



Clearing the Air for Our Kids: School Ventilation Guidance Series

Part Three: The Necessity of a Dedicated Nurse's Isolation Suite

Published on May 6, 2021

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In the third part of my series, 'Clearing the Air for Our Kids: School Ventilation Guidance,' I'm discussing the importance of a dedicated nurse's isolation suite in schools as we return to in-person learning.

Pre-COVID-19, nurse's stations in schools ran the gamut, from a small room off the front office to large, compartmentalized, dedicated spaces situated away from the general population. Newer schools tend to have better layouts and architectural barriers while older buildings are usually limited to a small suite. One thing they all had in common, however, was the lack of HVAC separation from the main building and centralized HVAC units. There were no code requirements to isolate the air flow of nurse's suites.

But with the threat of COVID-19 and to prepare for future infectious aerosols, nurse's stations -- and their location, structure, and setup -- are an important topic among planners, engineers, and school administration staff. Due to an increased possibility of an infected person entering a nurse's suite, greater caution is necessary. Based on a facilities risk assessment for airborne infectious aerosols, modernized HVAC systems must be designed and installed, based on the principles of an airborne isolation room in a hospital. A full blown airborne infectious suite that is Infection Control Risk Assessment (ICRA) certified is not budget friendly and realistic but there are pragmatic levels of containment we can achieve at a reasonable cost.

The primary goals of a nurse's isolation suite must prioritize the safety of the attending nurse or admin staff while ensuring that there is no re-entrainment of air back into the school spaces. As schools prepare to welcome children back to in-person learning, many nurse's suites will need a ventilation and design makeover. The first thing to confirm is that the HVAC system for the nurse's suite is connected to the main building and can it be disassociated so no return air that is transferred back to either the plenum or an air handling unit. A plenum in HVAC systems is the air space pathway above the ceiling back to the HVAC unit.

In addition to confirming (and updating, if necessary) the ventilation rates, keeping the infirmary physically separate is critical. Isolation of a nurse's suite should include architectural barriers such as taking ceilings up through the plenums to create a slab to slab partition. There should be a protocol on air cleaning, sanitizing and air changes after a sick student has left the space. Finally, there needs to be air isolation by removing and plenum return pathways back to the main building HVAC to mitigate the airborne transmission. There cannot be air flow from the suite back into the general building.

Furthermore, the safety and protection of the attending nurse or staff needs to be accommodated in the design approach. When deciding on a location for a nurse's isolation suite, the safe and efficient exit of a sick person from the nurse's suite out of the building needs to be considered to minimize the release of viral particles in the building. If the nurse's suite can be located on an outside wall with a door to the outside, it will greatly reduce the release of infected particles back into the building airspace. As engineers and school facility managers start reconfiguring nurse's suites, there are two levels of recommendations: Base Minimum and Advanced Indoor Air Quality (IAQ). These recommendations can be implemented in a phased approach based on your budget. New school designs should give consideration to an advanced IAQ approach.

Here's an overview of the recommendations for both levels:

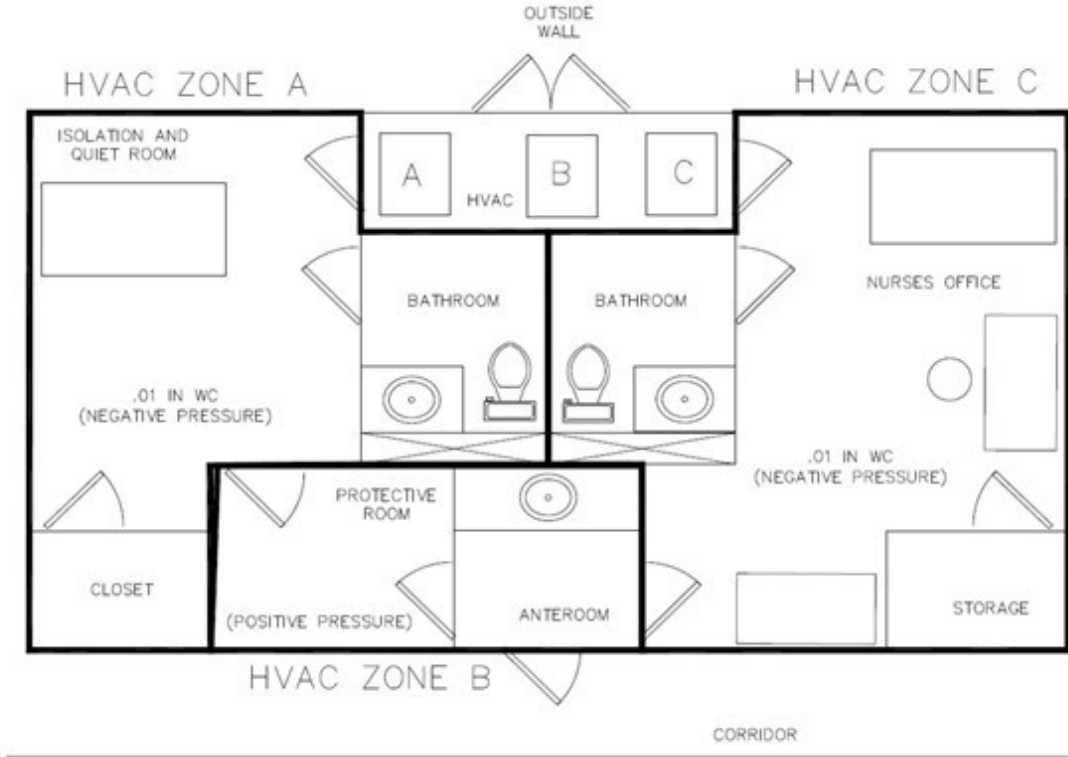
Base Minimum

- Establish your risk profile based on your school population, budget and estimated maximum sick children in a day
- Create a school/building-specific nurse's isolation suite with a minimum of two beds/isolation suites. This can also be a modular trailer based room in the parking lot.
- Take walls up to the plenum and physically isolate the rooms
- Do not mix isolation room air with any other spaces like corridors, No air recirculation back to building air handlers or spaces
- Minimum number of Air Changes per Hour (ACH) = 6 to 10. Low cost way to achieve this will be with portable air cleaners sized by an engineer
- Nurse's suite should be under negative air pressure. Protective Environment (PE) rooms should be under positive pressure (in relation to adjacent rooms).
- Follow [ASHRAE 170, table 6.4](#) – Protective Environment (PE) room filter guidelines
- Two filter banks, MERV 7 and HEPA (MERV 14 for existing HVAC that is unable to support HEPA)
- Include provisions for biohazard waste

Advanced IAQ

- Include all of the base minimum criteria
- Create a school/building-specific nurse's isolation suite based on the unique school population
- Minimum number of air changes per hour (ACH) = 10 to 20
- Follow ASHRAE 170 and [2019 ASHRAE Handbook](#) Chapter 9
- Include a dedicated, separate HVAC system capable of 100% outside air
- Dedicated bathrooms should be kept under negative pressure in relation to adjacent spaces
- Recommend locations of nurse's office HVAC on an exterior wall
- Exhaust directly outdoors with HEPA filtration on exhaust
- Maintain pressure relationship for room, waiting room, and corridor

Nurse's Isolation Suite: Prototype design layout to be designed by an AE professional based on each school



For more specific instructions or to learn how to do a filtration analysis, [contact me directly on LinkedIn](#).