
# Report on the Status of Ventilation in Maryland's School Facilities

September 2021

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# Introduction

On December 14, 2020, the Interagency Commission on School Construction (IAC) produced a document outlining COVID-19 Risk Reduction Strategies for Reopening School Facilities. Available on the IAC website, this document's recommendations, which are outlined below in this report, list risk reduction measures focused on minimum air quality standards in school facilities and provide a flow chart to help LEAs and schools determine their best course of action to reduce risk of COVID-19 transmission.

Prior to the start of the 2021-22 school year, the IAC requested that LEAs submit responses to a survey on the effectiveness of the implementation of ventilation strategies in their facilities which would allow them to report on any facility spaces that were unavailable due to ventilation. The survey was sent to LEAs on August 20, 2021 and all 24 LEAs responded. **None of the LEAs reported HVAC or ventilation issues that cause them to not be able to use any sections of their buildings.**

Some LEAs provided details on the specific measures taken to ensure that facility spaces are available and that efforts to reduce COVID-19 transmission have been made. That information can be found beginning on page 5 of this report.

# IAC Recommendations for COVID-19 Risk Reduction Strategies for Reopening School Facilities

While the use of risk reduction strategies does not mean that there is zero risk of COVID-19 transmission in school facilities, the IAC's December 2020 document shared general information and recommendations for LEAs and schools to implement to best protect students, faculty, and staff.

The riskiest environments for transmission are indoor areas with poor fresh-air ventilation. Because major facilities modifications are not practical or affordable due to time and funding constraints, the focus on risk reduction in school facilities should be on maintenance practices and space-use needs and policies. A multi-layered approach is recommended, however, with adherence to handwashing, distancing, and the use of face masks being critical to risk reduction strategies.

The IAC recommendations focus on air quality:

- Maximize time outdoors and minimize time in enclosed spaces
- Avoid the use of poorly ventilated spaces
- Clean and properly install air filters so that air does not go around them
- Utilize filters with the highest Minimum Efficiency Reporting Value (MERV) that can be accommodated by the system
- Implement strict preventive maintenance programs for air handling units and exhaust fans
- Maximize outside air by using the highest outside air setting possible for the equipment
- Open windows and doors as much as safely possible

The IAC also recommended using CO2 levels as a proxy for measuring ventilation. IAC's Educational Sufficiency Standards have a maximum of 1,200 parts per million (ppm), though levels should mostly be below 1,000 ppm and levels in the 600-800 ppm range indicate very good ventilation. Inexpensive CO2 meters can be used to evaluate facilities.

Usually not effective in larger areas, portable HEPA air filtration units were recommended for small spaces with poor ventilation such as health/nursing suites, offices, and isolation rooms.

The document also provides a flowchart to assist facilities staff properly adjust HVAC systems to meet these recommendations and provides next steps for when elevated CO2 levels are detected.

Published 9 months prior to the administration of the ventilation survey, LEAs had ample time to implement the recommendations before providing a report on the ventilation of their school facilities.

# LEA Ventilation Survey Responses

While no LEAs reported facility spaces unavailable due to ventilation issues, some LEAs provided details on the specific measures taken to ensure that facility spaces are available and that efforts to reduce COVID-19 transmission have been made.

## Allegany County

No classroom spaces unavailable for instructional use.

Specific measures:

- Prior to reopening for in-person learning in March 2021, each school was evaluated by administration to ensure that proper social distancing could be achieved. Adjustments to space usage were made.
- Regular maintenance of HVAC systems.
- Outside air flow adjusted to maximum on systems with that capability.
- Air filter changes on a regular schedule.
- Facilities are encouraged to open operable windows when weather permits.
- Portable HEPA filtration units placed in every teaching space.

## Anne Arundel County

No ventilation related issues reported.

## Baltimore City

No educational spaces reported that are unable to support learning due to ventilation issues.

Specific measures:

- MERV 13 filters and/or air purifiers and scrubbers have been installed in all district buildings.

## Baltimore County

No ventilation related issues reported.

Specific measures:

- Systems are consistently monitored and ventilation concerns are remedied immediately.
- All ventilation systems have been inspected and confirmed to be operating as designed.

## Calvert County

No ventilation related issues reported.

## Caroline County

No ventilation related issues reported.

## Carroll County

No ventilation related issues reported.

## Cecil County

No ventilation related issues reported.

Specific measures:

- Evaluation of air exchange rates in various spaces at several schools.
- Heating, cooling, and ventilation are monitored and scheduled. Increasing fresh air in buildings is emphasized.
- Facilities may open operable windows when weather permits.
- Activities planned to maximize use of outdoors space when possible.
- In areas of concern, portable air purification units with HEPA filters are used.
- When ventilation concerns arise, CCPS maintenance staff evaluate air quality parameters of temperature, humidity, and CO2 levels with adjustments and improvements made to air exchange rates and air filters as needed.

## Charles County

No ventilation related issues reported.

Specific measures:

- Dedicated Preventive Maintenance (PM) staff performs filter changes based on automated work orders. Frequency varies depending on the equipment. All filters are ensured to fit properly.
- PM staff performs routine HVAC preventative maintenance procedures (coil cleaning, belt tensioning/replacement, motor/bearing lubrication.
- Exhaust fans inspected monthly.
- Annual HVAC inspection schedule is being developed.
- Equipment with outside air dampers have a minimum set point and can modulate to increase outside air based on a sequence of operations.
- Opening operable windows is encouraged, with securing after school hours enforced.
- CO2 sensors are built into newer equipment.
- Room air purifiers with UV and HEPA filtration are in each nurse suite.
- CCPS has also worked to secure funding for upcoming HVAC system upgrades in several schools and portable classrooms.

## Dorchester County

No ventilation related issues reported.

Specific measures:

- Utilizing HEPA air purifiers, open windows when possible, masking, and reduction of students in spaces with minimal OA capability.

## Frederick County

No ventilation related issues reported.

Specific measures:

- Enacted CDC recommendations for modifying the operation fo ventilation systems with the intent to maximize the introduction of outside air and maximize air filtration as possible.
- Portable HEPA fan/filtration systems with three layers of filtration (pre-filter, H13 True HEPA, and activated carbon) are deployed in educational spaces.

## Garrett County

No ventilation related issues reported.

Specific measures:

- Portable air cleaners in all classrooms without direct access to outside air, nurse suites, main offices, kitchens, and faculty rooms as Phase I of IAQ project.
- Phase II of IAQ project is dependent on receiving equipment to complete the following:
    - UV lighting and ionization systems to be installed in air handlers.
    - Portable fan filter units with ozone free needle point bipolar ionization, UV-C germicidal lamps, DEEP HEPA H13 filtration, and MERV 8 pre filters to be installed at Accident Elementary, Southern High School, and Yough Glades.
    - Portable units and maintenance materials to be distributed.
    - Provide manufacturer recommended quantities of prefilters, HEPA filters, and UV lamps for up to three years.

## Hartford County

No ventilation issues reported.

Specific measures:

- Utilized Elementary and Secondary School Emergency Relief (ESSER) funding to contact with multiple mechanical engineering firms to evaluate all HVAC systems, identify areas of potential improvement, and provide recommendations.
- Systems run to maximize air filtration and fresh air exchange by increasing run time.

    - Typical runtime is Monday-Friday, 4:00am-6:00pm
    - For facility use outside of typical hours, systems run for two hours in advance and one hour after departure.
- Preventive maintenance staff change air filters routinely, monitor system performance, and respond to air quality concerns.
    - Humidity maintained at 40-50% of RH
    - Temperature maintained at 68-78 degrees Fahrenheit
    - CO2 levels maintained under 1000 ppm
- Supplemental and/or portable filtration systems utilized on a case-by-case basis. Schools can submit requests through the HCPS School Sponsored Project approval process.
    - Approved units: UL listed, portable units containing a HEPA filter and powered fan system.
    - Not approved units: UV, Ionization, and/or Electrostatic type technologies.
- Demand Controlled Ventilation Systems have been disabled to maximize introduction of outside air.
- IAQ conditions are monitored and deficiencies addressed through the use of the Environmental Protection Agency's "Tools for Schools" program.

## Howard County

No ventilation issues reported.

Specific measures:

- Air filters with MERV rating of 13 where systems can accommodate.
- Properly sized air filters, or wood/metal spacers to fill in any spaces around air filters, are utilized in HVAC units.
- Proper operation of exhaust fans outdoor air dampers for all HVAC units confirmed during Summer 2021.
- Proper operation of airside economizers which utilize maximum outdoor air ventilation allowed by the HVAC units are confirmed.
- Run times extended to two hours before and after occupancy.
- Demand-controlled ventilation disabled.
- Energy recovery units disabled during times of non-extreme summer and winter conditions.
- Because outdoor air ventilation is provided through HVAC systems to all classrooms, opening windows or exterior doors is not recommended due to the potential for elevated humidity, mold, drafts, pests, and security concerns.
- CO2 meters installed in all school cafeteries, 12 gymnasiums, and 3 weight rooms.
- Portable HEPA filters installed in isolation rooms in each health suite, in two portable classrooms at Clarksville Middle School where existing HVAC systems do not provide outdoor air ventilation.
- Portable HEPA filtration units are being installed in all 4,485 classrooms. Scheduled completion date is October 29, 2021.

## Kent County

No ventilation related issues reported.

## Montgomery County

No ventilation related issues reported. Guidance was requested regarding recommended response to power outages and minor equipment failures, which have in the past led to the closure of classrooms or buildings.

MCPS noted facing common challenges such as delayed delivery of parts and equipment, difficulty in scheduling contracted labor, and increased staff shortages.

Specific measures:

- Upgraded HVAC systems with highest MERV rated filters possible.
- Installed 6,000 portable air cleaning devices.
- Enhanced cleaning and disinfecting protocols.
- Continued quarterly filter replacement.
- Encouraged use of outdoor spaces for lunch and some learning activities.
- Verification program measuring CO2 levels in buildings to ensure systems are operating as intended and to assist in making minor adjustments.

## Prince George's County

No ventilation issues reported.

Specific measures:

- All filters replaced with MERV 13 filters.
- 3,100 air purification units purchased to remedy all spaces with limited ventilation.
- Supplemental air purification units used in all health suites and COVID-19 isolation rooms.
- Additional portable filtration used on standby in the event of outages of older systems.
- Carbon dioxide testing done as needed in most facilities. Newer buildings and newly replaces systems incorporate this testing.

## Queen Anne's County

No ventilation related issues reported. QACPS follows IAC guidelines for risk reduction as closely as possible.

## St. Mary's County

No ventilation related issues reported.

## Somerset County

No ventilation related issues reported.

## Talbot County

No ventilation related issues reported.

## Washington County

No ventilation related issues reported.

Specific measures:

- All systems adjusted to draw in outside air.
- MERV 13 or highest rated filter for best performance has been installed.
- Room air purification units used in all instruction and administration spaces.

## Wicomico County

No ventilation related issues reported.

Specific measures:

- Six foot floor markers installed in 2020 are still in place.
- CDC and MSDE recommendations regarding disinfection and air quality are followed.
- Aggressive countywide cleaning of ducts, coils, and air handling unit interiors is underway by a professional duct cleaning contractor. Pre- and post-air sampling is conducted.
- Bids are being solicited for a testing and balancing survey of all facilities.
- Random air sampling program (once per month for six months, to be followed by sampling on a three month schedule).
- Built-in water fountains are to be replaced with touchless bottle filling stations.
- A PM program is in place, which includes HVAC filter changes every three months, checks of belts, motors, and mechanical equipment, and cleaning of equipment.
- Building automation system monitors space conditions.
- Multiple HVAC renovation/upgrade projects are underway.
- Cleaning and disinfecting materials are available in each classroom and occupied office. Hand sanitizer stands are at all exterior access doors and outside of cafeterias.
- High touch points sanitized through the day. Spraying/disenfecting of all occupied spaces two evenings per week.
- COVID signage in multiple languages at all public entrances and throughout the building.
- ESSER III Funding will be used to install one outside classroom at each school.
- HVAC filters ensured to fit properly and changed on three-month rotation. 75% of filters are MERV 11.

- PM program for HVAC units and ductwork. Multi-year program to clean all ductwork and HVAC units began in June 2021, with evening cleaning continuing until all schools are cleaned.
- Maximum amount of air exchange allowed by equipment is enabled.
- Schools are permitted to open operable windows.
- Environmental testing company samples CO2 levels in all schools once a month for six months.
- Four newest schools have demand ventilation controls with setpoints at maximum 800 ppm. CO2 handheld meter utilized.
- Portable HEPA filters installed in all health suites (nurse and isolation rooms). Miscellaneous requests accommodated on an individual basis utilizing recommended practices from CDC and MSDE.