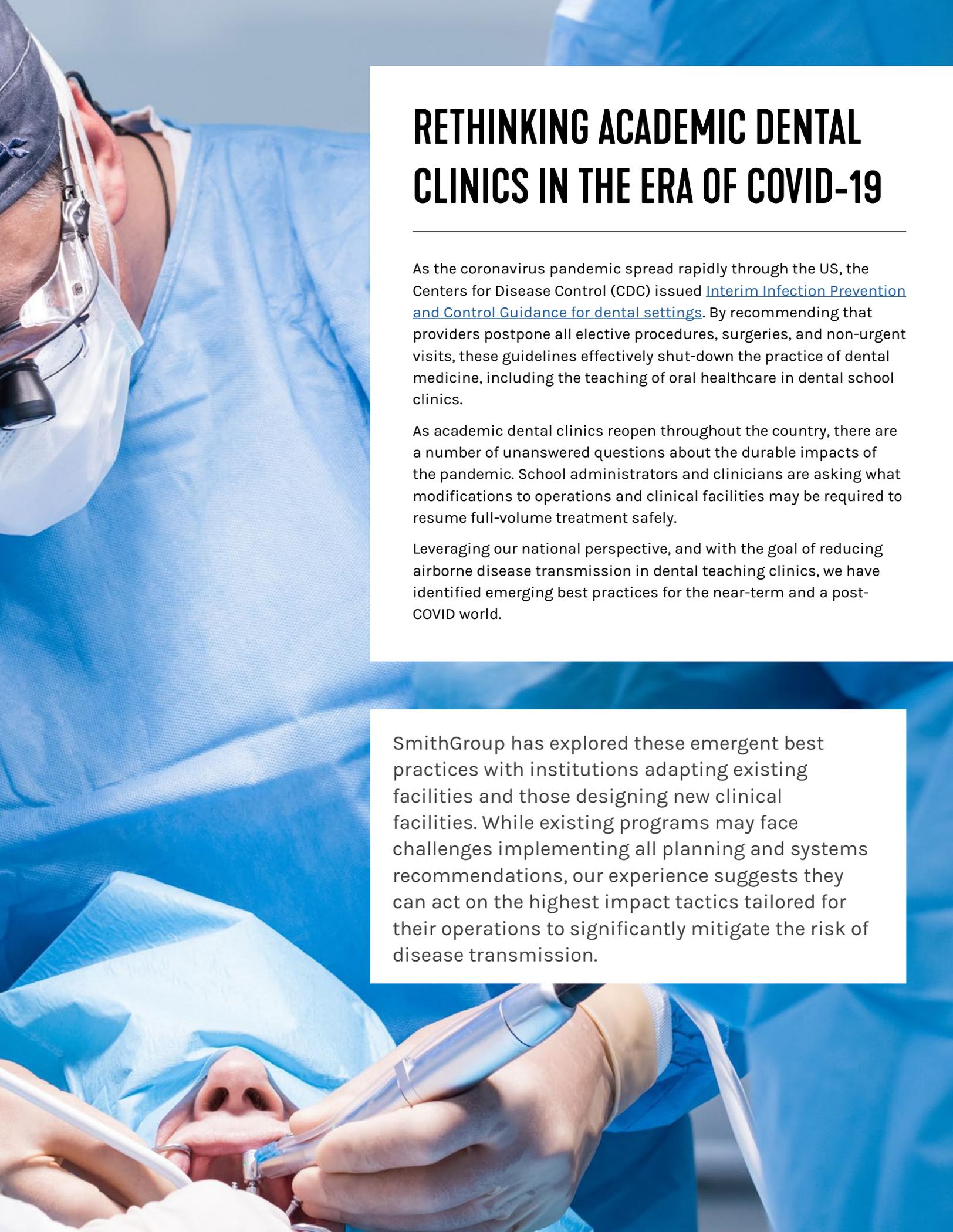


RETHINKING ACADEMIC DENTAL CLINICS IN THE ERA OF COVID-19

SMITHGROUP







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As the coronavirus pandemic spread rapidly through the US, the Centers for Disease Control (CDC) issued [Interim Infection Prevention and Control Guidance for dental settings](#). By recommending that providers postpone all elective procedures, surgeries, and non-urgent visits, these guidelines effectively shut-down the practice of dental medicine, including the teaching of oral healthcare in dental school clinics.

As academic dental clinics reopen throughout the country, there are a number of unanswered questions about the durable impacts of the pandemic. School administrators and clinicians are asking what modifications to operations and clinical facilities may be required to resume full-volume treatment safely.

Leveraging our national perspective, and with the goal of reducing airborne disease transmission in dental teaching clinics, we have identified emerging best practices for the near-term and a post-COVID world.

SmithGroup has explored these emergent best practices with institutions adapting existing facilities and those designing new clinical facilities. While existing programs may face challenges implementing all planning and systems recommendations, our experience suggests they can act on the highest impact tactics tailored for their operations to significantly mitigate the risk of disease transmission.



SOURCE CONTROL

The respiration of infected individuals is believed to be the primary source of coronavirus transmission. Proximity to the patient's mouth puts Dental Healthcare Personnel (DHCP) at "very high" risk of infection, according to the CDC. There is a reciprocal risk for the patient to become infected by DHCP. Recognizing this, the CDC recommends:

- Requiring facemasks or cloth face coverings for everyone entering the dental setting, regardless of whether they have COVID-19 symptoms.
- Screening everyone on the spot for fever and symptoms of COVID-19 before they enter the dental setting.
- Screening DHCP on the spot for fever and symptoms before every shift.

The logic of source control is overarching. Our research suggests that operational and facility strategies to reduce transmission become less effective as a function of distance from the source of infection. This conclusion drives our recommendations—from patient check-in and arrival, to the dental chair and operator, systems zoning of the clinic, and management of air systems at the building scale.

The spread of SARS-CoV-2, the virus that causes COVID-19, is believed to occur primarily person-to-person through respiratory droplets produced by coughing or sneezing. Airborne transmission may also be possible in some circumstances.

COMMUNITY

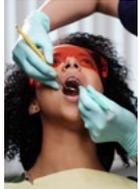
SCALE OF INTERVENTION

RISK MITIGATION

- Vaccination
- Mitigation through behavioral modification
- Acquired immunity



PATIENT



- Care-provider protocols
- Arrival and processing
- Wayfinding and surface contact
- Personal Protective Equipment (PPE)
- Aerosol management



OPERATORY

- Physical barriers
- Materials management
- Surface decontamination
- Air distribution patterns



CLINIC

- Patient and provider circulation
- Materials management
- Chair spacing and orientation
- Air distribution patterns
- Enhanced localized filtration
- Localized air disinfection
- Temperature and relative humidity
- Toilet flush plume mitigation
- Touchless fixtures



BUILDING

- Enhanced system-scale filtration
- Centralized air disinfection
- Surface (cooling coil) disinfection
- System operation and maintenance protocols



PATIENT MANAGEMENT



Managing patient arrival and entry to the dental clinic is the first, and perhaps most important, step in the risk mitigation process. Clinic operators should implement screening polices that reduce the likelihood of infected individuals entering the facility. Onsite screening should be implemented for all patients entering the building.

PRIOR TO VISIT

- Telemedicine triage or patient survey screening for symptom / risk factors
- Online registration

PRIOR TO ENTERING CLINIC

- Staggered arrival times
- Text notification of patient arrival
- “Patient Navigators,” managing drop-off and entry
- Face-covering PPE check

UPON ENTERING CLINIC

- Screen for symptoms
- Provide isolation / holding room for patients with symptoms
- Provide clear signage indicating expectations for social distancing, use of waiting areas, and patient routing
- Locate hand sanitizer, mask dispensers, and sanitizing wipes at the entry and along the patient route
- Utilize “touchless” check-in and touchless routes from waiting to dental chair



PROVIDER MANAGEMENT



Students and faculty are at risk for exposure to aerosolized pathogens. Routine screening is required to protect both the health of providers and patients. Similarly, new protocols addressing PPE, waste management, and disinfection could be implemented to further mitigate risk.

PRIOR TO SESSION / PATIENT ENCOUNTER

- Onsite screening for symptoms

PPE

OSHA has [developed standards for the use of PPE in dental settings](#). For presumed well patients an aerosol producing procedures OSHA requires:

- Gloves
- Gown
- Eye protection (goggles or face shield)
- NIOSH-certified, disposable N95 filtering facepiece respirator, or better

CDC recommends disposing of this PPE in operatory—not wearing or conveying to a centralized disposal area. This, and the expectation for rigorous decontamination of the operatory suggests that students should have limited responsibility for prepping and cleaning patient treatment areas. Rather, the collection of instruments, used PPE, waste and decontamination should be performed to consistent standards by trained staff.

AT THE CHAIR



The production of aerosols at the oral cavity presents significant risk of disease transmission. A High-Volume Evacuator (HVE) captures a significant percentage of these aerosols before they leave the mouth.

With as much as five times the extraction volume of the conventional saliva ejector or low volume evacuator tip used to suction saliva from a patient's mouth, an HVE can operate at 100 cubic-feet-per-minute (CFM) and reduce the release of aerosols by 90% - 98%.

Many dental students and dental hygienists work unassisted; because these providers have only two hands, they are more likely to use the easily managed saliva ejector. A “third-hand” or “hands-free” arm could be mounted to the chair to position the HVE tip.

A wide-range of dental education stakeholders, including SmithGroup, chair manufacturers, and dental schools are exploring the potential to retrofit existing chairs with point exhaust at the patient's mouth to capture aerosols much like an HVE.



AT THE SCALE OF THE OPERATORY



While HVE is particularly effective at capturing aerosols, there are additional measures that can be taken to further limit the transmission of airborne pathogens. Our research suggests that high partitions between chairs has dual benefits: they are both a physical barrier and can limit the mixing of air between adjacent operatories.

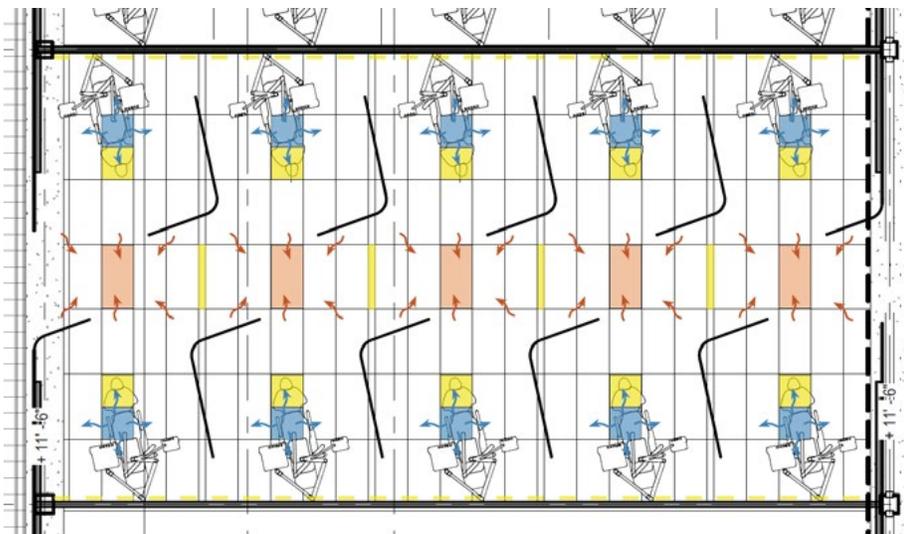
At the height of the pandemic, both CDC and OSHA restricted dental practice to emergency care with the recommendation to provide “easily decontaminated physical barriers or partitions between patient treatment areas.” Because disease status is difficult

to establish definitively, we expect partitions between chairs as tall as 8’-0” to become standard practice.

Retrofit applications include extending existing partitions or installing new—floor mounted, attached to existing worksurfaces, or hung from the ceiling.

These taller enclosures present challenges in terms of maintaining faculty sightlines and should be transparent or designed to preserve these views.

Supply air and exhaust systems can be coordinated with these partitions to limit the transfer, or mixing, of air to adjacent operatories.



HVAC DIAGRAM FROM KANSAS CITY UNIVERSITY COLLEGE OF DENTAL MEDICINE. DEDICATED SUPPLY AIR IS PROVIDED TO EACH OPERATORY.

- SUPPLY
- EXHAUST
- LIGHTING

FULL-HEIGHT PARTITIONS BETWEEN PRACTICE GROUPS.



CLINIC-WIDE TACTICS



Opportunities to reinforce social distancing exist at varying scales from the clinic's patient waiting room to the circulation pathways. Similarly, the movement of materials and waste streams through the clinic can be managed to reduce risk to patients, care providers, and staff.

- Compose waiting room furniture to reflect social distancing requirements
- Limit use of social seating—banquettes, sofas, loveseats, etc.
- Specify upholstery and finishes that are easily decontaminated
- Where possible provide one-way circulation and “touchless routes”

- Operatories are stocked, prepped, and decontaminated by trained staff

On the building systems side, there may be opportunities for local filtration of air within the clinic. For example, clinics using fan-coil units can be outfitted with higher MERV (Minimum Efficiency Rating Value) filters. While this tactic reduces particulate concentration, these devices often cannot achieve the degree of filtration required to capture viruses. An alternate, or additional, tactic is using fan filter units with HEPA filtration.

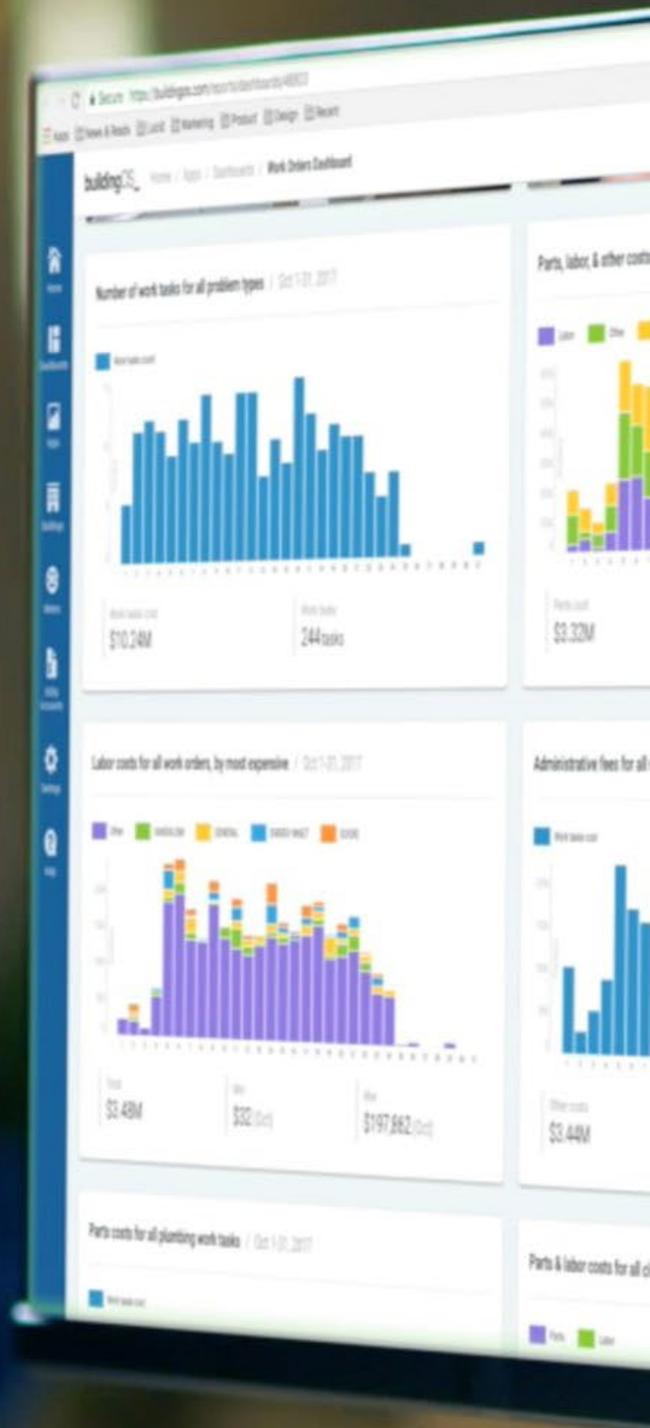
In spaces like waiting and procedure rooms, where continuous disinfection of return air may be desirable, Ultraviolet Germicidal Irradiation has proven to be safe and effective when properly applied and commissioned.

BUILDING SCALE OPTIONS +

Building system choices and modifications may also reduce disease transmission. At this scale, building management systems (BMS) can play a role through the regulation of air flow and ventilation to the building.

Some building systems may be able to operate in a “threat response mode,” which implements a controls-based protocol when the perceived threat of disease transmission in the building is elevated. In this scenario, the HVAC system operates with continuous dilution with outside air.

Building scale HEPA and UVGI filtration are also possible, but may be remote from the most likely source of pathogens in the clinic.



NEXT STEPS

These practices are being implemented across a wide range of dental schools—with significant differences in context, patient volume, and physical planning. SmithGroup welcomes the opportunity to partner with you to understand additional approaches to providing oral care through the pandemic, learning which practices have been most beneficial, and which will be incorporated into future models of care.

For further information or to spark a dialogue, we welcome you to reach out to one of our experts:

DAVID JOHNSON, HIGHER EDUCATION DESIGN STRATEGIST

313.442.8177 | david.johnson@smithgroup.com

CINDY COGIL, ENGINEERING/BMS EXPERT

312.641.6763 | cindy.cogil@smithgroup.com

CHRIS PURDY, HIGHER EDUCATION PRACTICE DIRECTOR

313.442.8315 | chris.purdy@smithgroup.com



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