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Infection Prevention in Dentistry: Reaching our “New Normal”

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Infection Prevention in Dentistry: Reaching our 'New Normal'

By Karen K. Daw, MBA, CECM, CDIPC, and Marie T. Fluent, DDS

The COVID-19 pandemic has wreaked unprecedented worldwide havoc over the past two years, with no clear end in sight. The high transmissibility, mutating nature, and devastating morbidity and mortality associated with the virus have taken a staggering toll socially and economically on individuals, families, communities, and public/private institutions.

The dental community has been deeply impacted, and as the science and understanding of COVID-19 evolves and the SARS-Cov-2 virus mutates into variants the guidance and standards for mitigation strategies have been modified and updated accordingly. Given this, any attempt to define a static "new normal" in dental infection prevention guidance seems futile and not consistent with the dynamic nature of the threat.

As such, the Centers for Disease Control and Prevention (CDC) appropriately refers to its *Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic* as "interim,"[1] while the Occupational Safety and Health Administration (OSHA) states its "guidance will be updated over time to reflect developments in science, best practices and standards."[2] Dental personnel should expect continued modifications in standards, guidelines, and recommendations, and that the "new normal" will be one defined by continuous change and evolution.

(Continued on Page 42)

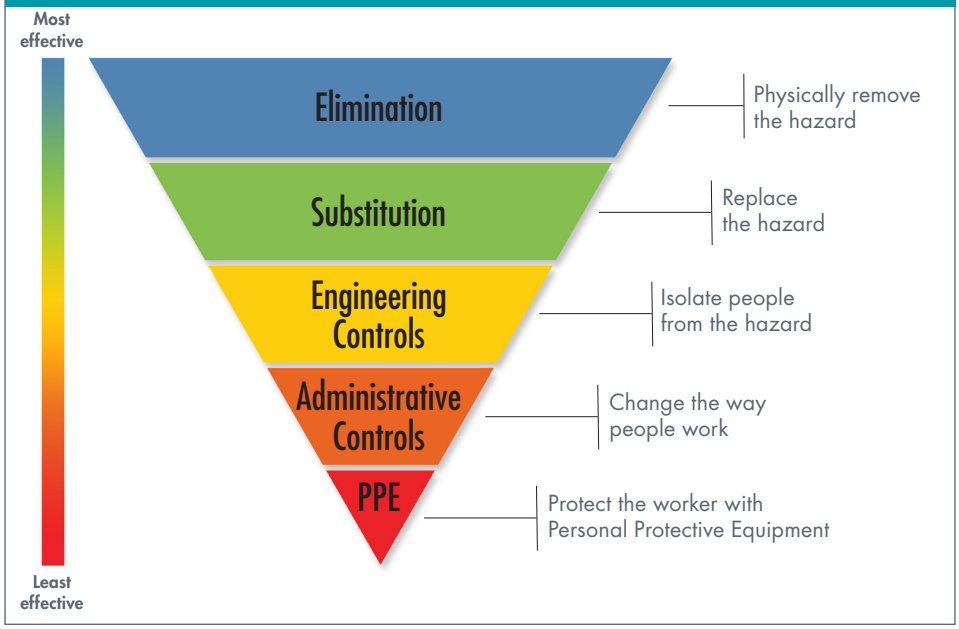
To best understand where we are headed regarding future infection prevention strategies, it is helpful and instructive to know where we have been, and where we presently stand.[3] It seems increasingly clear that the "next pandemic" is more a matter of "when" than "if." Thus, it is imperative we appreciate the infection control principles of the past, keep up to date with current guidance and recommendations, and understand the emerging science and mitigation strategies of COVID-19 and other diseases. By embracing this "new normal," we will best prepare ourselves to safely navigate the dental setting in the face of the inevitability of new emerging transmissible diseases down the road.

In summary, this article will discuss how previous infectious diseases and the COVID-19 pandemic changed the practice of dentistry, how dental personnel can mitigate the transmission of bloodborne and airborne pathogens, and how to ensure that every dental visit is as safe as possible for patients and team members.

First, a look back

While the principles and practices of asepsis were discovered and evolved long before the 20th century, most dental clinicians practiced "wet finger dentistry" up until the mid-1980s. While this colloquial term refers to performing dental care without gloves, other forms of personal protective equipment (masks, protective eyewear, gowns) were also uncommon in the dental setting at that time. In 1985, with the increase of diseases being transmitted by bodily fluids such as HIV and Hepatitis B, the CDC introduced "universal precautions" — a set of precautions for health care professionals to protect themselves from the transmission of diseases that can be spread through blood and other bodily fluids. In 1996, CDC updated these precautions and introduced "Standard Precautions" to prevent the transmission of diseases acquired through contact with blood, saliva, non-intact skin, and mucous membranes. Standard precautions are intended to be used in the treatment of every patient regardless of their infection status.

Figure One — Hierarchy of controls



Source: National Institute for Occupational Safety and Health

Standard precautions and regulatory considerations

The CDC describes these practices as the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered. Standard precautions are designed to both protect DHCP (dental health care personnel) and prevent DHCP from spreading infections among patients.

Components of standard precautions include:

- Hand hygiene.
- Use of personal protective equipment (e.g., gloves, masks, eyewear).
- Respiratory hygiene/cough etiquette.
- Sharps safety (engineering and work practice controls).
- Safe injection practices (i.e., aseptic technique for parenteral medications).
- Sterile instruments and devices.
- Clean and disinfected environmental surfaces.[4]

Historically, dental personnel were taught that standard precautions would protect themselves and patients from disease transmission in the dental setting, and the transmission of bloodborne pathogens was emphasized. Bloodborne pathogens are typically spread by direct contact (percutaneous injury by contaminated needle or sharp object) of infectious blood or materials to mucosal surfaces, and indirect transfer of potentially infectious materials via contaminated objects or environmental surfaces. However, aerosol transfer of infectious materials was considered possible, or theoretical.[5] This is evident in OSHA's Bloodborne Pathogens (BBP) Standard as it applies to occupational exposure to human blood

and other potentially infectious materials (OPIM). The BBP Standard also applies to body fluids such as saliva, however it does not specifically address respiratory droplets that may contain coronavirus unless blood also is present.

In the era of COVID-19, the CDC states that COVID-19 most commonly spreads during close contact and can also be spread by airborne transmission;[6] thus, standard precautions are not sufficient to protect against the SarsCoV-2 virus. Dental personnel now should be familiar with "transmission-based precautions" — the second tier of basic infection control for patients who may be infected with certain infectious agents for which additional precautions are needed to prevent infection transmission.[7]

The CDC and OSHA both reference this enhanced level of protection when the practice is in an area with substantial or high level of community transmission. Dental personnel can obtain up-to-date information regarding the level of community transmission in their community at https://covid.cdc.gov/covid-data-tracker/#datatracker-home,

From a regulatory standpoint, while OSHA does not have a specific standard for protection from coronavirus, OSHA does have several standards within Title 29 of the *Code of Federal Regulations* that are relevant to protecting employees. However, OSHA's General Duty Clause obligates employers to provide "employment and a place of employment, which are free from recognized hazards that are causing or are likely to cause death or serious physical harm."[5] While breakthrough infections are a possibility, ultimately the employer is responsible for removing known hazards to the best of their abilities.

Protection from COVID-19 (and other diseases) in the dental setting

Dental health care professionals should practice in compliance with recommendations and best practices from the CDC and mandatory requirements from OSHA and the Bloodborne Pathogen Standard (BBP) to prevent disease transmission during dental care.

An overview of recommendations from the CDC and OSHA can be summarized by looking at the Hierarchy of Controls (Figure One) from the National Institute for Occupational Safety and Health (NIOSH) — the research arm of the CDC responsible for making recommendations for preventing occupational injury and illness.[8] This inverse pyramid illustrates the most effective mitigation strategies for the prevention of COVID-19 and all other diseases at the upper base of the pyramid, down to the least effective strategies at the lower tip of the inverse pyramid. Although personal

(Continued on Page 44)

Pre-screening — Temperature checks can be part of the pre-screening of patients and team members.

protective equipment has historically played a large role in keeping employees safe, on the hierarchy it is listed at the bottom of this inverse triangle. While the importance of PPE should not be minimized, it is considered a last line of defense and the least effective protection relative to other mitigation strategies.

A description of the Hierarchy of Controls with some applications for the practice of dentistry in the era of COVID-19 follows.[9,10]

- Elimination (physically remove the hazard).
  - Postpone care on patients suspected or with COVID-19 when possible.
  - Immunization (COVID-19 vaccination).
  - COVID-19 testing.
- Substitution (replace the hazard).
  - Provide care through teledentistry.
  - Limit close contact of patients throughout the practice.
  - Re-assign roles of high-risk personnel to low exposure work or locations.
- Engineering Controls (isolate people from the hazard).
  - Use physical barriers to isolate spaces and patient treatment areas.
  - Use rubber dams (when possible).
  - Use high volume evacuation.
  - Evaluate and modify the heating, ventilation, and air conditioning (HVAC) system to determine strategies to reduce exposure to the virus based on CDC guidance.
- Administrative Control (change the way people work).
  - Have respiratory hygiene/cough etiquette/hand hygiene stations.
  - Create sick leave policies that are non-punitive for team members.
  - Limit points of entry.
  - Provide education and training to employees based on roles and risks of COVID-19 in the facility.
  - Develop and implement a Respiratory Protection Program (RPP)
  - Complete a health screening assessment at the time of, or immediately prior to, patient check-in.
  - Masks or cloth face coverings worn by every one entering the facility.
  - Train employees on health and safety protocols.
- Personal Protective Equipment (protect the worker from the hazard).
  - Gowns.
  - Gloves.
  - Mask.
  - Face shield.
  - Goggles.
  - N95 or higher-level respirator.

Of note, some practice settings may have additional compliance

Questionnaire — Patients should also answer COVID-19-screening questions before their appointment.

considerations. Factors affecting compliance may include which state their practice is located, accreditation by the Joint Commission, military settings, Federally Qualified Health Care Centers, or whether the practice is required to adhere to the OSHA Emergency Temporary Standard (ETS). For example, current at the publication of this article, federal employees and employers with 100 or more employees may soon need to ensure all employees are vaccinated or begin weekly testing for COVID.[11]

Respiratory hygiene/cough etiquette: then and now

In the pre-COVID-19 era, CDC introduced its Respiratory Hygiene and Cough Etiquette, which contained a list of best practices for protection from airborne pathogens in health care settings. These practices provide protective policies and protocols upon initial interaction to a potentially infectious person and were considered best practices. They included signage requesting those entering health care facilities to immediately inform personnel of symptoms associated with respiratory infection and to practice respiratory hygiene/cough etiquette. Specific recommendations included:

- Cover your mouth and nose with a tissue when coughing or sneezing.
- Use the nearest waste receptacle to dispose of the tissue after use.
- Perform hand hygiene (e.g., hand washing with non-antimicrobial soap and water, alcohol-based hand rub, or antiseptic handwash) after having contact with respiratory secretions and contaminated objects/materials.
- Adequate access and provision of items needed to adhere to respiratory hygiene/cough etiquette should be in reception areas and include waste receptacles that do not require contact to use, easy access to tissues, hand sanitizers and/or soap, and disposable towels.[4]

In the era of COVID-19, some updated respiratory hygiene and cough etiquette measures include:

- Universal source control requiring everyone entering the facility to wear an appropriate mask or face covering.
- Physical distancing: maintaining six feet between people (except during the delivery of dental care).
- Hand hygiene for everyone entering the facility.
- Removing high-touch items such as magazines, toys, coffee makers, and remote-control devices from reception area.

Personal protective equipment for patient care: then and now

Prior to the pandemic, PPE traditionally consisted of a protective gown, surgical face mask, appropriate gloves (exam gloves, sterile surgeon's gloves), and protective eyewear/face shields, and to ensure that these were readily accessible to dental personnel. In addition, all PPE was to be removed prior to leaving the work area.

With enhanced precautions taken to prevent exposure to SARS-CoV-2, current PPE may now vary depending upon the rate of transmission of COVID-19 within the community. PPE may consist of a gown (disposable or reusable), appropriate gloves, high-rated ASTM mask or respirator, and goggles or face shield. While respirators were not commonly used in dental settings prior to the pandemic, they are now common practice. When respirators are worn, they must be utilized in conjunction with a written respiratory protection program. In addition, current guidance now emphasizes PPE policies and practices such as:

(Continued on Page 46)

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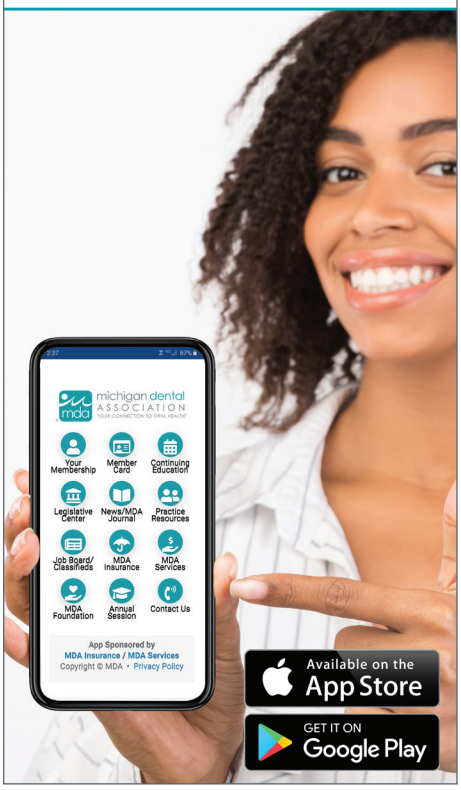

- Establishing an area where PPE can be donned appropriately and safely.
- The correct sequence of donning and doffing PPE, followed by effective hand hygiene.
- Discarding disposable gowns or laundering cloth gowns after each use.

Infection prevention practices that have not changed in the era of COVID-19

CDC Guidelines for Infection Control in Dental Health-Care Settings (2003) remains the blueprint document and the standard for infection prevention policies and practices in the dental setting. Some recommendations and guidelines remain the same as in the pre-COVID era, including sterilization and disinfection of patient care items, the maintenance of dental unit waterlines (DUWL), sharps safety, and safe injection practices. While the premises of environmental infection control practices remain the same as the pre-COVID era, there is now an emphasis on routine cleaning and disinfection of housekeeping surfaces such as door handles, counter tops, and other frequently touched surfaces, although the transmission of SARS-CoV-2 has been shown to be airborne and not from contact with hard surfaces. Fortunately, intermediate level surface disinfectants with a tuberculocidal claim are effective at killing the SARS-CoV-2 virus. Yet guidance now recommends that all products used to clean and disinfect clinical contact surfaces are on the Environmental Protection Agency (EPA) list N for use against SARS-CoV-2. This list may be found at https://www.epa.gov/coronavirus/about-list-n-disinfectants-coronavirus-covid-19-0.

Compliance in the era of COVID-19

Most dental practices were closed for routine dental care during the initial stage of the pandemic. As offices reopened, guidance from both CDC and OSHA could be found at https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html and https://www.osha.gov/sites/default/files/publications/OSHA3990.pdf.

Current guidance as of the publication of this article may be found at https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html, https://www.osha.gov/coronavirus, and specifically in Michigan at https://www.michigan.gov/leo/0,5863,7-336-94422_11407---,00.html. In addition, dental personnel must comply with rules and regulations from their state dental board and follow manufacturer's instructions for use for all infection control-related supplies and equipment. Note that the MDA website contains these links.

The future of infection prevention in dentistry

The current and future state of infection prevention has undoubtedly been forever altered by the era of COVID-19. The last major pandemic that impacted dentistry was human immunodeficiency virus (HIV). As a result of this novel virus in the early 1980s, the CDC introduced universal precautions in 1986, and updated these to standard precautions in 1996. OSHA responded by creating the Bloodborne Pathogens Standard in 1991 designed to protect workers from bloodborne pathogens.[12]

On a federal level, OSHA continues to mull releasing an airborne and infectious disease standard that details safety measures and expectations for health care workers, similar to the BBP standards for protection against bloodborne pathogens. However, as of the writing of this article, there has been no update on the status.[13] Therefore, given what we know about CDC recommendations, and existing OSHA

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Karen K. Daw, MBA, CECM, CDIPC, is an award-winning national speaker, the author of numerous articles and CE courses on safety in dentistry, an authorized OSHA trainer, and a consultant for practices and health care systems across the country. She earned her BA from The Ohio State University and her MBA with concentrations in Health Care Administration and Business Management. After graduating, she was recruited from the emergency department to the role of assistant director of sterilization monitoring and health and safety director for the OSU College of Dentistry. She now presents and consults nationally full-time and is a member of the Organization for Safety Asepsis and Prevention, where she also served as co-chair for their Annual Conference and Infection Control Boot Camp.

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standards (barring anything more stringent as mentioned previously), at a minimum employers will be expected to conduct a workplace hazard assessment and ensure those hazards are either abated or mitigated.

Best protection from aerosol-generated hazards will most likely involve a multi-tiered approach, and when standard precautions are applied, may eliminate the need to screen; due to asymptomatic spread of the virus, all patients moving forward may be considered potentially infectious if community transmission remains high. Proper engineering controls to contain aerosols at the source and environmentally may be implemented, rather than eliminating the practice altogether. Task-related protective factors will most likely include continued adherence to the CDC's Respiratory Hygiene/Cough Etiquette, ongoing continuing education like the BBP annual training requirement, and possibly enhanced PPE if future studies demonstrate respirators provide the best protection against aerosols.

Conclusion

Predicting the future direction of infection prevention practices in the dental setting during the epoch of COVID-19 is fraught with seemingly unsurmountable challenges. However, several realities seem evident. The science and understanding of COVID-19 continue to unfold, the SARS-CoV-2 virus continues to mutate, and the next emerging disease to impact our community is a matter of "when," not "if."

Given this, accurate prognostication of what changes might remain as the standard of care moving forward is difficult, if not impossible. However, by understanding the infectivity and transmission routes of a particular pathogen and the prevalence of that disease within a community, the hierarchy of controls within this article may be applied and adapted to prevent disease transmission in the dental setting.

We can also confidently anticipate that public health and regulatory agencies will continually modify best practices, guidance, and standards for infection prevention strategies to reflect the emerging science and to assure that every dental visit is as safe as possible for all participants. To assure this reality, the onus falls upon us as dental professionals to maintain our vigilance in monitoring for updates and changes reflecting the most recent, evidence-based, and ever-changing "new normal." ●

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