Indoor Air Quality Best Practices for Dialysis During Periods of High Respiratory Viral Spread (e.g., Influenza, RSV, SARS-CoV-2)

☐ Verify routine maintenance of HVAC System with facility management staff.
- Routine maintenance
- Ensure system provides minimum outdoor air ventilation requirements.
- Increase introduction of outdoor air beyond code-minimum
- Turn HVAC fan to 'ON' instead of 'auto'.

HEPA filter	Change per manufacturer's instructions.	Minimum MERV rating of 13 (EPA)
Air Exchanges	Maximize to allow HVAC system to bring in as much fresh air as possible.	Minimum 6 air exchanges per hour (ASHRAE 170)

☐ Use **CO2 monitors** to evaluate room air quality. Readings below 800 ppm indicate adequate air quality.

☐ Utilize Air Purifiers, Air Sanitizers, **HEPA** Machines to filter and clean the air in the room as a supplement to your HVAC system as needed.
- Maintain equipment, change filters, and verify performance according to instructions from manufacturers at least monthly.
- Visually inspect intake for debris and clean as necessary.
- Placement of machines:
  - Make sure machines are placed to keep walkways clear and unobstructed, ensuring that air intake and discharge are not blocked.
  - The optimal placement is nearest to the source of highest area of potential contamination or transmission.
  - If a limited number of machines are available, then prioritize placement in the stations where patients are ill.
- Selection of machines: Most portable air cleaners are rated according to their clean air delivery rate (**CADR**). The higher the CADR, the larger the area it can serve. Larger areas may need more than one machine.
  - How to calculate the size of a room: Measure the room and calculate the volume: length x width x height. Most rooms have 8-foot ceilings. (You can also find a metal tape measure, and measure the height, and then the length and width.) 14' x 10' x 8' = 1120 cubic feet.
  - in-room-air-cleaner-guidance-for-reducing-covid-19-in-air-in-your-space-or-room.pdf (ashrae.org)

☐ Other methods of **Filtration**: There are more options to improve indoor air quality that require installation by professionals.
- **UVGI** (Upper-Room Ultraviolet Germicidal Irradiation): UV kills or inactivates microorganisms.
- **Bipolar Ionization**: technology that can be used in HVAC systems or portable air cleaners to generate positively and negatively charged particles to remove viruses.

☐ Bring in as much outdoor air as possible through the HVAC system.
- Consult facility engineers before doing anything that may change airflow dynamics.
- The opening of windows and use of fans may be recommended for schools, homes, and office buildings, but is not recommended for healthcare facilities due to the increase in risk of spreading infectious particles.

☐ Staff and patient actions such as masking and physical distancing provide an additional layer of protection.
- Respirators and mask use is still one of the best practices to control the spread of airborne particles at the source. Surgical face masks may filter and block particles when individuals breathe, talk, or cough.
- Staff should adhere to work exclusion policies and stay home when sick.
- Consider cohorting patients with similar respiratory illness (i.e., running on different shifts from well patients).
- Provide separation of patients by providing barriers between dialysis stations (i.e., curtains)

Resources:

NE ICAP Course (CE available) Optimization and Use of Engineering Control in Indoor Air Quality
Learning Center – ICAP/ ASAP Education on Your Own Time (nebraskamed.com)

Key Terms	
Activated Carbon Filter	Filter utilized to filter gas particles.
Air Exchanges	Refers to the number of times per hour that fresh air is delivered through the HVAC system. Aim for a minimum of 6 air changes per hour.
Bipolar Ionization	A technology that can be used in HVAC systems or portable air cleaners to generate positively and negatively charged particles to remove viruses. Produces ozone, which is an irritant to the airways. Not recommended by the EPA.
CADR	Clean air delivery rate. Rating for the size of room or area that particles are filtered. The higher the rating, the higher the size of room it can filter. Measured in cubic meters per hour.
CO2 Monitors	Humans take in oxygen and release CO2. The room's CO2 reading can be an indicator of how well-ventilated space is and if more fresh air needs to be brought in. Outside air reads around 400 ppm (parts per million), exhaled air reads around 40,000 ppm.
Filtration	The action or process of removal of particles in the air. Air purifiers, air sanitizers, and HEPA machines are designed to filter the air in a single room. They work best with windows and doors shut.
HEPA Filter	High Efficiency Particle Air. A filter that removes particles (including viruses) from the air. https://www.epa.gov/indoor-air-quality-iaq/what-hepa-filter
MERV Rating	Minimum Efficiency Reporting Value. The measurement was used to report effectiveness of a filter. The higher the rating the smaller the particles are that can be removed from the air.
UVGI	Ultraviolet Germicidal Irradiation. UV kills or inactivates viral particles. Utilized in the return air ducts or upper room near the ceiling. UV light can be harmful to the eyes and skin. What is Upper-Room Ultraviolet Germicidal Irradiation (UVGI)? What is HVAC UVGI? Can either be used to disinfect the air and help protect myself from COVID? | US EPA
Ventilation	Systems that supply warm or cooler air to the building. Ventilation systems need to be cleaned and serviced to meet code requirements. ASHRAE Standards and Guidelines

References:

- ANSI/ASHRAE/ASHE Addendum j to ANSI/ASHRAE/ASHE Standard 170-2017
  - Minimum 6 total outdoor ACR (air exchanges per hour)
  - Temp 72-78 F
  - Humidity-NR (no recommendations)
- ASHRAE Standard 241-2023- Control of Infectious Aerosols
- EPA: IAQ Science and Technologies | US EPA
- CDC: Ventilation in Buildings (cdc.gov)