broad range of bactericidal and residual activity.
- Health care personnel hand wash – have bactericidal and germicidal ingredients.



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How do we achieve infection control in our environment?

- **Antiseptic agent** –An antiseptic agent may refer to an anti microbial substance that inactivates microorganisms or inhibits their growth on living tissues. Examples include alcohols, chlorhexidine gluconate (CHG), chlorine derivatives, iodine, Chloroxylonol (PCMX), quaternary ammonia compounds and triclosan.
- **Drying** is also an essential part of the hand hygiene process. Paper towels are recommended to both dry the hands and to turn off the faucet. Repeated hand washing may damage the skin if not performed correctly and, in some instances, hand cream maybe used that will not degrade the procedure gloves used while in the operative setting.





# Hand Sanitizers

Proper method to remove gloves



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How do we achieve infection control in our environment?

Always practice aseptic techniques during treatment and clean up, blood and saliva.

Contaminated blood, aerosolized viral particles can be spread by anything that has been in patient's mouth.



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## Aseptic techniques

- Aseptic techniques are any procedures that reduces or eliminates the dissemination of pathogens.
- One of the most basic techniques in ensuring that one touches as few surfaces as possible with the fingers gloved or ungloved that might be coated with blood or saliva.
- Gloves are used for changing every time they are contaminated or the professional leaves the chairside.
- The reduction of dental aerosols and spatters produced by the handpieces, ultrasonic scalers, and air-water syringe.



# What are bloodborne pathogens?

Why is it so important ?



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## Blood Borne Pathogen Standard

In a dental set-up, the patient's saliva mixed with blood, pus, plaque and crevicular fluid is often aerosolized and spattered, thus exposing the dental professional to potential infectious agents. This is because micro-organisms are always mixed with these body materials and they cause infectious and transmissible disease, most common of which are common cold, herpes, hepatitis and AIDS. It therefore becomes mandatory for the dental professional to follow the standard precautions and treat every patient as being potentially infectious. Standard precaution means that the same infection control procedures are used for all patients. The dentist must hence be aware of these precautions and should mandatorily follow the infection control protocol in his or her dental set-up.



## What are Bloodborne Pathogens

Bloodborne pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV). Needlesticks and other sharps-related injuries may expose workers to bloodborne pathogens.





# Staff Safety

## **CAUTION!**

**If you are stuck by a needle or other sharp or get blood or other potentially infectious materials in your eyes, nose, mouth, or on broken skin, immediately flood the exposed area with water and clean any wound with soap and water or a skin disinfectant if available. Report this immediately to your supervisor and seek immediate medical attention.**



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What can be done to control exposure to bloodborne pathogens?

Employer will use engineering and work practice controls

Personal protective clothing and equipment

Employee training

Medical surveillance

Hepatitis B vaccinations

To include provisions as required by OSHA's Bloodborne Pathogens Standard ([29 CFR 1910.1030](#)).

Engineering controls are the primary means of eliminating or minimizing employee exposure and include the use of safer medical devices, such as needleless devices, shielded needle devices, and plastic capillary tubes.



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# What We Know and Do not Know About Dental Aerosols

**Spatter (Splatter)**  
**Aerosols**  
**Droplet Nuclei**



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## Spatter (Splatter)



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## Spatter - Droplet Nuclei

Beginning as spatter but, as the water component of the spatter starts to evaporate and particle size and weight diminish, droplet nuclei become light enough to become aerosols. This may be the greatest concern with dental infection control, as droplet nuclei exit the mouth as relatively large particles and therefore are able to contain more biological material from the patient. As the water evaporates and they become small enough to become aerosols, the biological—and possibly infectious—material becomes more concentrated.



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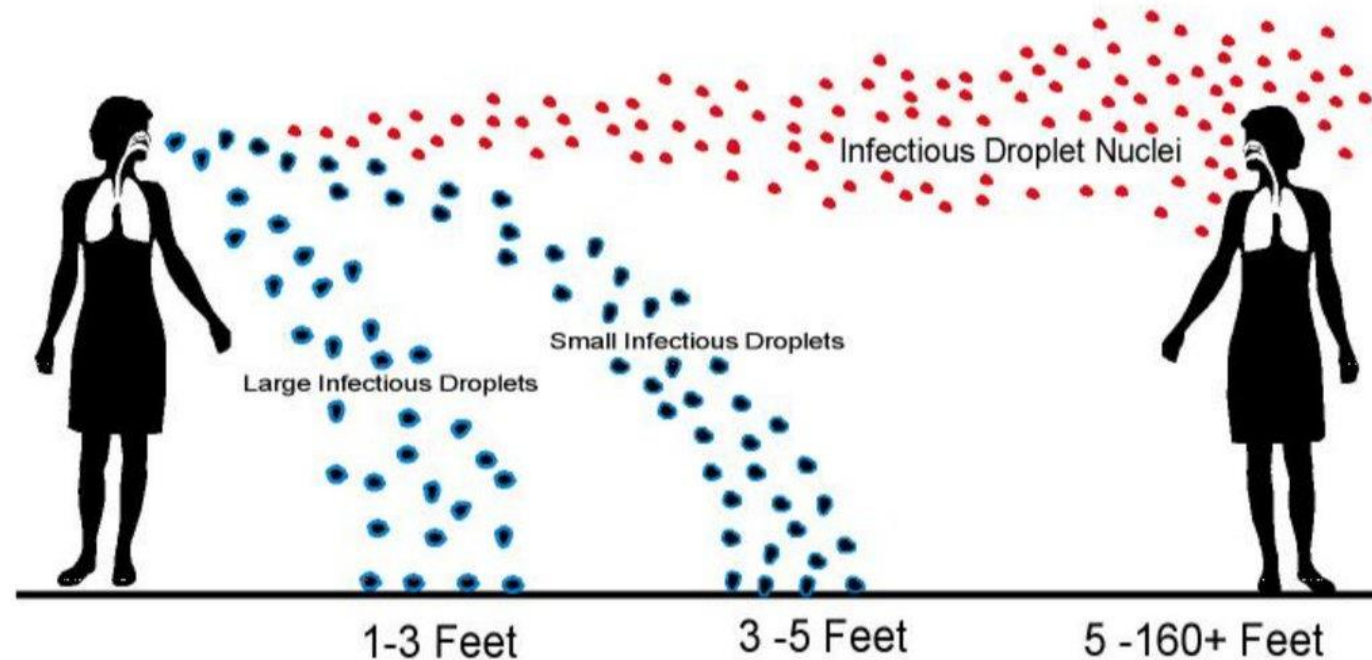
# Aerosolization dynamics

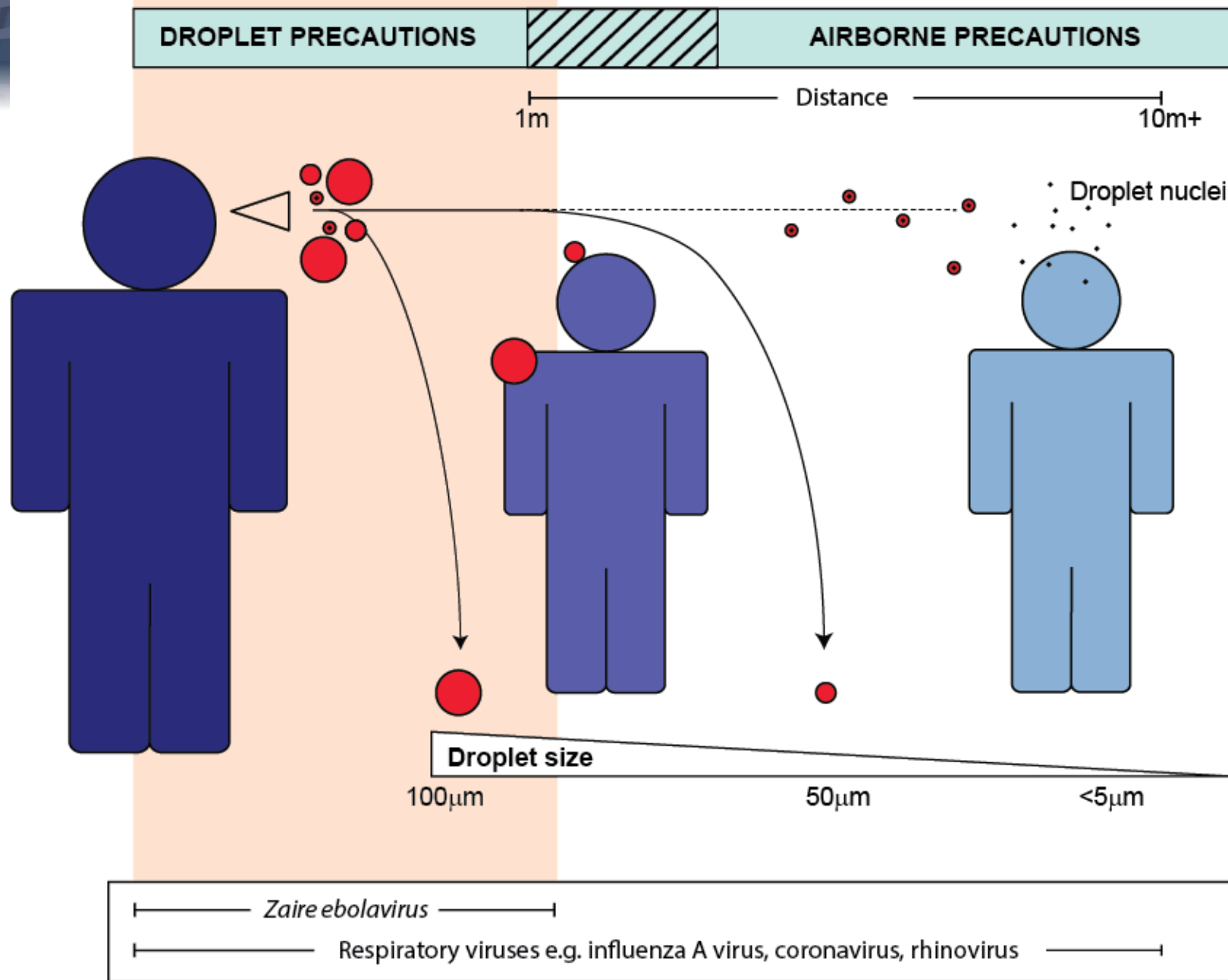


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## Infectious Droplets & Droplet Nuclei travel lengths





**SIMPLE SKETCH OF DROPLET & AIRBORNE  
VIRUS AND BACTERIAL TRANSMISSION**

# Major aerosol generating dental devices

Tools of the trade



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Medical history review, air water syringe , high speed handpiece, and cavitron/ultrasonic scaling tips continued

The ultrasonic scaler and air polishers are the greatest producers of small particle aerosol contamination in dentistry. Several studies show that the ultrasonic scaler produces more airborne contamination than any other instrument in dentistry. Mitigation strategies to reduce pathogenic load include:

- Utilization of a pre-procedure rinse to reduce the pathogenic load.
- Utilizing high volume evacuation systems such as Mr. Thirsty decreases contaminants released from the oral cavity.
- If the instrument and the dental unit waterlines are maintained as recommended by the American Dental Association(ADA), the coolant water aerosol represents little danger to the operator. The risk of infection occurs when these instruments are used on a patient and the visible aerosol mixes with the invisible microorganisms that arise from the patient.



Medical history review, air water syringe, high speed handpiece, and cavitron/ultrasonic scaling tips

To review.. the air water syringe, dental high speed, ultrasonic scaler tips and prophy cups is the armamentarium most likely to create pathogenic aerosols.

To mitigate pathogenic load, it is important to identify any existing flags. It's not a matter of the type of condition the patient may have because we use **Standard precautions** but as a “Best view the patient’s medical history and Practice” you need to know the patient's existing condition

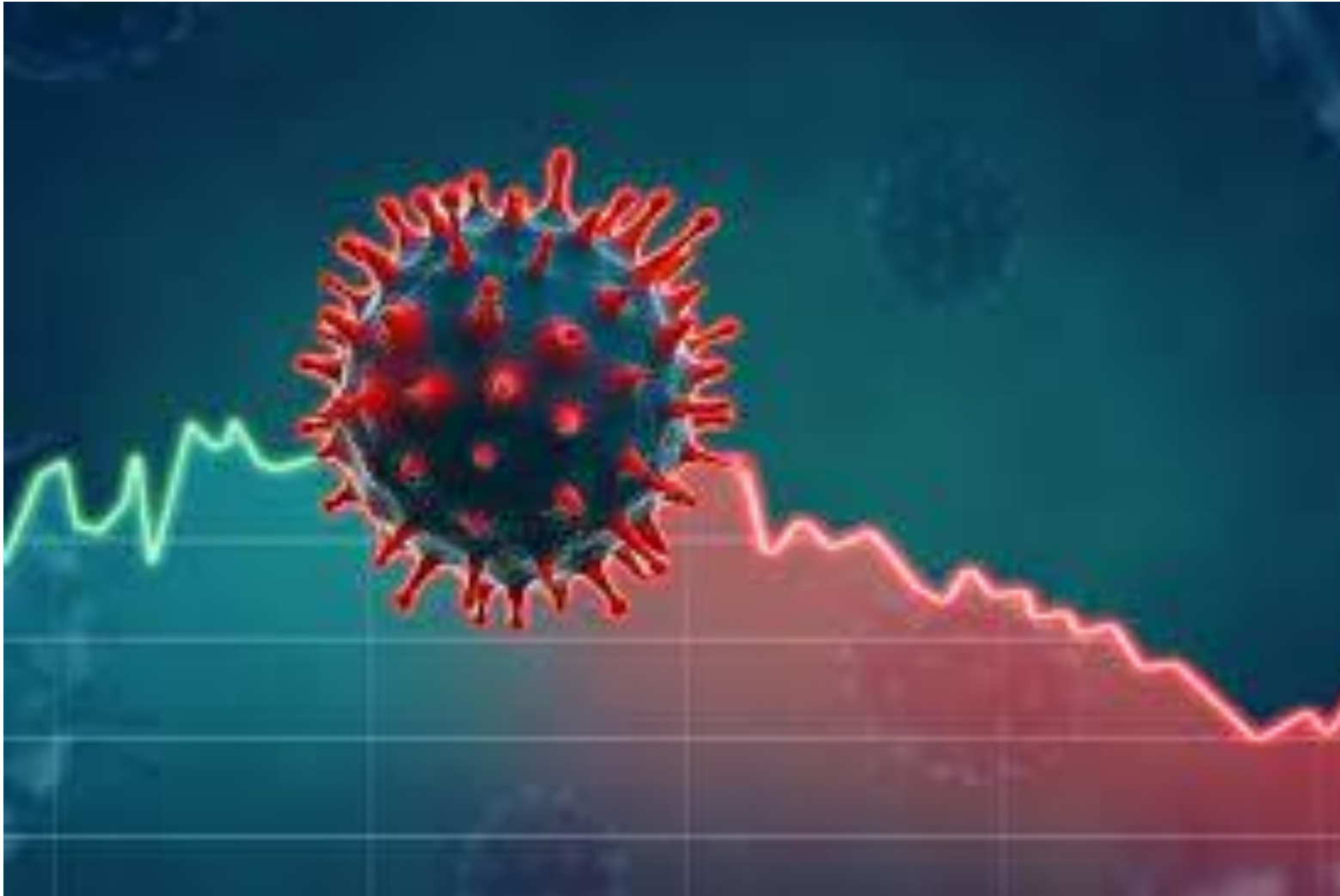
When using a high-speed handpiece, a good practice is to reduce the flow of water used to remove cavitated lesions. We all have been trained to use minimally invasive procedures such as silver diamine fluoride and reinforced glass ionomers employing the ART approach in high-risk situations. When acid etch is required be mindful of the technique used to rinse using the air water syringe . Blasting air or copious water sprays should be avoided. Please use finesse when desiccating the tooth prior to placing your bonding agent on anterior teeth and posterior buccal pits.



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## SARS-COVID-19



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## Current SARS-CoV-2 variant of concern (WHO)

### Variants of concern (VOC)

#### Working definition:

A SARS-CoV-2 variant that meets the definition of a VOI (see below) and, through a comparative assessment, has been demonstrated to be associated with one or more of the following changes at a degree of global public health significance:

- Increase in transmissibility or detrimental change in COVID-19 epidemiology; OR
- Increase in virulence or change in clinical disease presentation; OR
- Decrease in effectiveness of public health and social measures or available diagnostics, vaccines, therapeutics.

#### Currently circulating variants of concern (VOCs):

WHO label	Pango lineage*	GISAID clade	Nextstrain clade	Additional amino acid changes monitored°	Earliest documented samples	D
Omicron*	B.1.1.529	GR/484A	21K, 21L, 21M, 22A, 22B, 22C, 22D	+S:R346K +S:L452X +S:F486V	Multiple countries, Nov-2021	V

\* Includes BA.1, BA.2, BA.3, BA.4, BA.5 and descendent lineages. It also includes BA.1/BA.2 circulating recombinant forms such as XE. WHO emphasizes that these descendant lineages should be monitored as distinct lineages by public health authorities and comparative assessments of their virus characteristics should be undertaken.



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## **United States new cases as of Oct 1**

**New cases: 6,417**

**7-day avg: 48,289**

- DHCW must continue to follow the guidelines recommended by leadership.
- Dental programs and other Healthcare disciplines are continuously monitoring infection rates, symptoms and hospitalization rates.
- Quarantine and isolation practices are well defined within the institutions after 2 3/4 years experience with COVID.
- Monitor your institution by using the various COVID registries available on Lifeline



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## CDC Guidance

- Only avoid aerosol –generating dental procedures for patients with suspected or confirmed COVID-19.
- The CDC has updated its COVID-19 Guidance for Dental Settings to remove language stating the dental health care personnel should avoid aerosol-generating procedures for **all patients, regardless of their COVID-19 status.**
- Instead the CDC states to avoid aerosol-generating procedures in a typical dental operator only for patients with suspected or confirmed COVID-19, if possible.



## What can we do to protect ourselves from COVID-19 and the Omicron variants?

There are four specific actions that can be taken by all today to protect themselves and help slow the spread of COVID-19, including the Omicron variant.

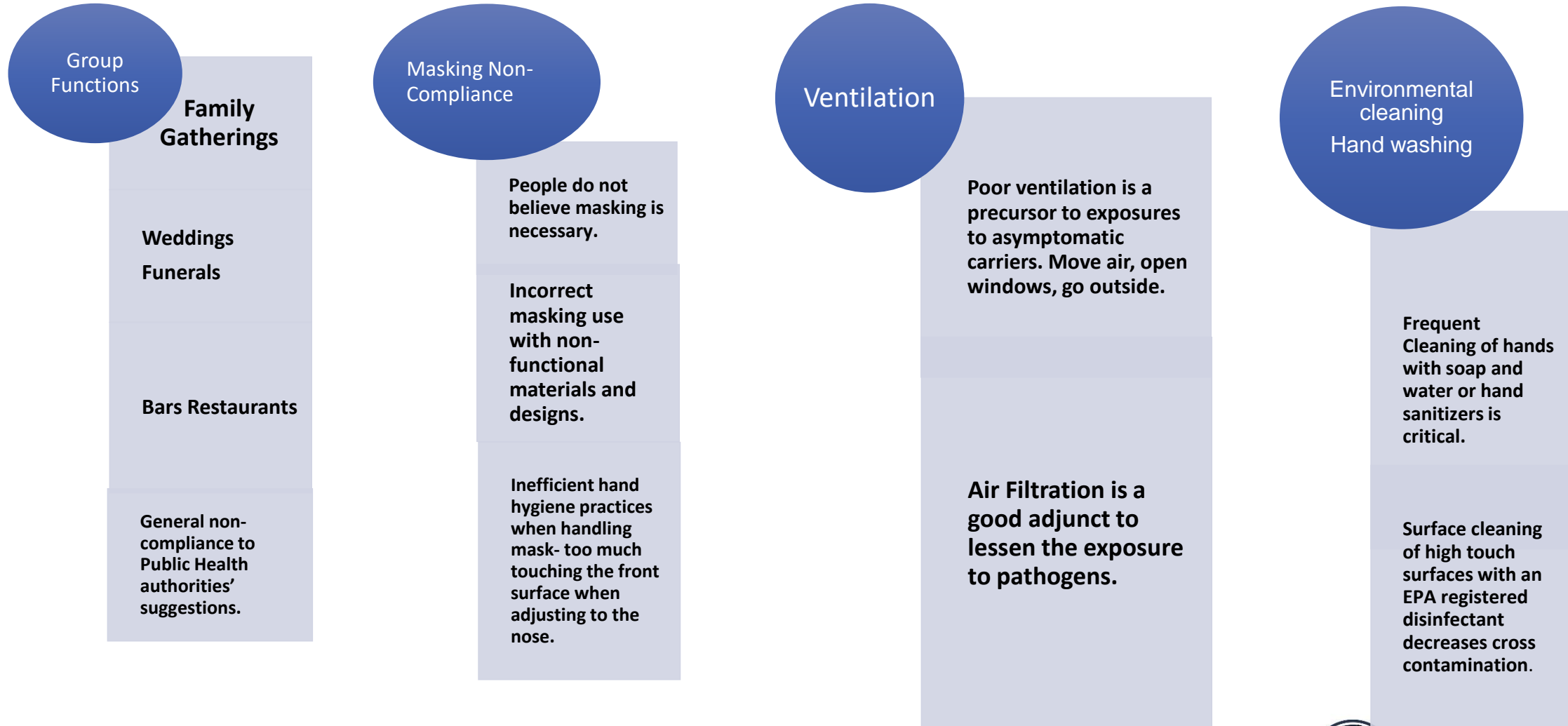
**Get Vaccinated:** All COVID-19 vaccines currently available in the U.S. are safe and effective at preventing serious illness from COVID-19. Vaccination will protect you and those you love. Children ages 5 and older are now eligible for vaccination. Additionally, those over the age of 12 who are at least five months since their last dose of Pfizer or Moderna, (age 18 and over) or at least two months since J&J, are eligible for a booster. To get vaccinated or get a booster visit the [My Turn website](#).

**Wear Masks:** Masks prevent the spread of COVID-19, [upgrade your mask](#) and check for good fit and filtration. Follow current state and local [masking recommendations and requirements](#). Currently, everyone must wear a mask in ambulatory and hospital settings.\*

**Get Tested:** You should immediately get tested for COVID-19 if you are feeling any symptoms – regardless of your vaccination status. COVID-19 symptoms can feel like a common cold (including just "the sniffles"), seasonal allergies, or flu. COVID-19 testing is generally free to anyone who needs it. You can book a free test appointment, find a walk-in test clinic, or buy a self-test kit from your local drugstore. [Find a testing site](#) online Stay Home if Sick Stay home if you are feeling sick, test, and isolate for at least 5 days if you test positive.



## Problems with indoor environments for COVID -19 Transmission – Persistent errors of judgement



Problems with indoor environments for COVID -19  
Transmission

The odds that a primary case transmitted COVID-19 in a closed environment is **18.7** times greater compared to an open-air environment.

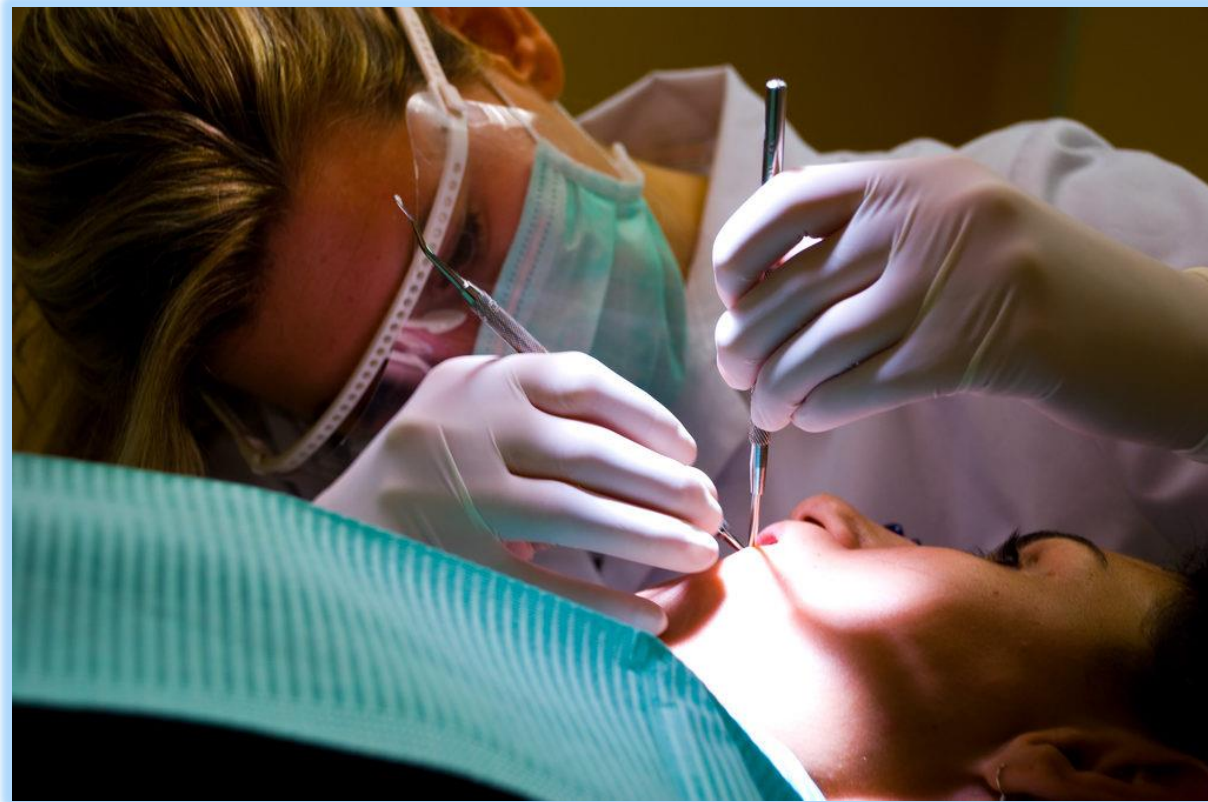
(95% 34 confidence intervals [CI]: 6.0, 57.9).



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## Staff safety

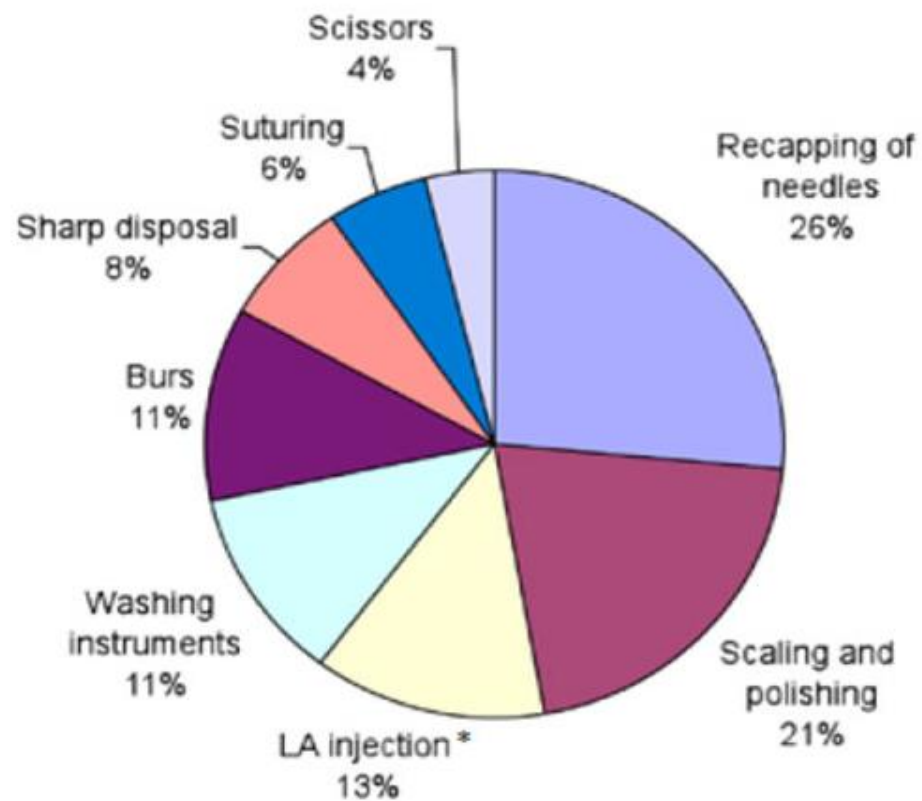


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## Staff Safety

### DISTRIBUTION OF PROCEDURES CAUSING PERCUTANEOUS INJURIES.

From: Jaber, M. A survey of needle sticks and other sharp injuries among dental undergraduate students. Int J Infect Control 2011; v7:i3.



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How do we achieve infection control in our environment?

- Use barriers for personal protection.
- Personal Protective Equipment (PPE) is the specialized clothing or equipment worn by a worker for protection against a hazard.
- Pre-procedure mouth rinsing by the patient.



How do we achieve infection control in our environment?

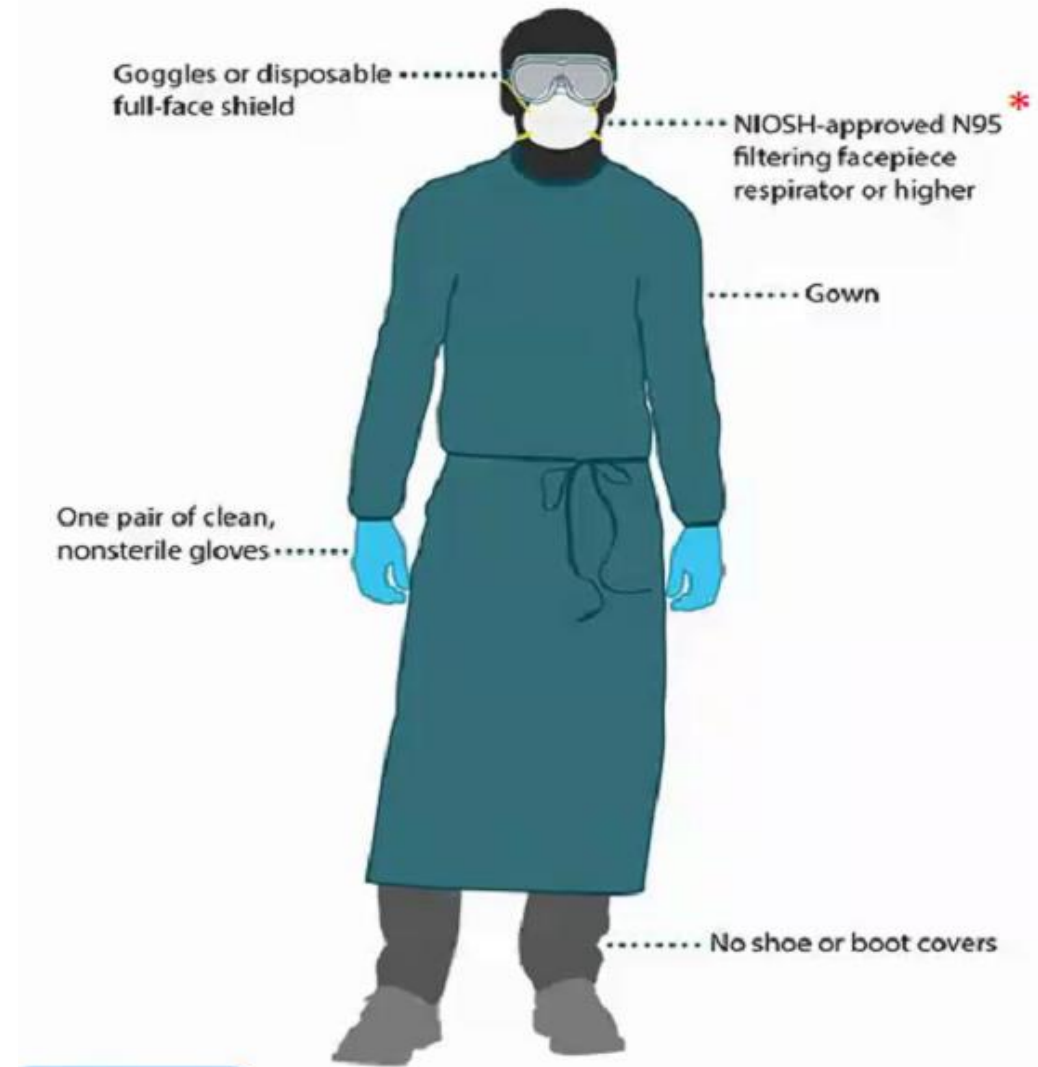
- PPE should be used in accordance with OSHA regulations including the following components.
- Gloves : In most instances' latex is avoided and Nitrile powder or powder free alternatives are effective.
- Gowns.
- Face Shields, Hair protection.
- Procedure mask N95 (currently).
- Goggles /Eye wear.



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## Personal protective equipment

Personal protective equipment is used as part of Routine Practices to prevent contact with blood, body fluids, secretions, excretions, non-intact skin or mucous membranes.



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## Personal protective equipment

**Do not hang up gowns.**  
**Do not reuse.**



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OSHA recommends the following PPE for dentistry during the COVID-19 pandemic

OSHA recommends the following PPE for dentistry during the COVID-19 pandemic:

Well patients		Patients with suspected or confirmed COVID-19	
<i>Dental procedures not involving aerosol-generating procedures</i>	<i>Dental procedures that may or are known to generate aerosols</i>	<i>Dental procedures not involving aerosol-generating procedures</i>	<i>Dental procedures that may or are known to generate aerosols</i>
<ul style="list-style-type: none"><li>▪ Work clothing, such as scrubs, lab coat, and/or smock, or a gown</li><li>▪ Gloves</li><li>▪ Eye protection (e.g., goggles, face shield)</li><li>▪ Face mask (e.g., surgical mask)</li></ul>	<ul style="list-style-type: none"><li>▪ Gloves</li><li>▪ Gown</li><li>▪ Eye protection (e.g., goggles, face shield)</li><li>▪ NIOSH-certified, disposable N95 filtering facepiece respirator or better*</li></ul>	<ul style="list-style-type: none"><li>▪ Gloves</li><li>▪ Gown</li><li>▪ Eye protection (e.g., goggles, face shield)</li><li>▪ NIOSH-certified, disposable N95 filtering facepiece respirator or better*</li></ul>	<ul style="list-style-type: none"><li>▪ Gloves</li><li>▪ Gown</li><li>▪ Eye protection (e.g., goggles, face shield)</li><li>▪ NIOSH-certified, disposable N95 filtering facepiece respirator or better*</li></ul>

Staff Safety

Dental mask, respirators and PAPRs

Determining different characteristics



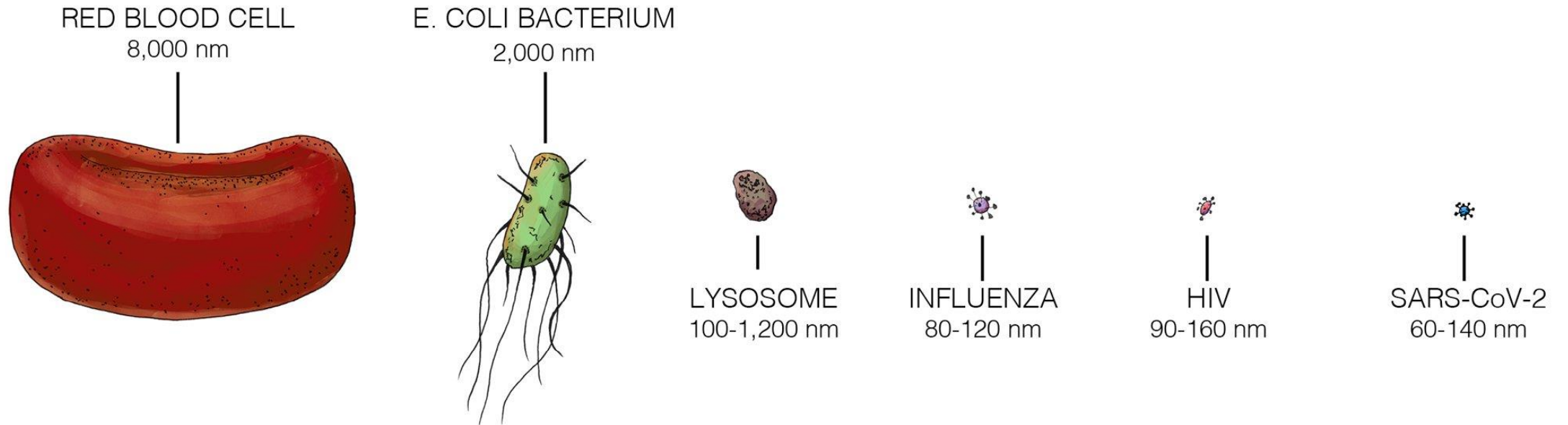
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## Masking Do's and Don'ts



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## Relative Sizes of Cells and Pathogens



Micrometer also called Micron is 1000 times smaller than a millimeter.

1 millimeter (mm)=1000 nanometers

A nanometer is 1000 times smaller than a micrometer and 1 micrometer equals 100 nanometers



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# Procedural and Surgical Mask

## ASTM STANDARDS



**ASTM LEVEL 1 BARRIER**  
**80 mm Hg FLUID RESISTANCE**

IDEAL FOR EVERYDAY USE OR WHERE  
THERE IS LOW RISK OF EXPOSURE  
TO SPRAY OR SPLASH



**ASTM LEVEL 2 BARRIER**  
**120 mm Hg FLUID RESISTANCE**

SUITABLE FOR PROCEDURES WITH A  
MODERATE RISK OF EXPOSURE  
TO SPRAY OR SPLASH



**ASTM LEVEL 3 BARRIER**  
**160 mm Hg FLUID RESISTANCE**

HIGHEST PROTECTION AVAILABLE ON THE  
MARKET, BEST FOR USE WHEN RISK OF  
EXPOSURE TO SPRAY OR SPLASH IS  
HIGH OR UNKNOWN



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## N95 filtering face piece respirator



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**KN95 filtering face piece respirator,**



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# N-95 User seal check and Fit Testing

## Qualitative versus Quantitative Fit Testing

**The main difference between quantitative mask fit testing and qualitative mask fit testing is that quantitative testing objectively measures the amount of leakage(quantity) while qualitative testing relies on the users taste and smell to detect leakage.**



## Cloth Mask Best Practices Tips



## Mask Fails

- **1. Leaving your nose uncovered by the mask.**
- **2. Wearing the face mask on your chin only.**
- **3. Touching and adjusting your mask frequently.**
- **4. Thinking a face mask replaces social distancing.**
- **5. Wearing a damp or dirty mask.**



## CAPRs



The proprietary CAPR moves the blower and motor unit from the belt up to the headgear itself, leaving only the battery pack on the belt and replacing the hose with a power cord. Thus, the somewhat cumbersome arrangement of the PAPR is streamlined and made a bit less intrusive, a benefit to health care workers and probably less intimidating for patients to see in a medical facility setting.

Max Air CAPR information and resource materials can be found on their website



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## Face/Eye Protection

Eye Protection  
for COVID-19:  
What are some  
**examples?**



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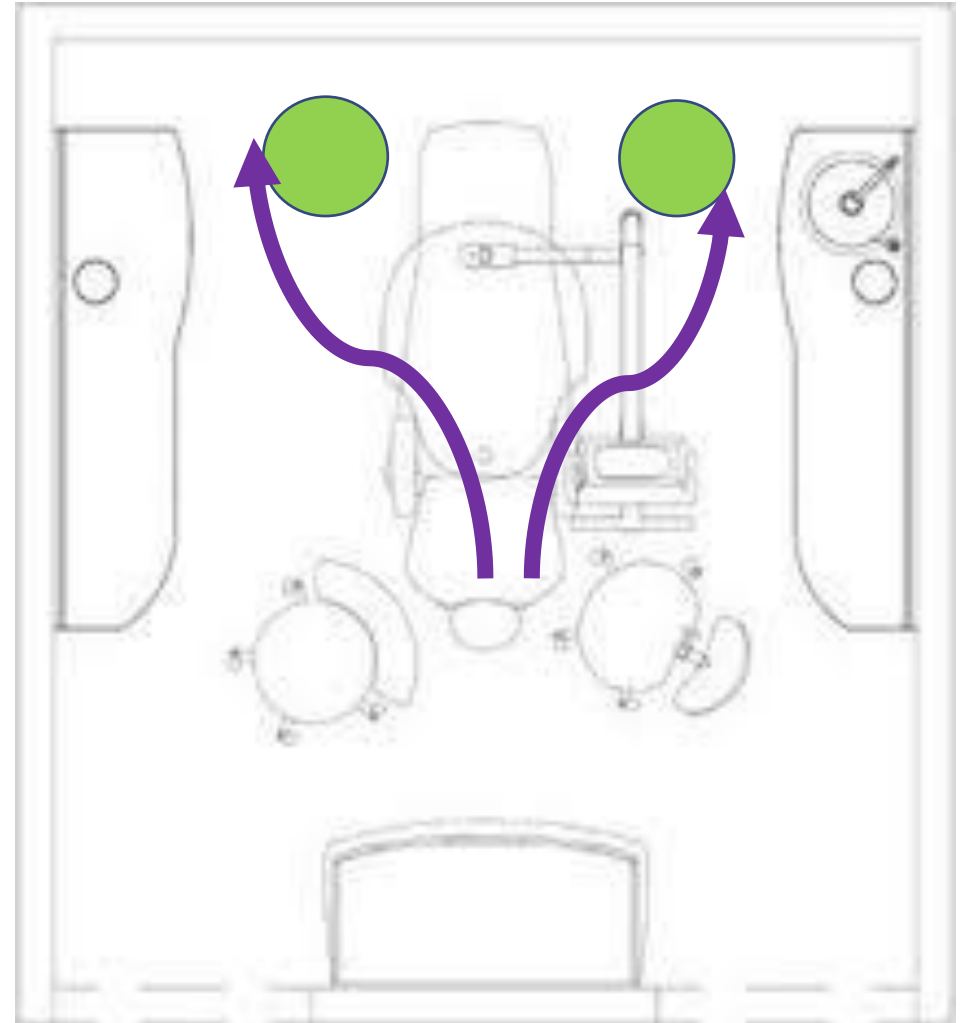
# Respiration Protection Program (RPP)



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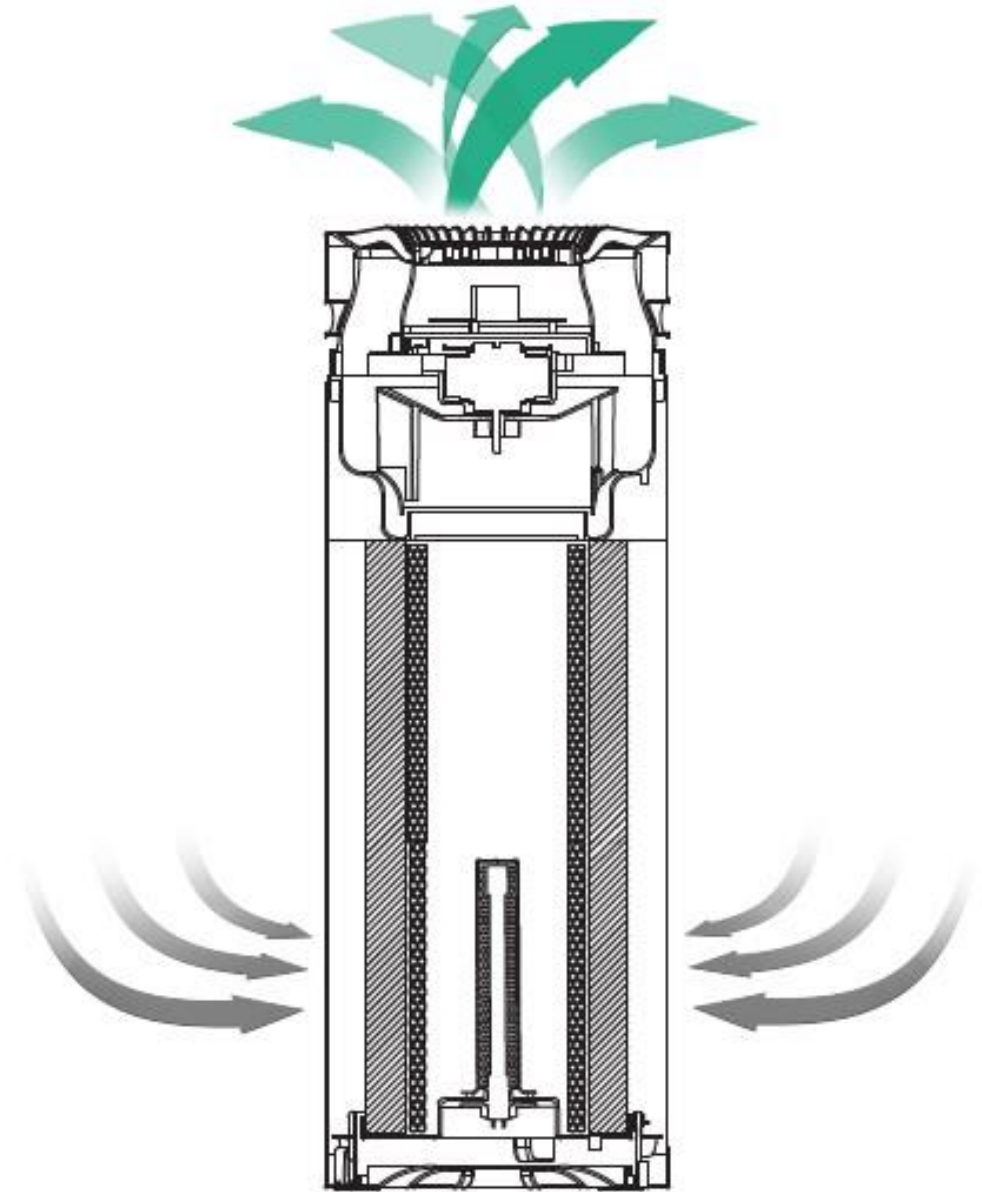
## Jade units placement in the Operatory

- Place Air Purifiers in the area between the patient's hip level and the foot end of the operatory (**BLUE arrows and lines**)
- As close to the treatment area as possible, either side of chair
- Air flow (**PURPLE lines**) from treatment area to AP unit should not be blocked by staff or dental equipment
- Minimum of 12" between the AP and any object (wall, cabinet, etc.)



## How It Works

- Rotating fan draws in contaminated air from 360° around the circular unit
- Contaminated air is pulled in and channeled through filters and treatment chambers
- Air is purified in six stages
- Clean air is released through the top of the unit



## How It Works – The Six stages

- HEPA-Rx® filtration removes particles as small as 0.025µm (microns)\*
- Activated carbon filter absorbs odors and gases
- Germicidal UV-C+ light chamber
- Super oxidizing photocatalytic nano-TiO<sub>2</sub> chamber
- Hydroxyl radical reactivity chamber
- Negative ion chamber freshens and energizes the air
- \*LMS Technologies, Inc. Bloomington, MN

**99.996% to 99.999%  
effective in removing  
particles 0.025 to 0.2 µm\***



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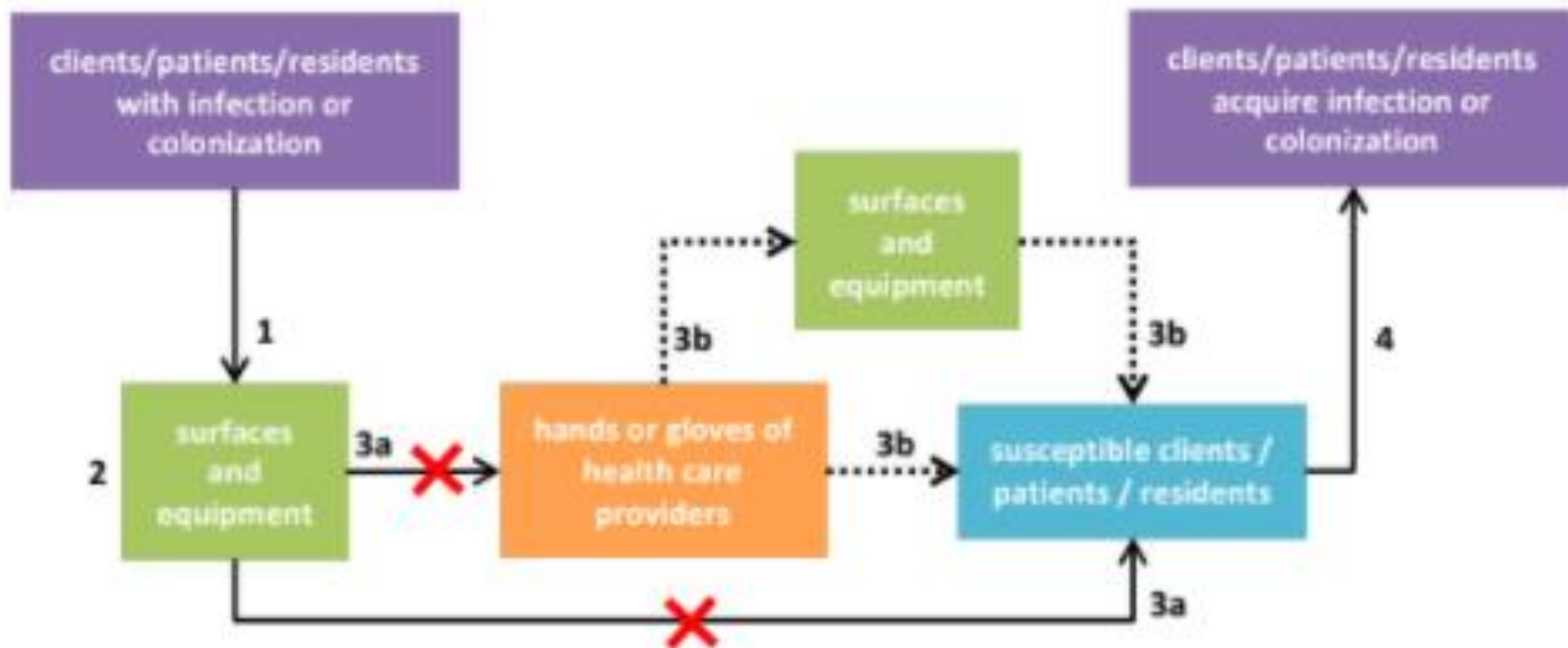
Environmental Surfaces

Staff Procedures and Responsibilities a team approach



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# How Environmental Contamination Results in Infection



→ Transmission of infection directly via contact with the environment.

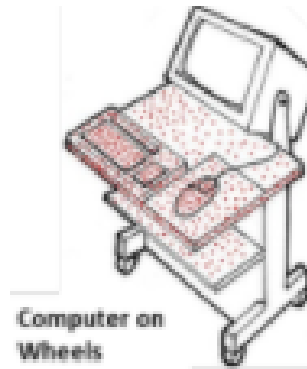
....→ Transmission of infection indirectly via the hands of health care providers, or via surfaces contaminated by the hands of health care providers.



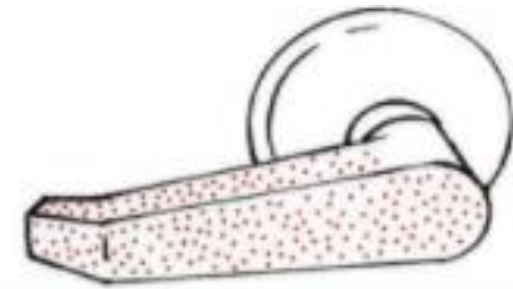
# Examples of High-Touch Items and Surfaces in the Health Care Environment



Light Switch



Computer on  
Wheels



Door Handle



# Housekeeping



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Consistency is the key  
Everyone on the team  
Has a responsibility to each  
other. Stay safe and alert.

Operatory Prep





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## Key Recommendations for DENTAL UNIT WATER QUALITY in Dental Settings

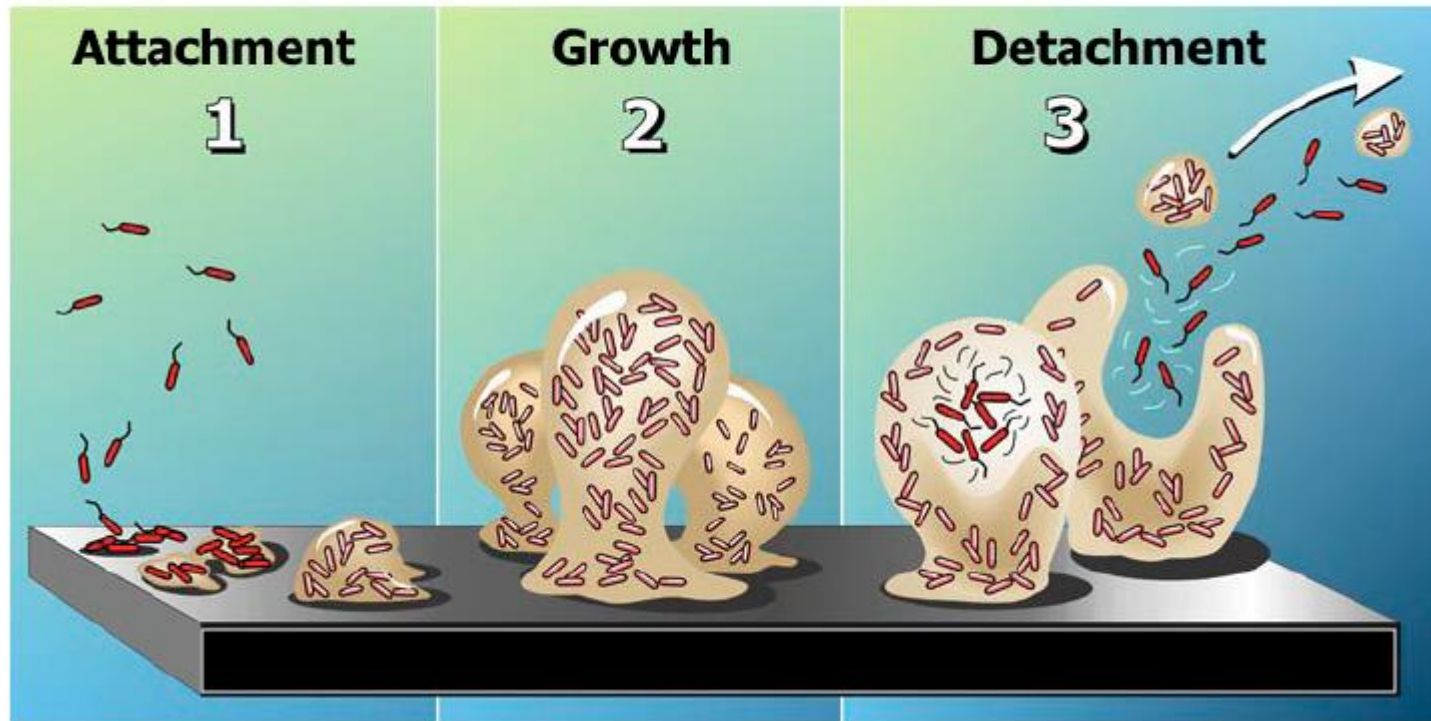
1. Use water that meets EPA regulatory standards for drinking water (i.e.,  $\leq 500$  CFU/mL of heterotrophic water bacteria) for routine dental treatment output water.
2. Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the quality of dental water.
3. Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product.
4. Use sterile saline or sterile water as a coolant/irrigant when performing surgical procedures.





Dental Unit Water Quality- Continuous monitoring and maintenance is a must

## BIOFILM CYCLE



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Maintain your maintenance timelines for our distillers



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All clinical should be trained on the operation and maintenance of dental equipment



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Thank you for participating

Dr. Archie



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