



A Day in the Life of a Student with Asthma

August 2, 2023



Indoor Asthma Triggers: What Oscar experiences

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Asthma & Allergy Foundation of America – Michigan Chapter
www.aafamich.org

Air Quality: Indoor

- People spend ~ 90% of their time indoors
- Can be 5X more polluted than outdoor air
(U.S. Environmental Protection Agency)
- 3.8 M deaths from indoor air pollution
(World Health Organization)
- IAQ impacts how well kids perform at school
- American Society of Civil Engineers (ASCE) gave U.S. public schools a D+ on its Infrastructure Report Card



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Common Indoor Triggers



- Allergens
 - Dust mites
 - Pet Dander
 - Mold
 - Cockroaches
 - Viruses
 - Pollen

- Volatile organic compounds (VOCs)
 - Paints, solvents, varnishes
 - Electronic equipment
 - Cleaning products
 - Furniture
 - Fuel Burning Heat Sources
 - Smoke
 - Fragrances & other strong smells

Common Indoor Triggers: **Schools**

- Old & poorly functioning HVAC
- Low or no use of HEPA filtration
- Carpeting
- Pesticide use
- Chalk & Dry Erase Markers
- Cleaning Supplies
- Self-care products



Search aafa.org "healthy home"

Common Indoor Triggers: **Schools**

- Bus & vehicle exhaust



- Particle pollution

- Ozone



- Smoking/Vaping on school grounds

- Climate change issues



Helping Oscar be his best

- ✓ Asthma affects a child's development and how well they perform in school
- ✓ Advocate for policies that make health impacts a priority and promote healthy school environments
- ✓ Review **AAFA's State Honor Roll** (aafa.org/state-honor-roll) and implement recommendations



Helping Oscar be his best

For Trigger Management:

- ✓ **GetAsthmaHelp.org**
Schools tab
- ✓ School-Based Allergy, Asthma and Anaphylaxis Management Program
Search **SAMPRO** schools
- ✓ **EPA IAQ** for Schools program





**ENVIRONMENTAL LAW
& POLICY CENTER**

Electric School Buses

Replacing an Asthma Trigger with a Clean Quiet Ride

A Day in the Life of a Student with Asthma

SUSAN MUDD, SENIOR POLICY ADVOCATE
SMUDD@ELPC.ORG



Rockford's New Country Q98.5 via YouTube

Dirty Buses = Sick Kids

INVEST IN A CLEAN RIDE FOR KIDS

- School buses are the largest form of mass transportation in our country, transporting **25+ million kids each day**
- Children breathe **50% more air per pound of body weight** than adults and their lungs are still developing, making them especially vulnerable to cancer and respiratory diseases caused by diesel pollution.
- A child sitting in the back of a school bus with windows closed is exposed to **4x more diesel** pollution than a child riding in a car in front of the same bus.

Diesel School Buses Contribute to Childhood Asthma

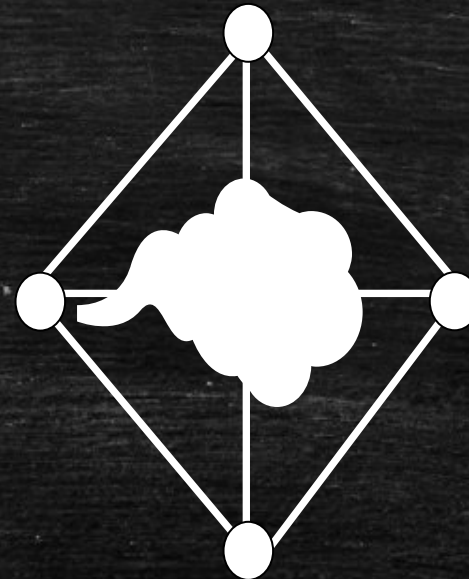
AVOIDABLE HEALTH HAZARDS



Asthma attacks are triggered by pollutants like NOx emissions from diesel school buses resulting in unnecessary hospitalizations and deaths

The wheelchair lift on school buses is located in the rear of the bus next to the exhaust pipe. Special needs children who are the most vulnerable are also the most exposed to pollution.

Diesel school bus tailpipe emissions (including NOx and PM 2.5) are asthma exacerbating pollutants



School buses idle while dropping and picking up students, increasing daily exposure to pollutants

Asthma is one of the most common chronic conditions among children



Benefits of Electric School Buses

HEALTH BENEFITS

ORIGINAL ARTICLE

Adopting Clean Fuels and Technologies on School Buses Pollution and Health Impacts in Children

Sara D. Adar¹, Jennifer D'Souza¹, Lianne Sheppard^{2,3}, Joel D. Kaufman^{2,4,5}, Teal S. Hallstrand⁴, Mark E. Davey⁶, James R. Sullivan², Jordan Jahnke⁷, Jane Koenig², Timothy V. Larson^{2,8}, and L. J. Sally Liu^{2,6†}

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Abstract

Rationale: More than 25 million American children breathe polluted air on diesel school buses. Emission reduction policies exist, but the health impacts to individual children have not been evaluated.

Methods: Using a natural experiment, we characterized the exposures and health of 275 school bus riders before, during, and after the adoption of clean technologies and fuels between 2005 and 2009. Air pollution was measured during 597 trips on 188 school buses. Repeated measures of exhaled nitric oxide (F_{eNO}), lung function (FEV_1 , FVC), and absenteeism were also collected monthly (1,768 visits). Mixed-effects models longitudinally related the adoption of diesel oxidation catalysts (DOCs), closed crankcase ventilation systems (CCVs), ultra-low-sulfur diesel (ULSD), or biodiesel with exposures and health.

Measurements and Main Results: Fine and ultrafine particle concentrations were 10–50% lower on buses using ULSD, DOCs,

and/or CCVs. ULSD adoption was also associated with reduced F_{eNO} (–16% [95% confidence interval (CI), –21 to –10%]), greater changes in FVC and FEV_1 (0.02 [95% CI, 0.003 to 0.05] and 0.01 [95% CI, –0.006 to 0.03] L/yr, respectively), and lower absenteeism (–8% [95% CI, –16.0 to –0.7%]), with stronger associations among patients with asthma. DOCs, and to a lesser extent CCVs, also were associated with improved F_{eNO} , FVC growth, and absenteeism, but these findings were primarily restricted to patients with persistent asthma and were often sensitive to control for ULSD. No health benefits were noted for biodiesel. Extrapolating to the U.S. population, changed fuel/technologies likely reduced absenteeism by more than 14 million/yr.

Conclusions: National and local diesel policies appear to have reduced children's exposures and improved health.

Keywords: particulate matter; air pollution; asthma; absenteeism; lung function

BROOKINGS



BROWN CENTER CHALKBOARD

Fixing school buses is an effective (and cheap) way to improve students' health and academic performance

Wes Austin, Garth Heafel, and Daniel Kneibman | Monday, April 22, 2019

Benefits of Electric School Buses

ENVIRONMENTAL AND HEALTH BENEFITS

Argonne's AFLEET tool calculates switching from diesel to electric school buses saves about 10.3 tons of greenhouse gas emissions annually per bus

A single electric transit bus has been estimated to save \$55,000 per year in health costs; a school bus savings is likely lower due to fewer miles traveled, young children's lungs are particularly susceptible to irritation from diesel emissions

A recent, peer-reviewed academic study suggests electric buses have a causal link to higher academic performance

- Can be equipped with seatbelts
- Less noise pollution and no diesel smell
- Drivers report quieter bus leads to quieter, more well-behaved children



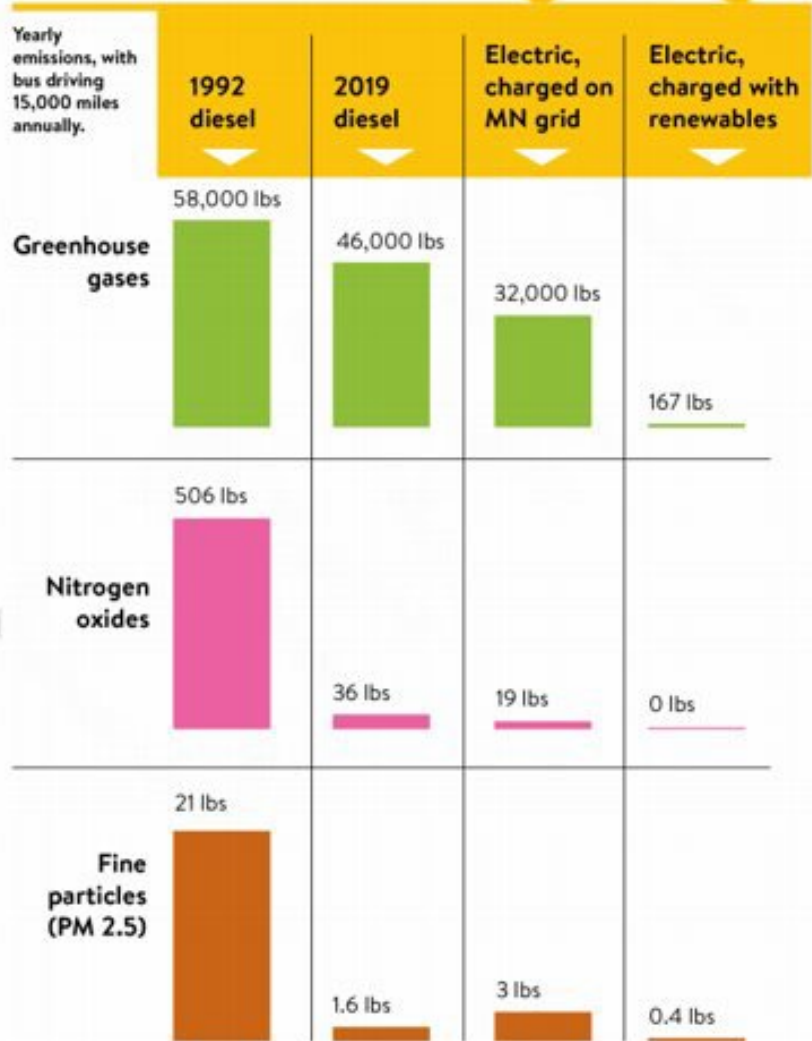
———— could result in ————

14

million fewer absences
from school a year

School buses: Cleaning up the fleet

Old school buses are very polluting.
Newer, cleaner options exist.



Well to wheels emissions using AFLEET emissions model.

Cleaner Options Exist!

Major School Bus Manufacturers Electric Models



IC ELECTRIC BUS CHARGE™



THOMAS SAF-T-LINER® C2
JOULEY SCHOOL BUS



LIONA

LIONA ALL-ELECTRIC
MINIBUS



BLUE BIRD ALL AMERICAN
RE ELECTRIC

TYPE A

- Lightning eMotors
- Lion Electric
- Micro Bird
- Phoenix Motorcars
- Endera
- GreenPower

TYPE C

- Blue Bird
- Lion
- Thomas
- IC/Navistar
- BYD

TYPE D

- Blue Bird
- Lion
- GreenPower
- BYD

Electric School Bus Pricing

MORE EXPENSIVE UP FRONT

THE PROBLEM

- Electric school buses are 3x the cost of diesel school buses (about \$350,000 vs. \$100,000)
- Plus charger and battery replacement costs
- However, traditional Diesel Buses have over **20,000 unique parts** to maintain and diesel costs can be highly variable

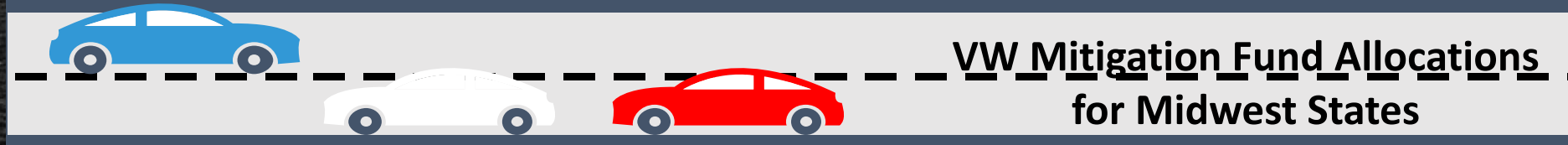


THE SOLUTIONS

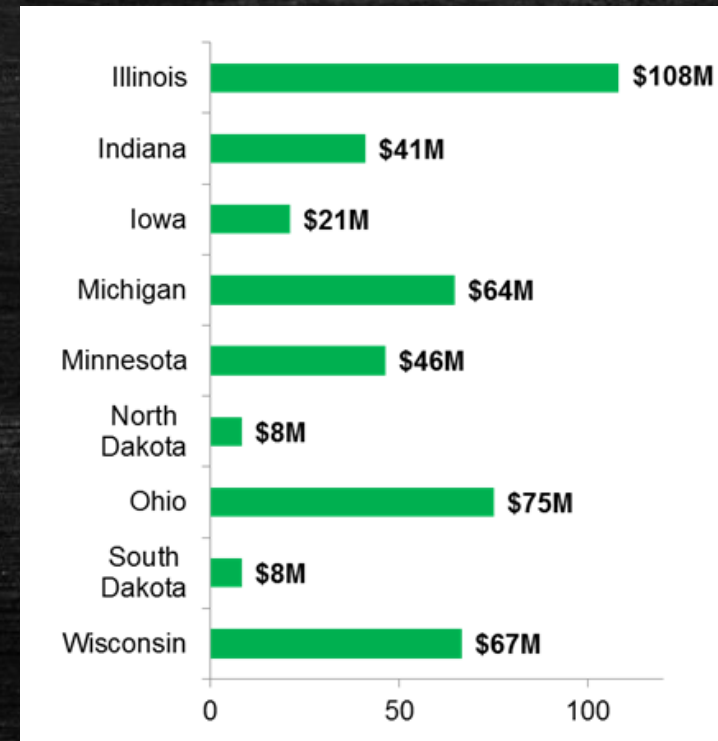
- Higher upfront costs can be offset by VW Settlement funds
- O&M savings of about \$15,000-\$22,000 per year
- EV Buses have less than 2,000 parts & electricity costs are relatively stable
- Total savings over the life of the bus vary, may amount to \$257,000 (net of battery replacement)

VW Settlement Offers Funding

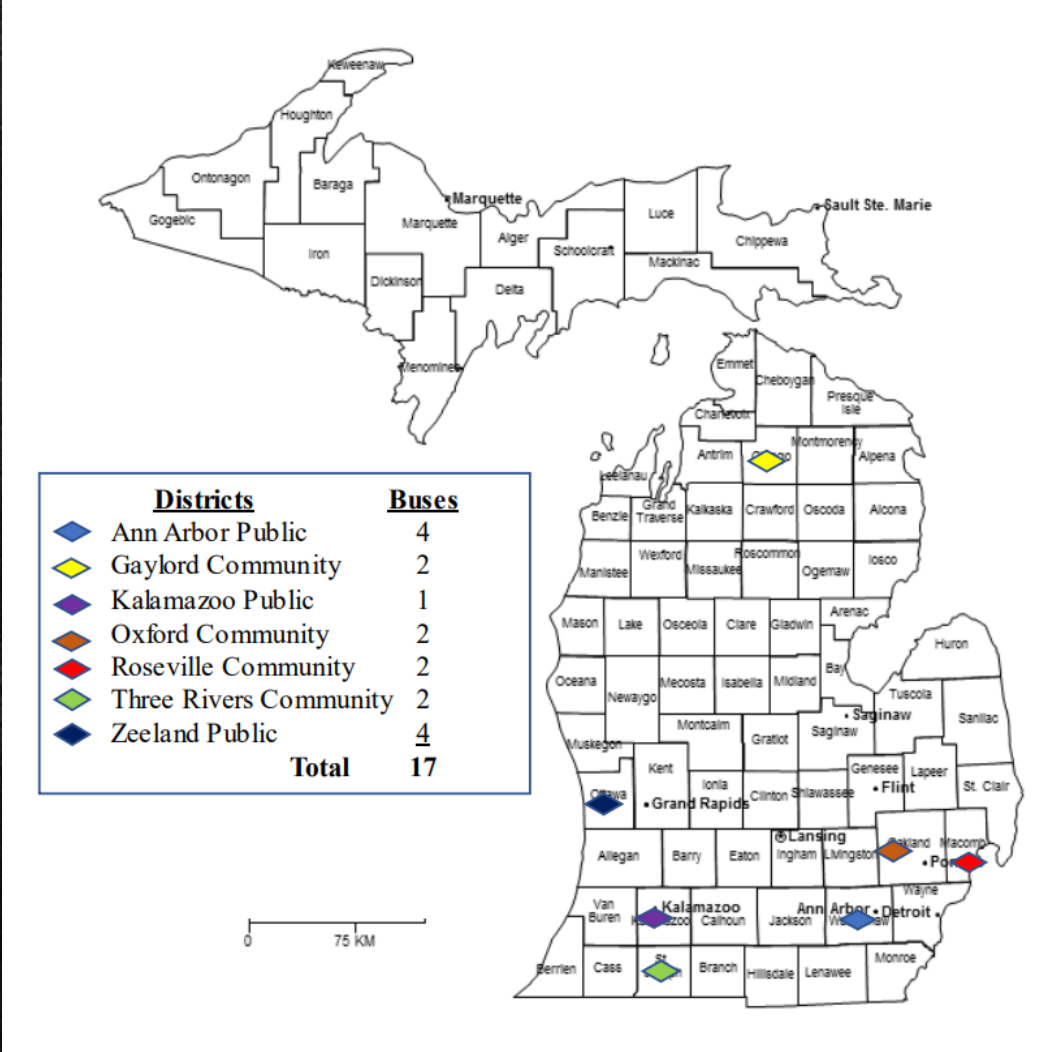
FOR ELECTRIC SCHOOL BUSES IN MICHIGAN



- Volkswagen (VW) violated the Clean Air Act by selling ~590,000 model year 2009 to 2016 diesel cars with defeat devices designed to cheat on federal emissions tests
- This resulted in excess NOx emissions of more than 40,400 tons
- US EPA and others sued VW resulting in a mitigation trust settlement through which each state will receive millions of dollars for projects that reduce NOx emissions
- The Indiana Department of Environmental Management dedicated **\$2.56 million** (6% of its funds) to procuring new electric school buses.



Michigan School Districts already operating Electric School Buses



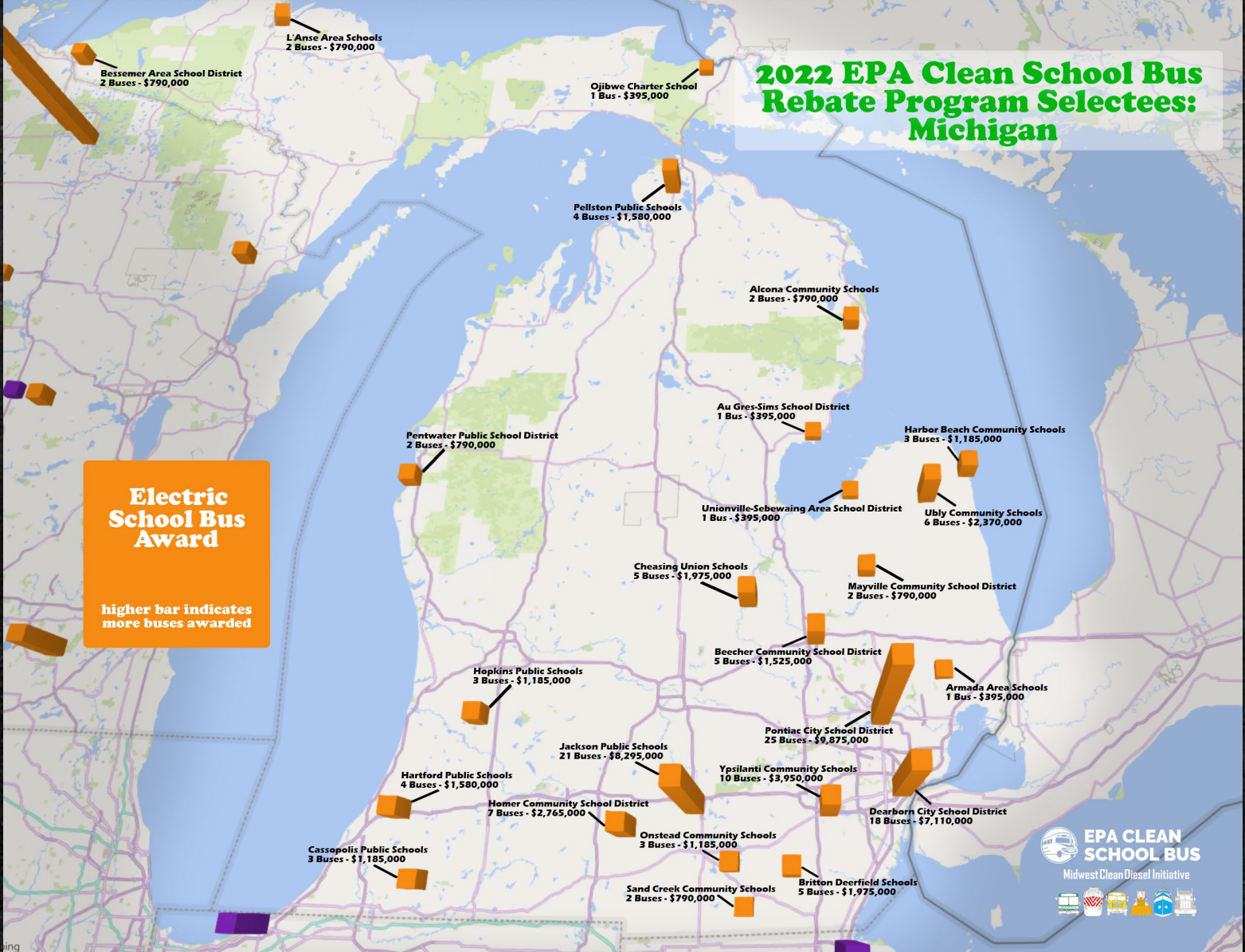
Infrastructure Law Created US EPA's new Clean School Bus Program



2022 EPA Clean School Bus Rebate Program Selectees: Michigan

Electric School Bus Award

higher bar indicates more buses awarded



Michigan unique support for electric school buses

- In addition to being the first state in the Midwest to roll out VW funded electric school buses,
- MI is looking ahead to the future when VW and Infrastructure Law funds are exhausted:
- MPSC approved DTE eFleet Battery Support Program for eTransit buses and signaled support for its expansion to e school buses;
- Recently enacted HB-4075, allows local districts to include school bus purchases in their Sinking Fund proposals, reduce school bus purchases by as much as 10% per unit, eliminate competition between classroom and capital needs, and allow local taxpayers to determine how and if they want to spend *their* money;
- and
- The just signed state budget creates a \$125 million MI Clean School Bus program offering grants for school districts and contractors serving public school districts to purchase electric buses and the corresponding infrastructure.

The Way to Go



#CLEANRIDE4KIDS



Detroit Chapter

Addressing Environmental Triggers: A Day in the Life of Oscar, a Student with Asthma

Building Occupant Interactions with HVAC Systems

August 02, 2023

Sonya M. Pouncy, CEM, CMVP, LEED-AP

Chair, Detroit Chapter Government Activities Committee

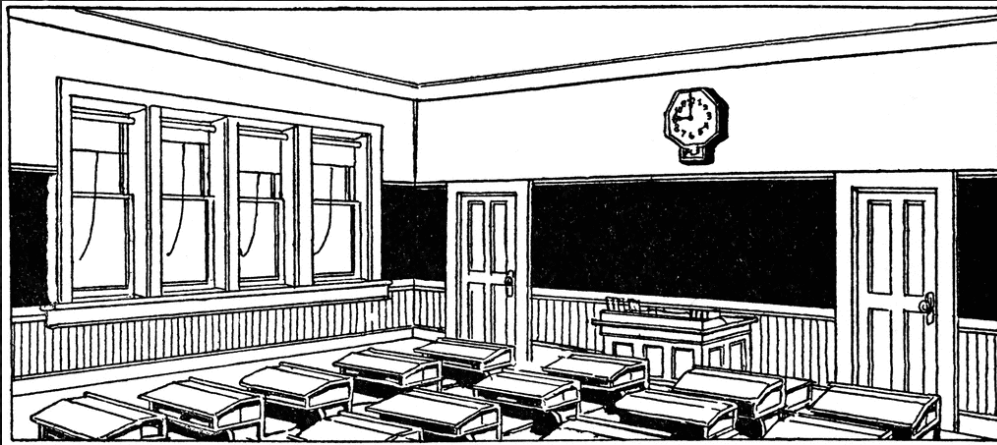
Disclaimer

The suggestions in this document should be considered along with the specific characteristics and requirements of your building as well as all owner and occupant criteria.

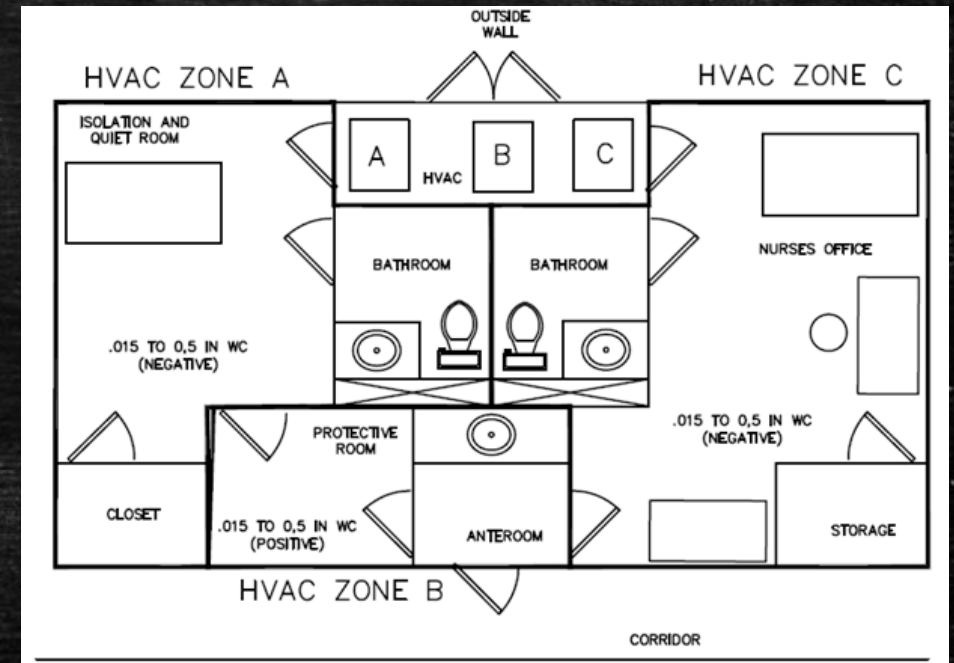
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Space Specific Criteria

Classrooms



Nurses' Clinic



Impact of School Building Indoor Air Quality

... air quality and temperature in classrooms are deployed factors in the learning process and improving them should be given as much priority as improving teaching materials and methods.

Research Report on Effects of HVAC On Student Performance

School HVAC

Strategies for Improving IAQ

By James E. Pappas, PE, Member ASHRAE, and Chris Surber, PE, Associate Member ASHRAE

Over the last few years, the Blue Valley School District (BVSD) has been a leader in the nation in its efforts to improve indoor air quality (IAQ) issues associated with increasing student population and limitations of the existing mechanical systems. The district decided to research the problem at the Blue Valley North High School (BVNS) and have the design team explore new and innovative design solutions. The design dramatically improved the learning environment, so the district has duplicated the solutions throughout the Blue Valley School District.

System Application and Design for School Air Conditioning

By Robert W. Flanagan, Fellow ASHRAE

This is a high school that is under construction. It is a 1.5 million sq ft building with a 1.5 million sq ft building. The design team was challenged to create a system that would provide the building with a high level of energy efficiency and indoor air quality. The design team was challenged to create a system that would provide the building with a high level of energy efficiency and indoor air quality.

High-Performance Schools

High Marks for Energy Efficiency, Humidity Control, Indoor Air Quality & First Cost

By John Fuchs, Member ASHRAE, Rick Muehlen, PE, Member ASHRAE, Ben Ellis, PE, Member ASHRAE, Stephen M. McCann, ASH, and Jack Graham

This article demonstrates how school facilities can be designed and constructed to comply with ASHRAE ventilation, energy and thermal comfort standards (55) while remaining energy efficient and cost effective. Research findings from a DOE sponsored demonstration show systems that actively control temperature, space humidity and ventilation can perform beyond the standards' requirements. Novel engineering solutions and equipment designs proved to substantially increase operating efficiency, and meet performance requirements for LEED certification. The construction cost of this advanced HVAC system was comparable to that of conventional HVAC systems that consume more energy and have been shown to be less effective at controlling humidity and ensuring proper ventilation.

Maintaining IAQ While Updating Occupied Schools

By Robert Flanagan

Limited available working space increasingly requires students to remain in a school during construction. This could endanger these students' health because of the air quality conditions that may result from construction. Careful planning is essential to prevent these hazards. Successful IAQ management also guards against construction delays and the significant cost overruns that can result when IAQ issues become construction.

LESSONS LEARNED IN PORTABLE CLASSROOMS

By Stephen Thomas-Brown, Dave Parker, Associate Member ASHRAE, and John Moore

This is the journal of the building's indoor air quality. The design team was challenged to create a system that would provide the building with a high level of energy efficiency and indoor air quality. The design team was challenged to create a system that would provide the building with a high level of energy efficiency and indoor air quality.

School HVAC

Continuous IAQ Monitoring

By Robert Muehlen, Barry Bridges, PE, Member ASHRAE, and David Stinson, Ph.D., Member ASHRAE

Traditionally, monitoring air quality has required substantial resources and intrusion into the space of building occupants. Consequently, typical investigations have involved short-term sampling measurements, and these exist only at small fractions of the school's building code.

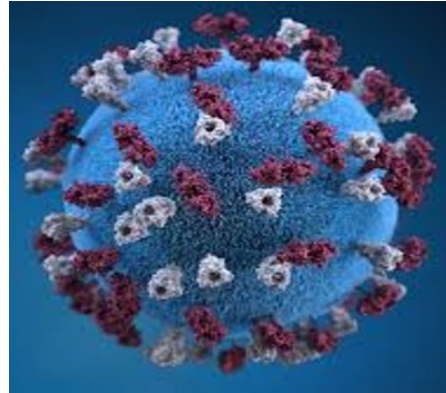
Controlling Summer Mold Growth in Schools

By John Fuchs, Member ASHRAE, Rick Muehlen, PE, Member ASHRAE, Ben Ellis, PE, Member ASHRAE, Stephen M. McCann, ASH, and Jack Graham

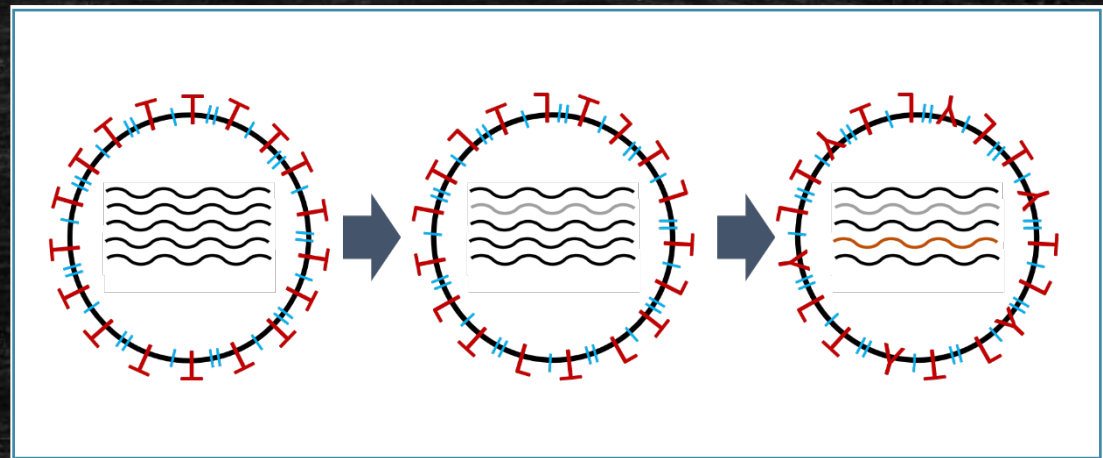
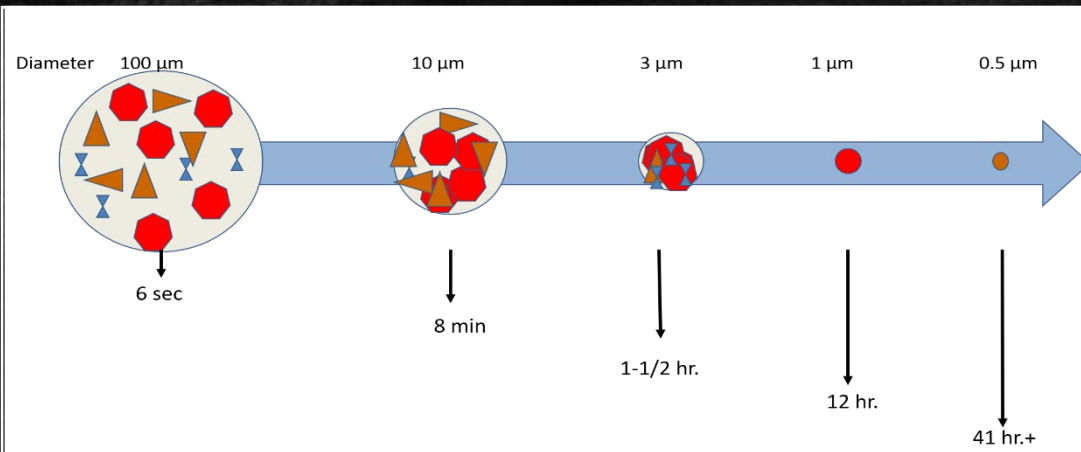
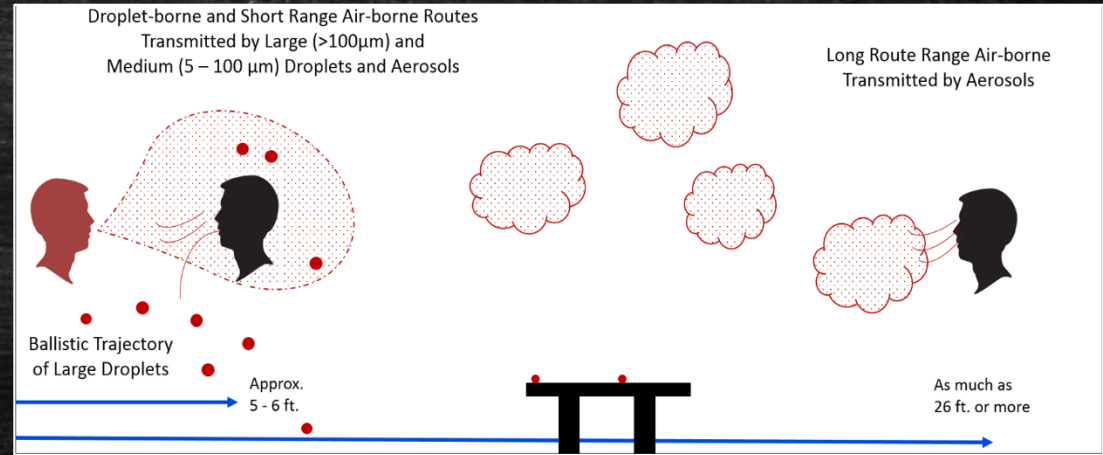
Air conditioning over the summer vacation presents significant challenges to school HVAC operators in humid climates, where mold growth is a common occurrence in unoccupied areas. Although health effects of mold exposure are generally limited to sensitive individuals, many others and visible growth are unacceptable to occupants and disruptive to school programs. Summer mold growth is sometimes attributed to shutting off school HVAC systems for energy conservation. However, in half of the schools experiencing summer mold growth investigated by the authors, the HVAC was running, but overcooling or over-venting unoccupied areas.

School Building Health contributes to Student, Teacher & Administrator Health

Indoor Transmission Risks of Infectious Aerosols



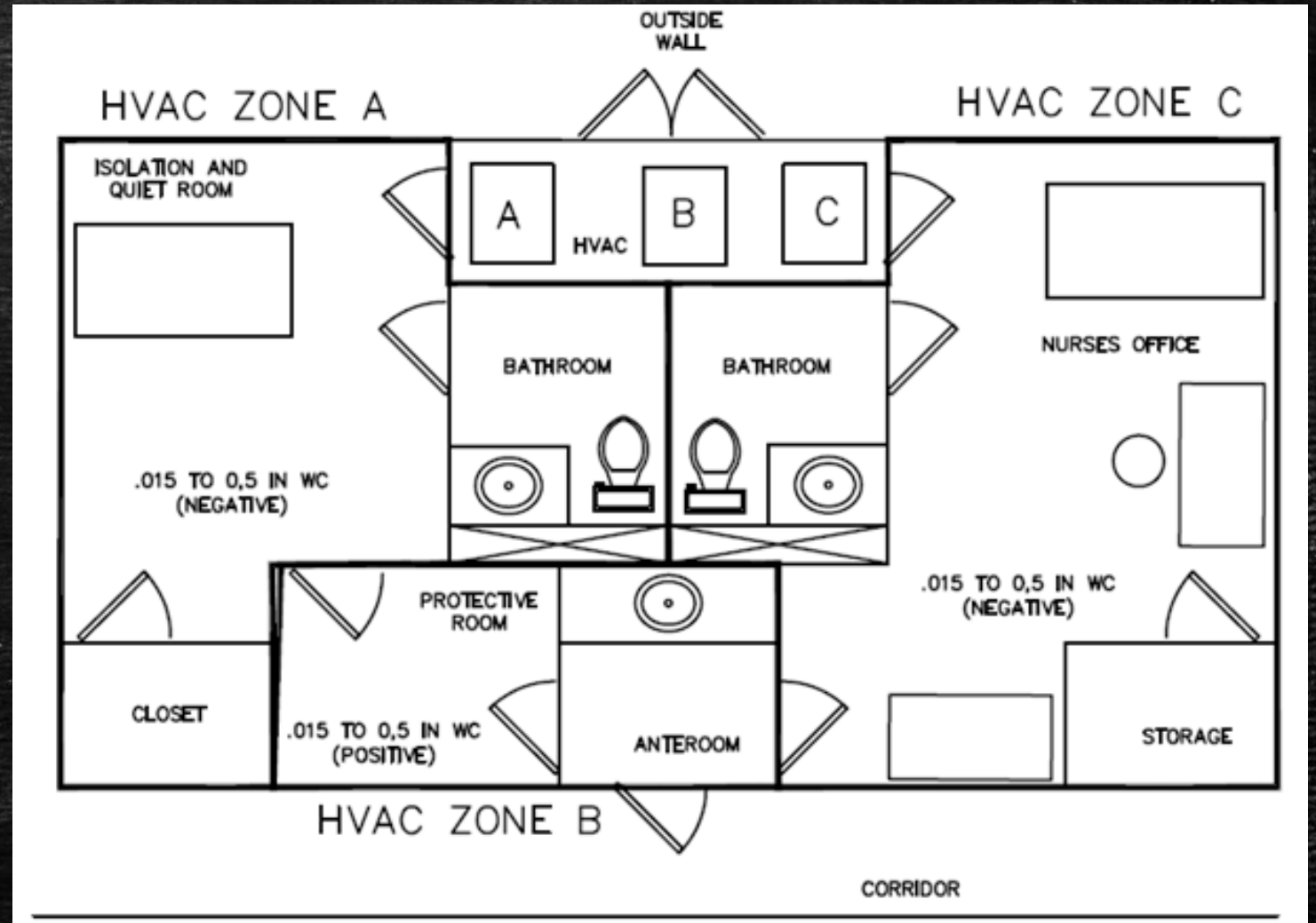
~ 0.1 μm



Ventilation in The Nurses' Office

Two modes of operation

- Normal
- Isolation



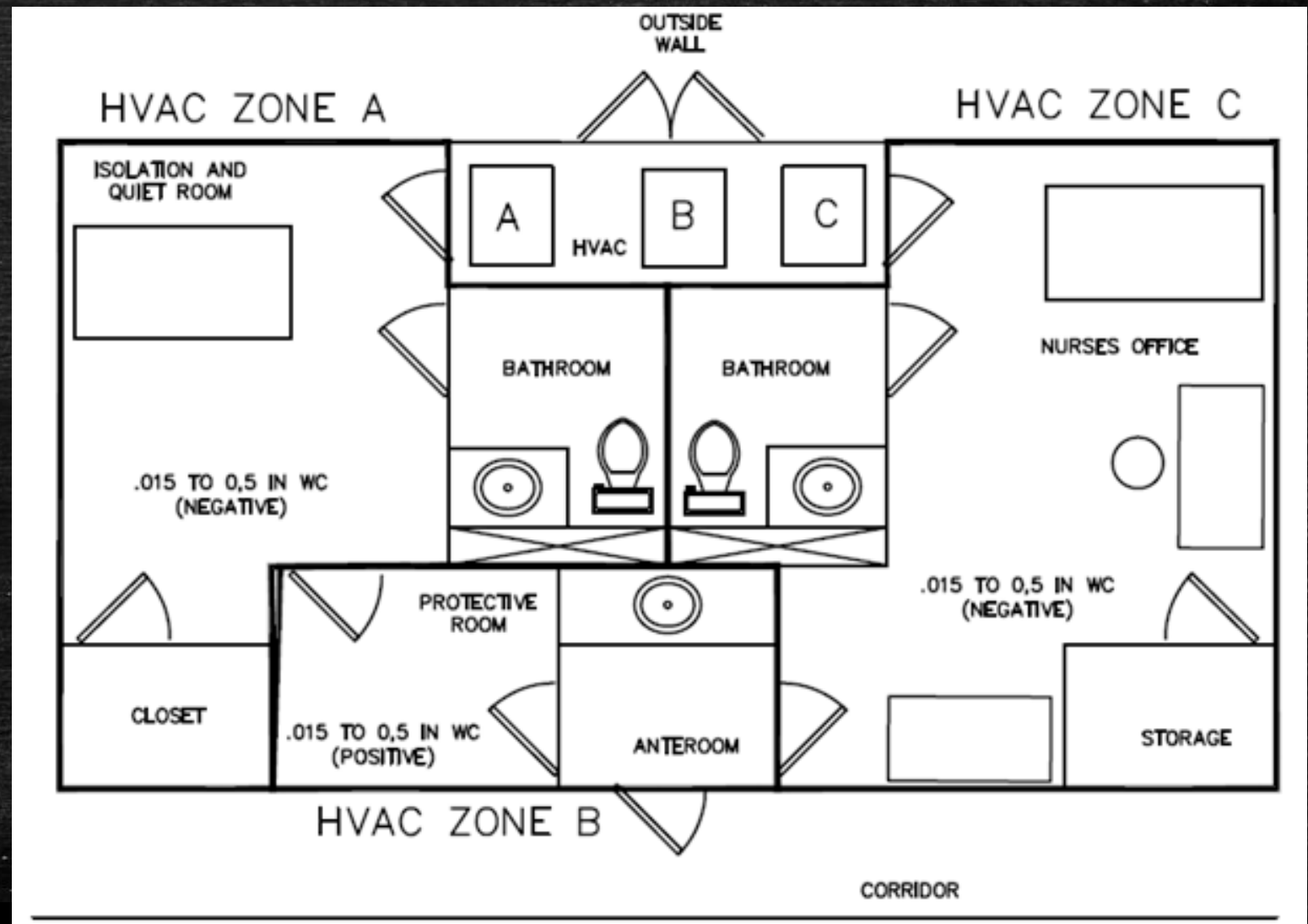
Nurses' Office Ventilation in Isolation Mode Operation

Ventilation

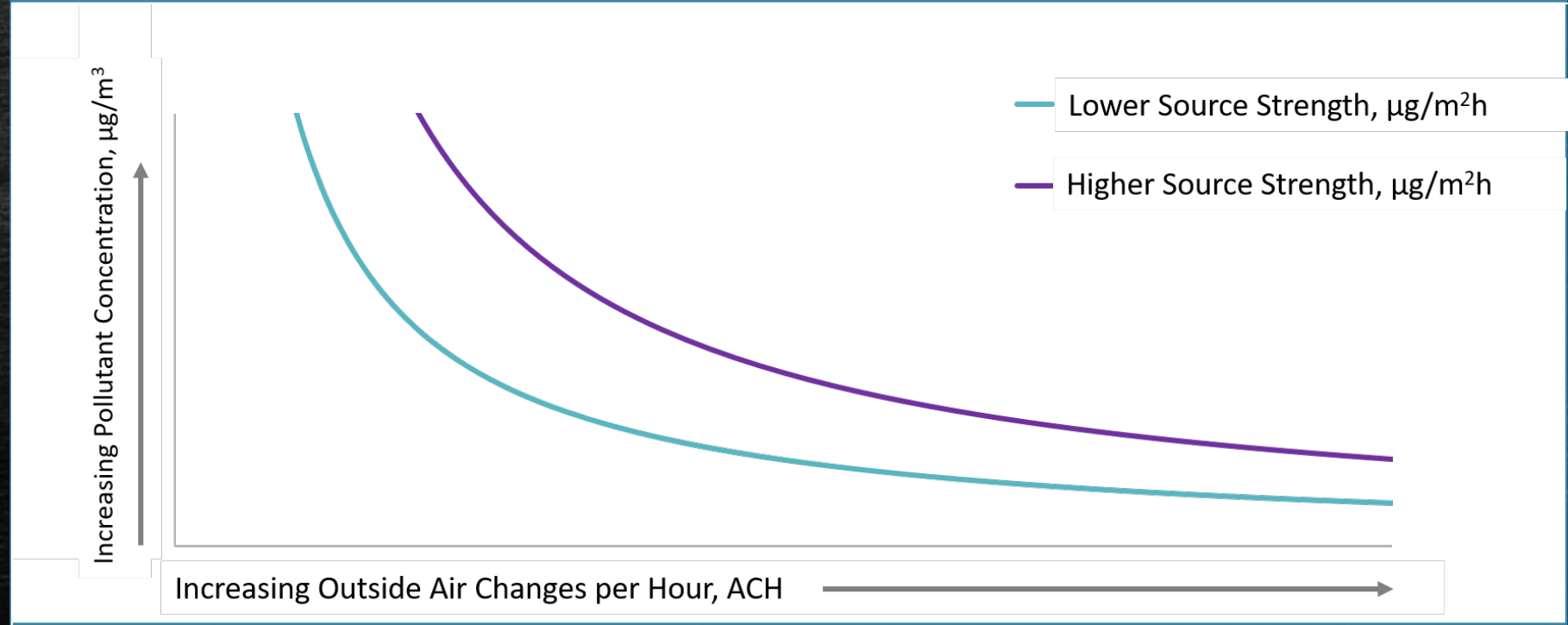
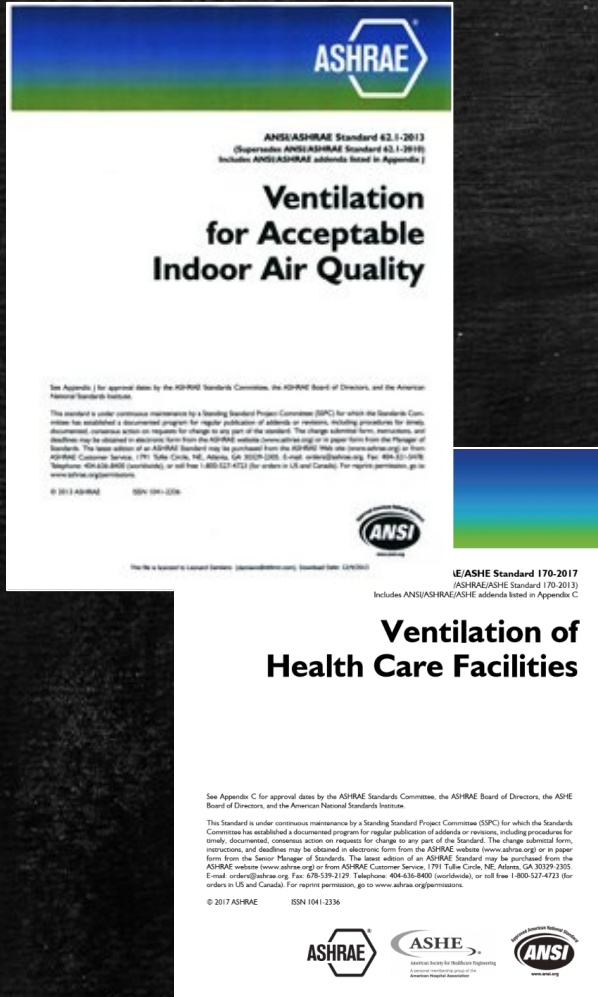
- 100% outside air
- 10 Total air changes per hour

Pressurization

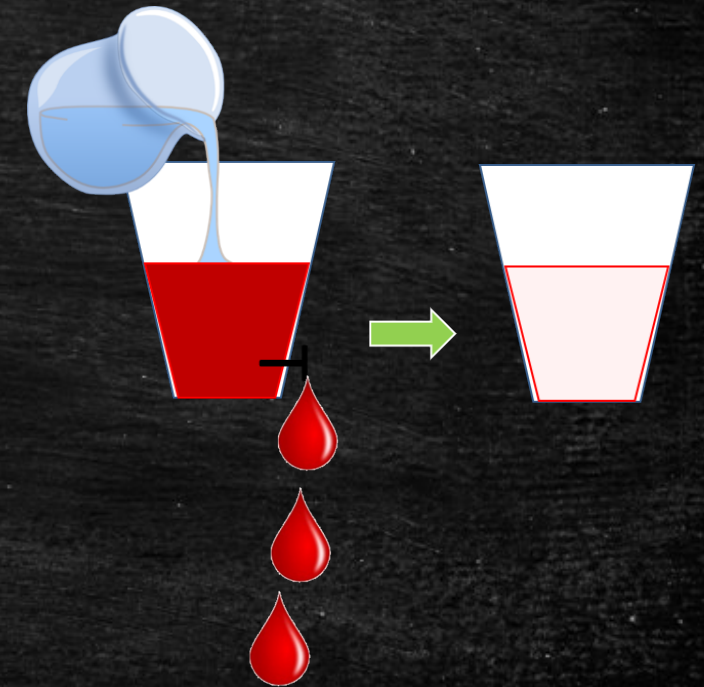
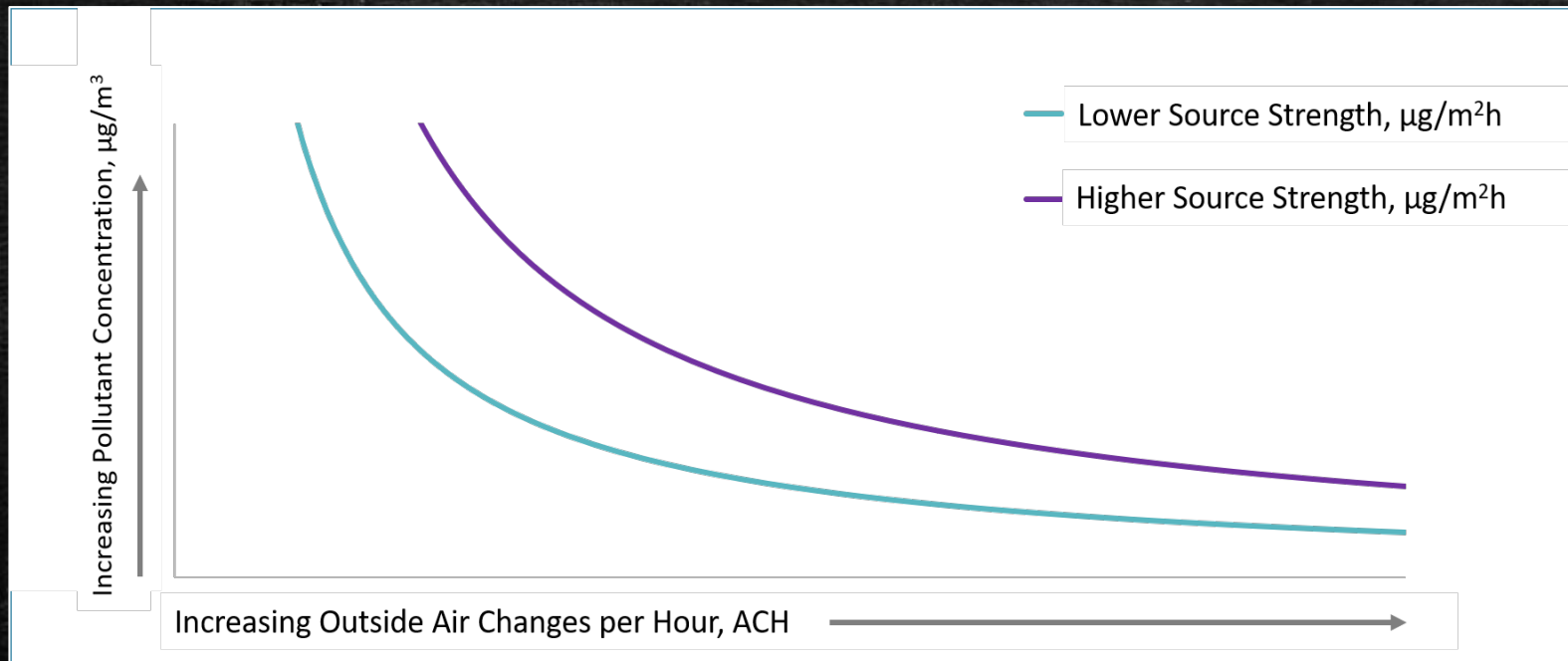
- Isolation Room and office
Negative pressure
(- 0.015" to - 0.05" W.C)
- Protective Room
Positive pressure
(+ 0.015" to + 0.05" W.C)



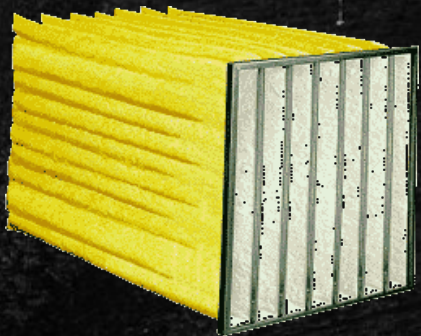
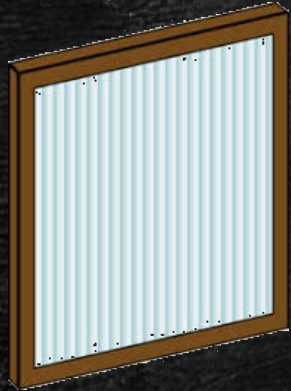
HVAC Strategy: Ensure Proper Ventilation



HVAC Strategy: Ensure Proper Ventilation



HVAC Strategy: Filtration



MERV	Maximal Average Particle Size Removal Efficiency			Typical Pollutants	Typical Pressure Drop	
	0.3 – 1.0	1.0 – 3.0	3.0 – 10.0		Initial	Final
6	N/A	N/A	35%	Dust, Pollen, Hairspray Mold Spores	0.2" to 0.3"	1.0"
7	N/A	N/A	50%			
8	N/A	20%	70%			
11	20%	65%	85%	Dust, <i>Legionella</i>	0.2" to 0.4"	1.0"
13	50%	85%	90%	Smoke, Toner, Bacteria, Some Virus	0.3"	1.0"
14	75%	90%	95%		0.5"	1.5"
15	85%	90%	95%		0.8"	1.5"
16	95%	95%	95%			
HEPA	99.97%	99.97%	99.97%	Viruses, Droplet Nuclei Insecticide Dust, Smoke Biochemical	0.5" to 1.0"	2.0"

Recommended for general classrooms and offices
 Recommended for nurses clinics

HVAC Strategy: Filtration

CLASSROOMS & OFFICES

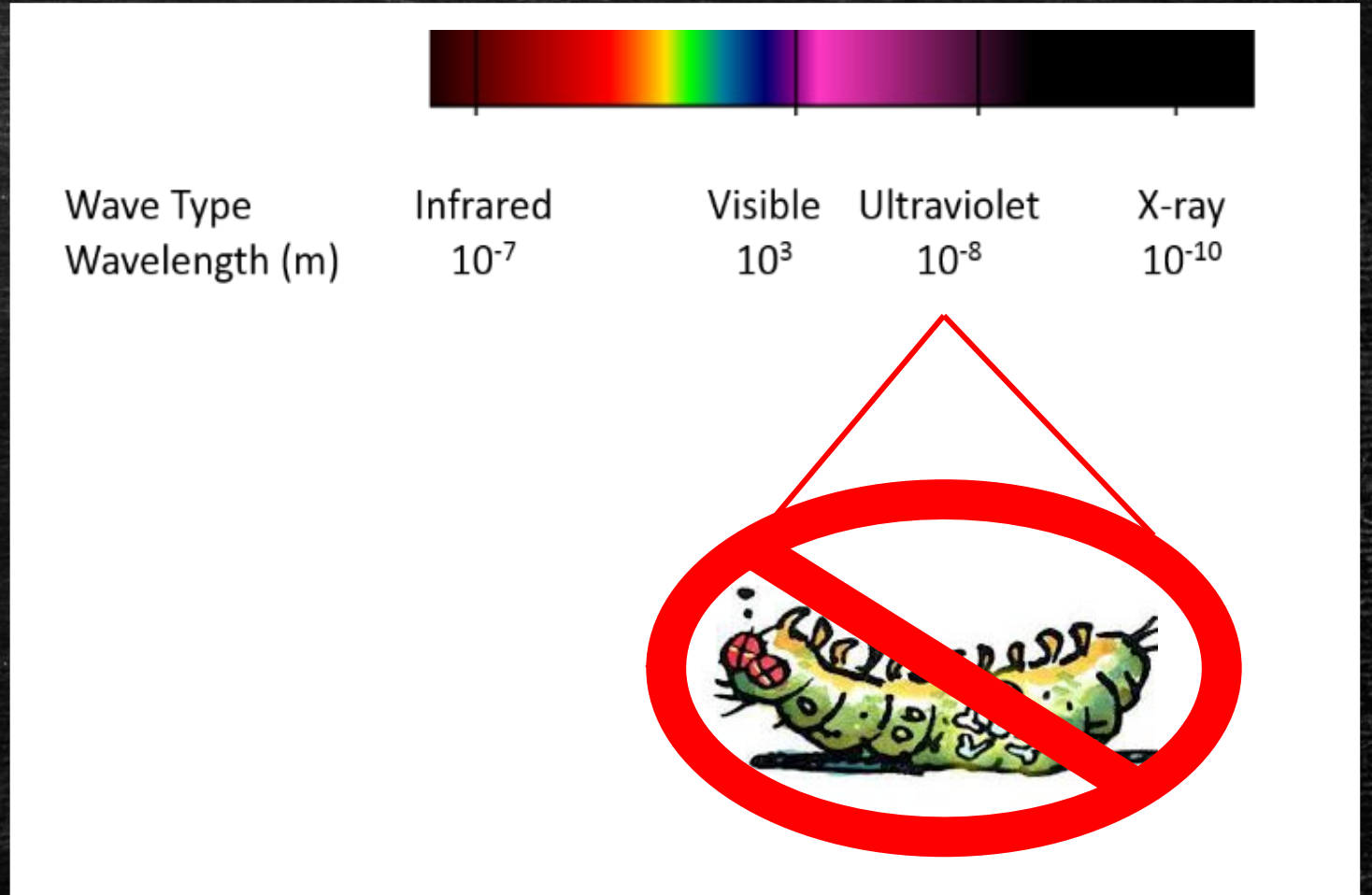
- MERV 11
- Or highest practical efficiency level

NURSES' CLINIC

- Pre-filter: MERV 7
- Final Filter: HEPA or no less than MERV 14

HVAC Strategy: Air-Cleaning (Disinfection)

Ultra-Violet Germicidal Irradiation



HVAC Strategy: Relative Humidity Control

CLASSROOMS & OFFICES

Temperature

- Winter - 72 °F
- Summer - 75 °F

Relative Humidity

- Winter - 40-50% RH
- Summer - 50%-60% RH

NURSES' CLINIC (ISOLATION MODE)

Temperature

- Winter - 72 °F
- Summer - 72 °F

Relative Humidity

- Winter - 50-55% RH
- Summer - 50%-60% RH

HVAC Strategy: Humidity Control

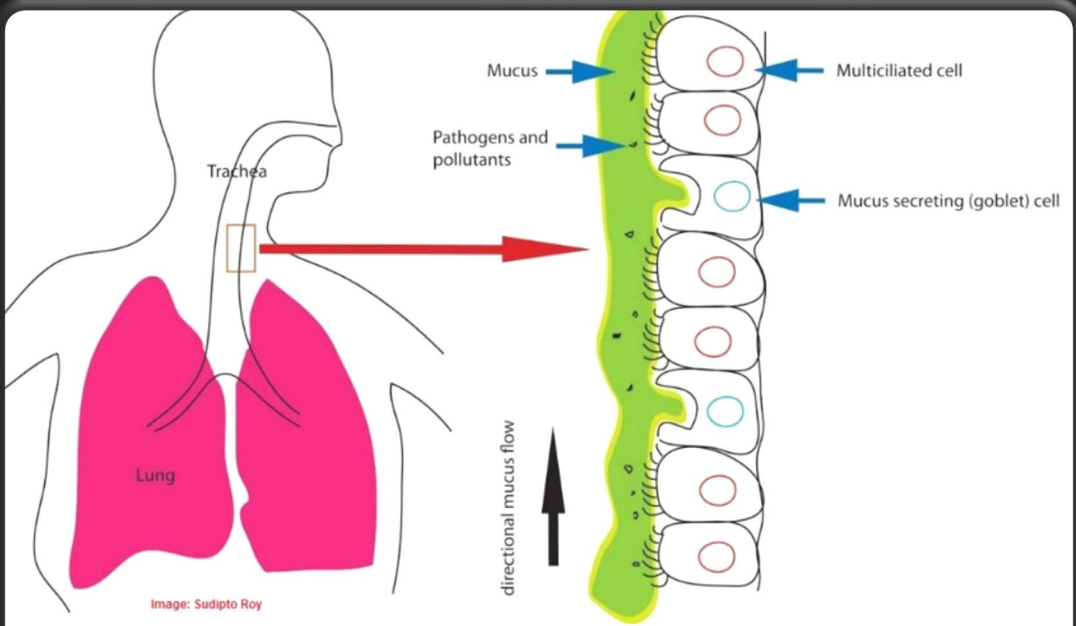
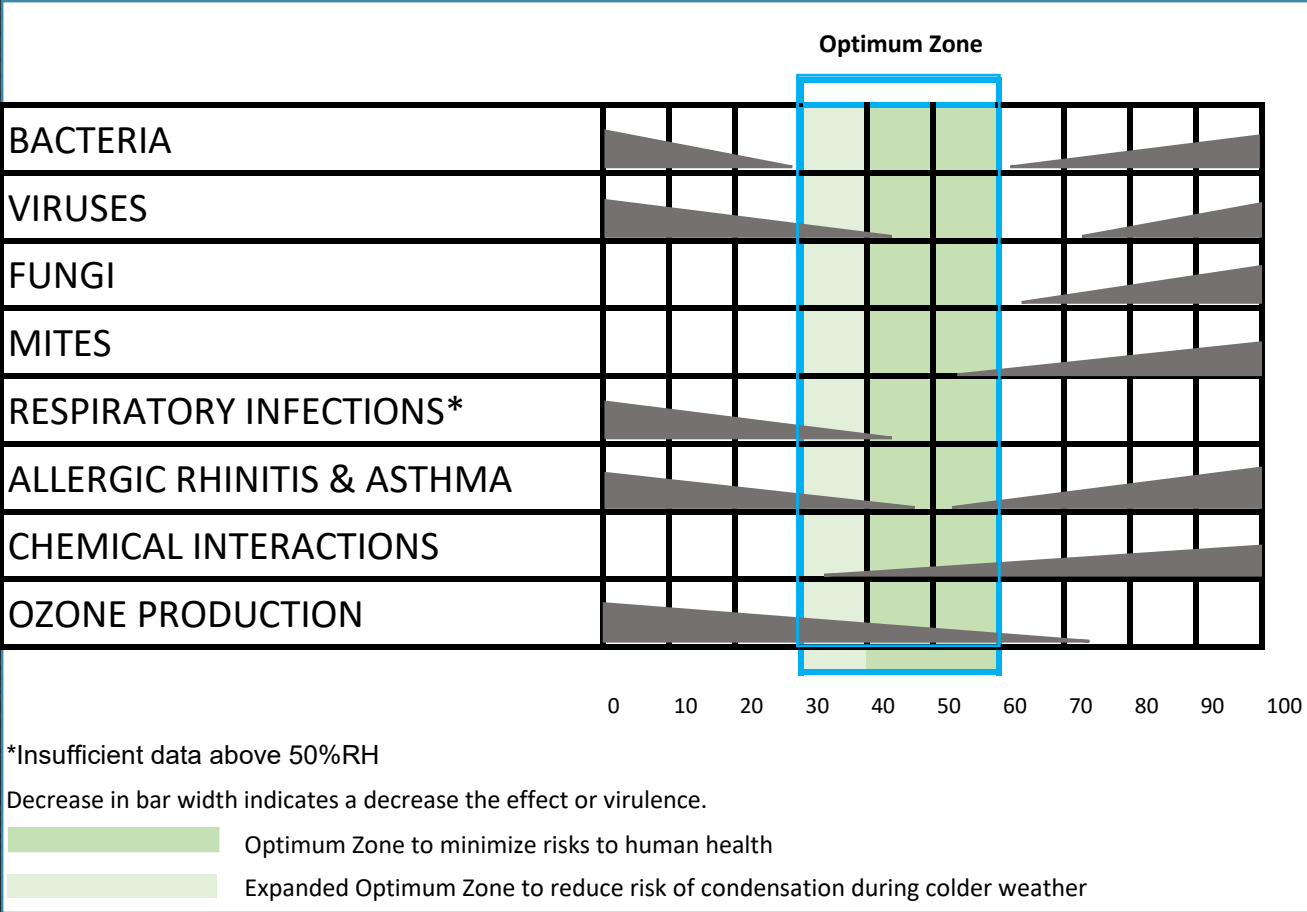


Image Credit: Sudipto Roy, PhD



Source: ASHRAE. 2016. HVAC Systems and Equipment. Adapted from E.M. Sterling, et. al., "Criteria for Human Exposure to Humidity in Occupied Buildings."

The technical suggestions in the document should be reviewed with each school's building operator and considered along with specific characteristics of and criteria for each building.

HVAC Strategy: Ensure Proper HVAC System Hygiene

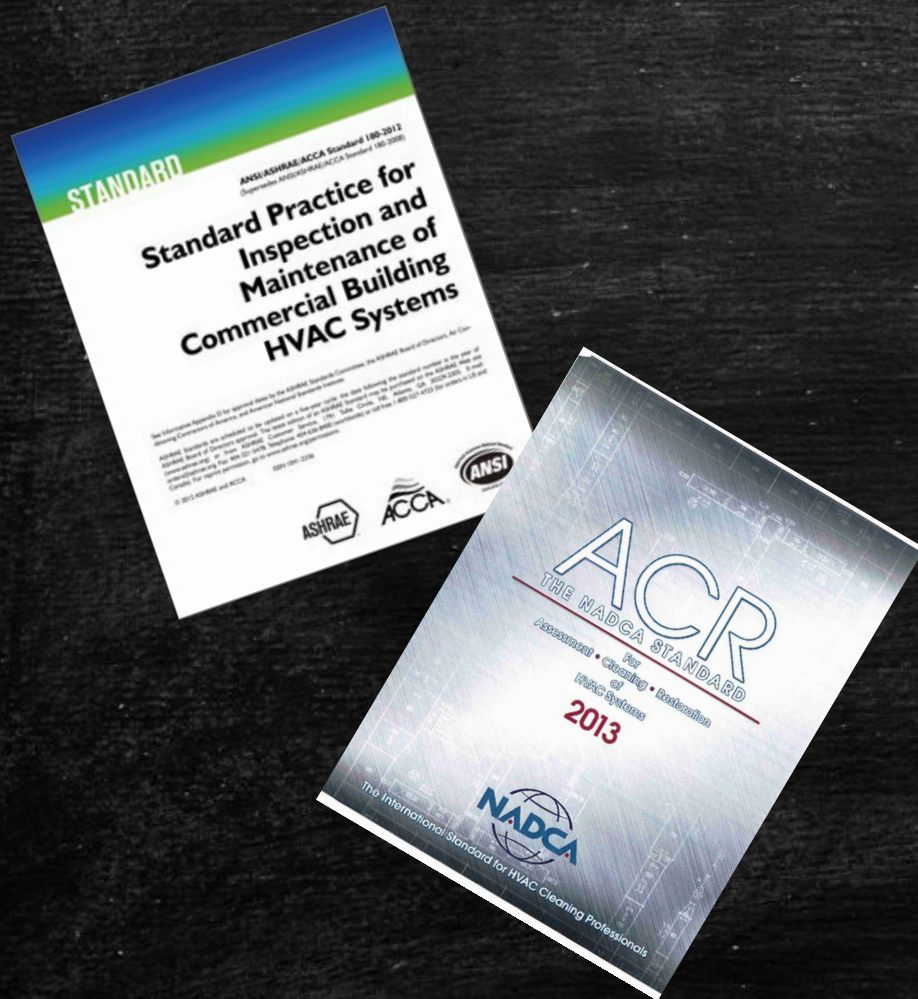


Space	Frequency	Item to Inspect and Clean or Change		
Clinic	Monthly	<ul style="list-style-type: none"> Filters 	<ul style="list-style-type: none"> Drain pans 	
All	Quarterly	<ul style="list-style-type: none"> Filters Terminal units 	<ul style="list-style-type: none"> Drain pans P-Traps 	<ul style="list-style-type: none"> UV lamps
All	Semi-Annually	<ul style="list-style-type: none"> Steam traps and devices Fan belts Sheaves 	<ul style="list-style-type: none"> Pumps and strainers Refrigerant Leaks Controls 	<ul style="list-style-type: none"> VFDs Control devices
All	Annually	<ul style="list-style-type: none"> Motors & bearings Refrigerant temperatures Cabinet panels 	<ul style="list-style-type: none"> Exposed ductwork Condensate pumps Fans and blades 	<ul style="list-style-type: none"> Fan housings Coil fins Dampers



IMPORTANT: Staff in contact with potentially contaminated equipment should wear PPE!!

Benefits of Proper HVAC System Hygiene



- Improved indoor air quality
- Improved occupant experience
- Fewer building related illnesses
- Improved equipment performance
- Longer equipment life
- Enhanced reliability
- Reduced life cycle costs
- Reduced GHG emissions
- Improved public image
- Improved customer satisfaction

ASHRAE Resources

ASHRAE CELEBRATING **125 YEARS**

GUIDANCE FOR THE RE-OPENING OF SCHOOLS

ASHRAE is a global professional society of over 55,000 members committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration and their allied fields. ASHRAE has established a Task Force to help deploy technical resources to address the challenges of the COVID-19 pandemic and possible future epidemics as it relates to the effects of heating, ventilation, and air conditioning systems on disease transmission. Guidance and building readiness information for different operational conditions has been developed for several building types, including commercial; residential; schools and universities; and healthcare facilities.

Protecting the health, safety and welfare of the world's students, faculty, and administrators from the spread of SARS-CoV-2 (the virus that causes the COVID-19 disease) is essential to protecting the entire population. ASHRAE's [guidance for schools](#) provides practical information and checklists to help minimize the chance of spreading SARS-CoV-2. A summary of key general recommendations related to HVAC and water supply systems appears below. Many different HVAC system types are used in educational facilities, so adaptation of these guidelines to specific cases is necessary. Please consult the full guidance for important details and consider reaching out to qualified design professionals for detailed analysis as needed.

- Inspection and Maintenance:** Consider assessing the condition of systems and making necessary repairs. All building owners and service professionals should follow ASHRAE Standard 180-2018 "Standard Practice for the Inspection and Maintenance of Commercial HVAC Systems."
- Ventilation:** A good supply of outside air, in accordance with ASHRAE Standard 62.1-2019, to dilute indoor contaminants is a first line of defense against aerosol transmission of SARS-CoV-2. Pre- and post-occupancy purge cycles are recommended to flush the building with clean air.
- Filtration:** Use of at least MERV-13 rated filters is recommended if it does not adversely impact system operation. If MERV-13 filters cannot be used, including with portable HEPA air cleaners in occupied spaces may be considered.
- Air Cleaning:** Air cleaners such as germicidal ultraviolet air supplement ventilation and filtration. Technologies and so they will effectively clean space air without generating additional air distribution.
- Energy Use Considerations:** In selecting mitigation strategies there may be multiple ways to achieve performance goals. Control changes and use of energy recovery to limit or offset rate and filter efficiency may reduce or offset energy and costs.
- Water System Precautions:** Buildings that have been unoccupied systems should be flushed to remove potential contaminants. Flushing can help minimize the risk of water-borne pathogens in HVAC/R systems play an important role in minimizing the spread of pathogens. For further assistance, please contact ASHRAE.

The most up-to-date information for schools is available at [ASHRAE's guidance for schools](#). For further assistance, please contact ASHRAE. The information above is provided as a service to the public. While every effort is made to ensure accuracy, it is provided for informational purposes only. They are not intended to be construed as a contract.

August 20, 2020

Questions? Email COVID-19@ashrae.org

Full ETF ROSTER

PLEASE support ASHRAE's continuing work to combat the transmission of COVID-19

DONATE NOW

GUIDE TO THE COVID-19 PAGES

Follow the links on the Infographic

LEARN MORE

FAQ


Questions Answered

Frequently Asked Questions and Glossary of Terms

FAQ / GLOSSARY

ACHIEVING ZERO ENERGY

Advanced Energy Design Guide for K-12 School Buildings



Developed by:
ASHRAE
The American Institute of Architects
Illuminating Engineering Society
U.S. Green Building Council
U.S. Department of Energy

Design Guidance for Education Facilities: Prioritization for Advanced Indoor Air Quality

Developed by
ASHRAE Technical Committee 9.7, Educational Facilities

ASHRAE

Peachtree Corners

www.ashrae.org/covid19

- COVID-19@Ashrae.org
- FAQs
- Recommended actions
- Technology overviews
- Building specific HVAC system guidance
- Transportation HVAC system guidance

Local Resources

ASHRAE Detroit Chapter Resource Guide



2021 - 2022 Edition

Published July 16, 2021



Available for download at
www.detroitashrae.org

Recommendations for HVAC and Domestic Water Systems when Re-Opening Facilities after Periods of COVID-19 Dormancy

For additional support in Michigan, contact us at www.detroitashrae.org or www.ashraewestmi.org



Pathogens, like COVID-19, that cause infectious disease are transmitted from primary hosts to secondary hosts by several different routes, including as bioaerosols. Within buildings, pathogen spread can be impacted by airflow patterns. Thus, operating HVAC equipment can impact pathogen transmission. Ventilation and filtration provided by HVAC equipment can help reduce airborne concentrations of bioaerosols. This document offers recommended operational and maintenance practices through which HVAC systems can help decrease building occupants' exposure to infectious bioaerosols.

In light of available information and accepted industry practices, the COVID-19 task force members of the Detroit and Western Michigan Chapters of ASHRAE have used their best efforts in the development of these recommendations for the benefit of building owners, managers, and occupants in Michigan. However, we do not guarantee, verify, or assure that the safety or performance of any products, components, or systems, tested, installed, or operated in accordance with these recommendations will be free from risk.

Information on COVID-19 is emerging and rapidly evolving. The suggestions in this document should be considered along with the specific characteristics and requirements of your building as well as all owner and occupant criteria, and all Executive Orders from the Michigan Office of the Governor.

General Recommended Actions for All Equipment and Systems

- Review your current facility or building systems manual, sequences of operation, and setpoints.
- Document all changes to the existing operating protocols.
- Establish a date to review temporary procedures and return to normal operations.
- Verify that all facility operators and management personnel are aware of all changes in operating procedures and have received appropriate training.
- Advise building occupants that temporary changes are in effect, that the building may slightly less comfortable, and that they should (1) advise building operating staff of any issues or concerns, (2) dress appropriately, and (3) not use ceiling fans, personal fans, or space heaters with internal fans.
- Monitor, track, and if possible, trend impacts of temporary operating procedures.
- At the appointed time, review impacts of temporary procedures and determine whether to return to previous protocols & setpoints.
- Document any additional changes in operating protocols & setpoints and communicate them to the building operations team.
- For additional guidance, see:
 - ASHRAE Position Document on Airborne Infectious Aerosols
 - ASHRAE Standard 180: Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems
 - ASHRAE Standard 62.1: Ventilation for Acceptable Indoor Air Quality
 - ASHRAE Standard 55: Thermal Environmental Conditions for Human Occupancy
 - ASHRAE Standard 188: Legionellosis: Risk Management for Building Water Systems
 - ASHRAE Guideline 12: Managing the Risk of Legionellosis Associated with Building Water Systems
 - ASHRAE Guideline 29: Guideline for the Risk Management of Public Health and Safety in Buildings
 - "Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings" by the U.S. CDC
 - NSF Protocol P453: Cooling Tower Water Systems – Treatment, Operation, and Maintenance to Prevent Legionellosis
 - CTI Guideline 159: Practices to Reduce the Risk of Legionellosis from Evaporative Heat Rejection Equipment Systems
- For assistance, consult your local engineer specializing in HVAC and/or water systems, water treatment specialist, and/or equipment manufacturer's representative.

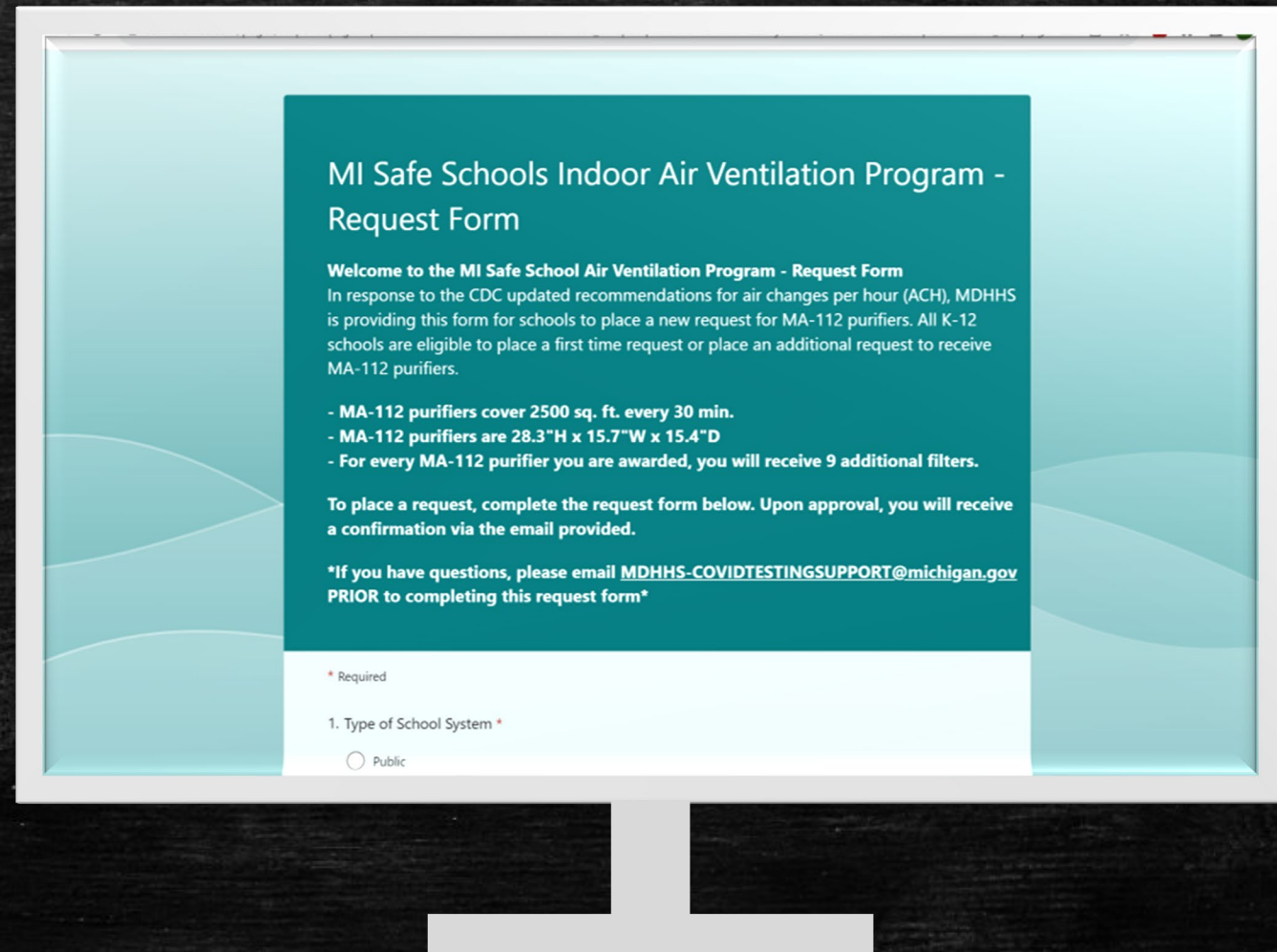
Acronyms:
HVAC- Heating Ventilating and Air-Conditioning
IAQ- Indoor Air Quality

Pg 1 of 6

06/09/2020
For additional guidance, visit:
www.ashrae.org/technical-resources/resources

State Sponsored FREE Filters

- Launched in December 2022
- 42,600 air purification machines
- 451 MI school districts



MI Safe Schools Indoor Air Ventilation Program - Request Form

Welcome to the MI Safe School Air Ventilation Program - Request Form
In response to the CDC updated recommendations for air changes per hour (ACH), MDHHS is providing this form for schools to place a new request for MA-112 purifiers. All K-12 schools are eligible to place a first time request or place an additional request to receive MA-112 purifiers.

- MA-112 purifiers cover 2500 sq. ft. every 30 min.
- MA-112 purifiers are 28.3"H x 15.7"W x 15.4"D
- For every MA-112 purifier you are awarded, you will receive 9 additional filters.

To place a request, complete the request form below. Upon approval, you will receive a confirmation via the email provided.

If you have questions, please email MDHHS-COVIDTESTINGSUPPORT@michigan.gov PRIOR to completing this request form

* Required

1. Type of School System *

Public

Contacts for additional information or resources include:

www.ashrae.org
www.detroitashrae.org
gac@detroitashrae.org

Thank You

Cleaning and Disinfecting

A Day in the Life of a Student with Asthma

Keith Kiama

Green Door Initiative

Program Manager: Air Quality Management Plan

Presentation Outline

- About the Green Door Initiative
- Indoor air quality: safe and effective cleaning and disinfecting.
- How to use EPA's "List N" to find Covid-19 disinfectants
- Resources





Mission

The Green Door Initiative (GDI) works to ensure that every person is environmentally literate and capable of practicing and promoting a sustainable lifestyle.

Cleaning vs Sanitizing vs Disinfecting

- **Cleaning**
 - Uses a detergent or soap and water to physically remove dirt, grime and germs from surfaces. This process does not necessarily kill germs, though SARS-CoV-2's outer lipid layer is dissolved by soap and the virus falls apart.
- **Sanitizing**
 - Reduces the number of germs on hard surfaces or objects to a safer level – at least a 99.9% reduction. Sanitizers are registered for use on bacteria, not viruses.
 - Sanitizers are used on food preparation and contact surfaces, and mouthed toys and pacifiers.
- **Disinfecting**
 - Inactivates 99.999% of germs on hard surfaces or objects if allowed to sit visibly wet or “dwell” on the surface for the recommended amount of “dwell” time.

Ten Steps for Safer Disinfectant Use

1. Check the expiration date and do not use the product if it's expired.
2. Consider using wipes instead of sprays to reduce irritating fumes (but never use disinfectant wipes on skin).
3. Never mix household bleach with ammonia or any other cleanser.
4. Follow the label's safety instructions on how to use the product.
5. Ventilate by opening windows (if it's safe to do so) and using fans that blow air outdoors.
6. Do not allow children to apply the products. Keep children and pets away while you're using the product and then until it is dry and there is no odor.
7. After using the product, wash your hands.
8. Throw away disposable gloves and masks after use because they cannot be cleaned. If your gloves are reusable, use a designated pair for routine disinfecting.
9. Store products out of reach of children and pets.
10. Always follow standard practice and appropriate regulations specific to your type of facility for at least the minimum cleaning and disinfection standards.

Product Ingredients

- **hydrogen peroxide** (no stronger than 3%) or **ethanol** (ethyl alcohol) are relatively safer.
- Do not use products that contain peroxyacetic acid or peracetic acid.
- Limit use of the following to when it is strictly needed or required: bleach (sodium hypochlorite) or quaternary ammonium compounds.

Five Steps for Using Disinfectants Effectively

1. Clean the surface before disinfecting.
2. Make sure the product is not expired.
3. Make sure the surface is wet for the entire time listed on the label. This will be called the “contact time” or “dwell time.”
4. Use the product only where the label says it can be used. Check the ‘use sites’ and ‘surface types’ on the label for where to use the product.
5. Make sure that the product will work against the Sars-Cov-2 virus by checking that the product is listed on EPA’s “List N:”

Using EPA's "List N:" Searching for Products

Disinfectants that are on EPA's List N work against the coronavirus on surfaces.

EPA United States Environmental Protection Agency

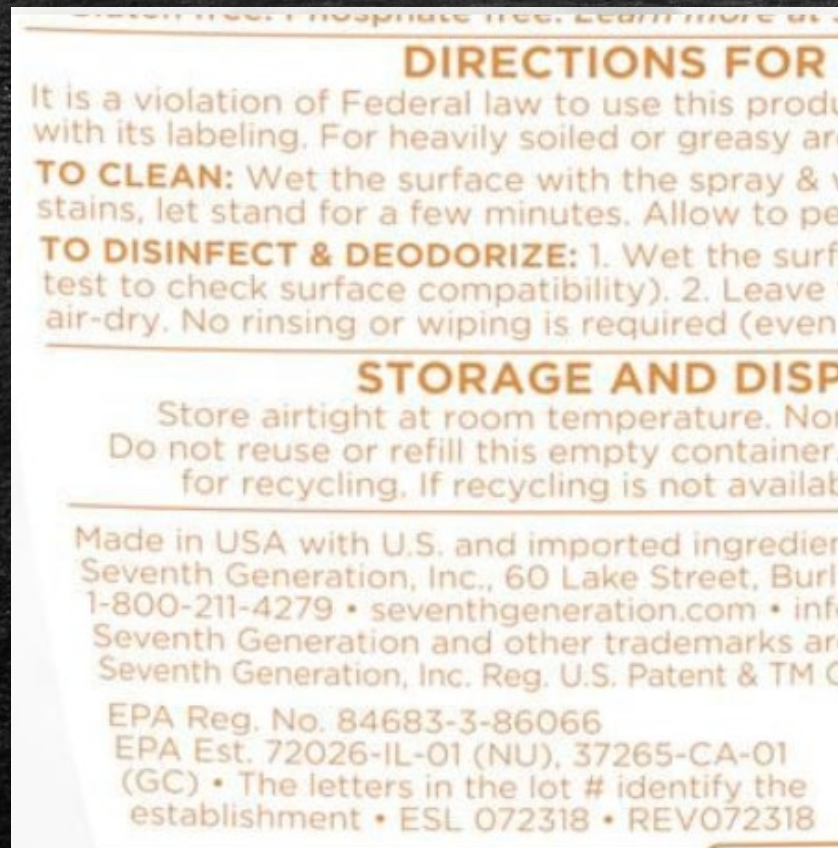
List N Tool: COVID-19 Disinfectants [Feedback](#)

Filter	Disinfectants
EPA Registration Number	All
Active Ingredient	1,2-Hexanediol Ammonium bicarbonate Ammonium carbonate Chlorine dioxide Citric acid
Use Site	Dodecylbenzenesulfonic acid Ethanol (Ethyl Alcohol) Glutaraldehyde
Contact Time	Glycolic acid Hydrochloric acid Hydrogen chloride Hydrogen peroxide Hypochlorous acid
Browse All	Iodine

[Keyword Search](#) [Show results](#) [Clear results](#)

<https://cfpub.epa.gov/giwiz/disinfectants/index.cfm>

Using EPA's "List N:" Verifying a Product is on the List



Make sure the first two sets of numbers in the product's registration number match those of the product you want.

← 84683-3

Resources

- EPA. About List N: Disinfectants for Coronavirus (COVID-19).
<https://www.epa.gov/coronavirus/about-list-n-disinfectants-coronavirus-covid-19-0>
- EPA. Six steps for safe and effective disinfectant use.
<https://www.epa.gov/coronavirus/six-steps-safe-effective-disinfectant-use>
- CDC. Cleaning and Disinfecting your Facility.
<https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>
- EPA. “ have a question about a word or phrase on the List N website. I’m not sure how something on List N helps me fight COVID-19.”
<https://www.epa.gov/coronavirus/i-have-question-about-word-or-phrase-list-n-website-im-not-sure-how-something-list-n>
- CDC. “People with Moderate to Severe Asthma.”
<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/asthma.html>
- Green Door Initiative Fact Sheets – available on the website.
<https://greendoorinitiative.org/>

Contact Us

www.greendoorinitiative.org

313-922-8055

keithk@greendoorinitiative.org

The Air Quality Management Plan project is funded by the National Institute of Environmental Health Sciences and the Michigan Department of Health and Human Services Asthma Prevention and Control Program.

A Day in the Life of a
Student with Asthma:
Outdoor asthma triggers

August 2, 2023

Kindra Weid, RN, BSN, MPH
MI Air MI Health, *It's Electric!*

Outdoor asthma triggers

Pollen

Temperature & humidity

Air pollution

Particulate matter



Pollen and allergies

Seasons:

March - June:
Tree pollen

Summer months:
Grass pollen

Fall: Wheats and
ragweed

Duration:

20 days longer in
North America &
more intense



A woman with short blonde hair, wearing a red polo shirt, is shown from the chest up. She is holding her right hand to her chest and looking down with a concerned expression. The background is a blurred outdoor setting with a black metal fence. The text "Is your asthma worse in humid weather?" is overlaid in white. Below the text is the aafa logo and the text "Asthma and Allergy Foundation of America". In the bottom right corner of the image area, it says "Visit aafa.org to learn more.".

Is your **asthma**
worse in
humid weather?

 Asthma and Allergy
Foundation of America

Visit aafa.org to learn more.

Temperature & humidity

Temperature & humidity 2



Cold, dry air and bronchoconstriction

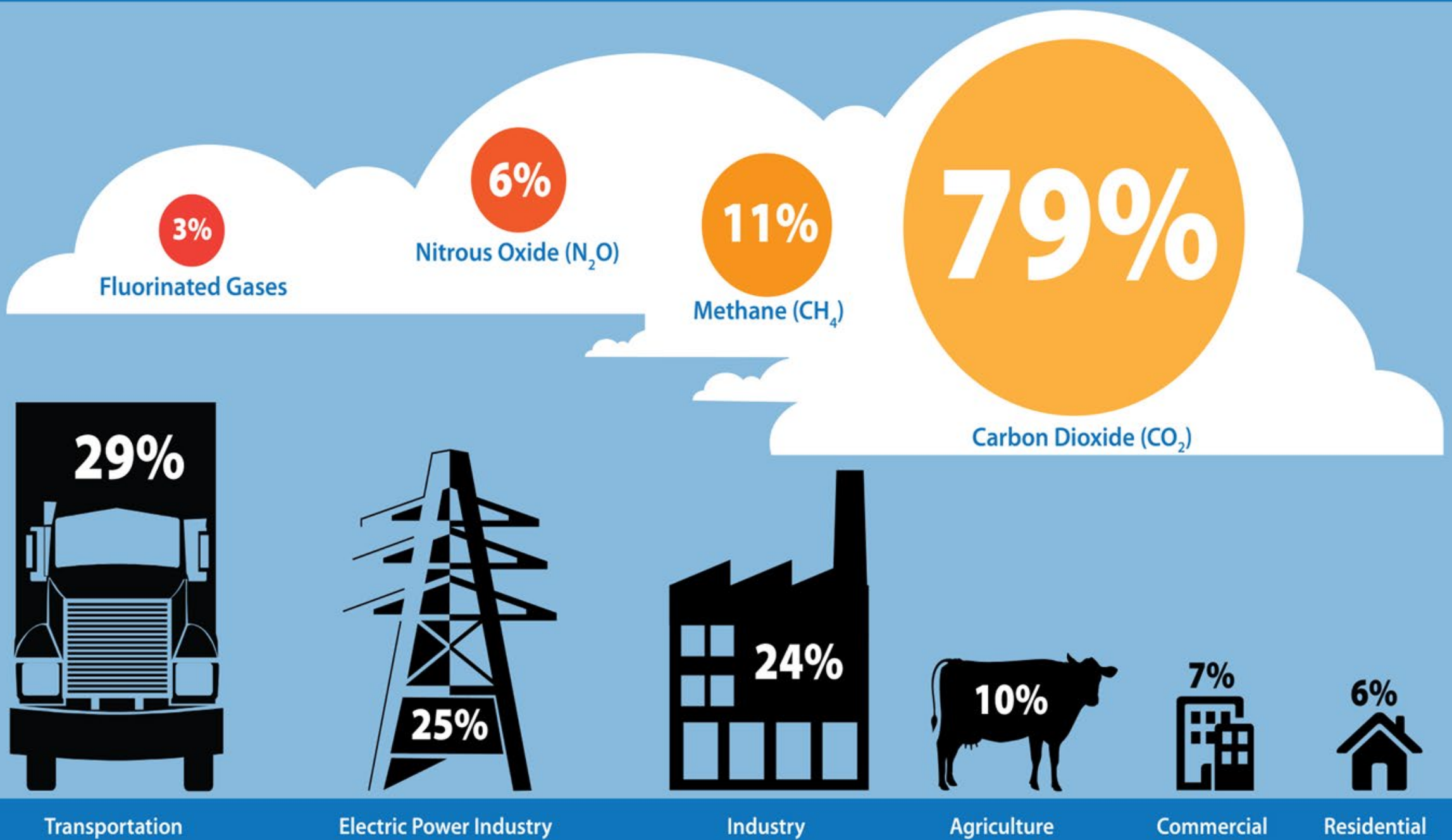
Wear a scarf or face mask over your mouth and nose. This will help warm and humidify the air you breathe.

If you normally exercise outdoors, consider an indoor activity on cold winter days.

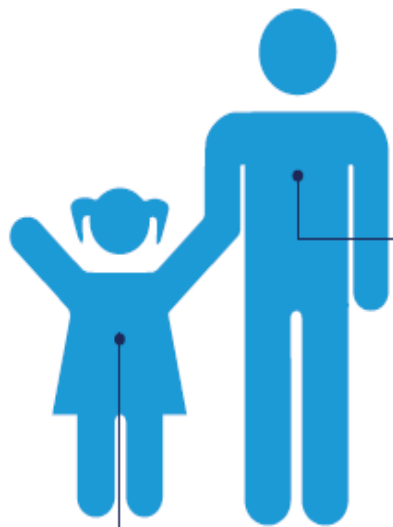
Always carry your quick-relief inhaler with you.

U.S. Greenhouse Gas Emissions in 2021*

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2021*



Air pollution remains a major danger to the health of children and adults.



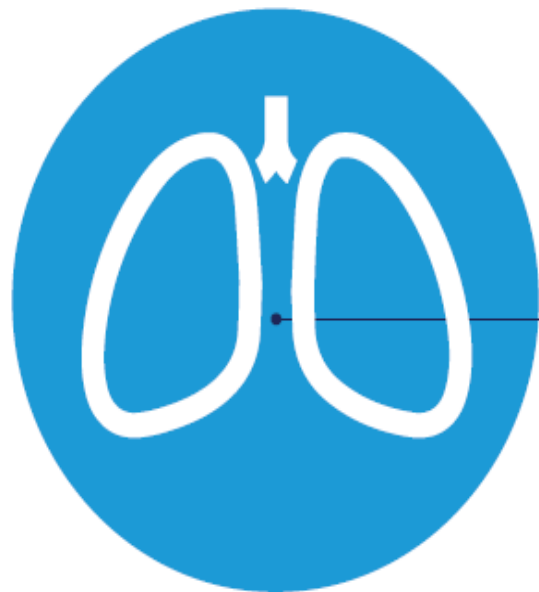
Health risks from:
Ozone Pollution
Particle Pollution



PREMATURE DEATH

May cause developmental harm

May cause reproductive harm



Health risks from:
Ozone Pollution
Particle Pollution



- Asthma attack
- Lung cancer
- Wheezing and coughing
- Shortness of breath
- Cardiovascular harm
- Susceptibility to infections
- Lung tissue redness, swelling

AQI Basics for Ozone and Particle Pollution

AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Current

Forecast

Loops

Archive

Info

Find address or place



Monitors
Daily AQI

Contours
Daily AQI

Show green contours

Ozone and PM (PM2.5 and PM10)

Ozone

PM (PM2.5 and PM10)

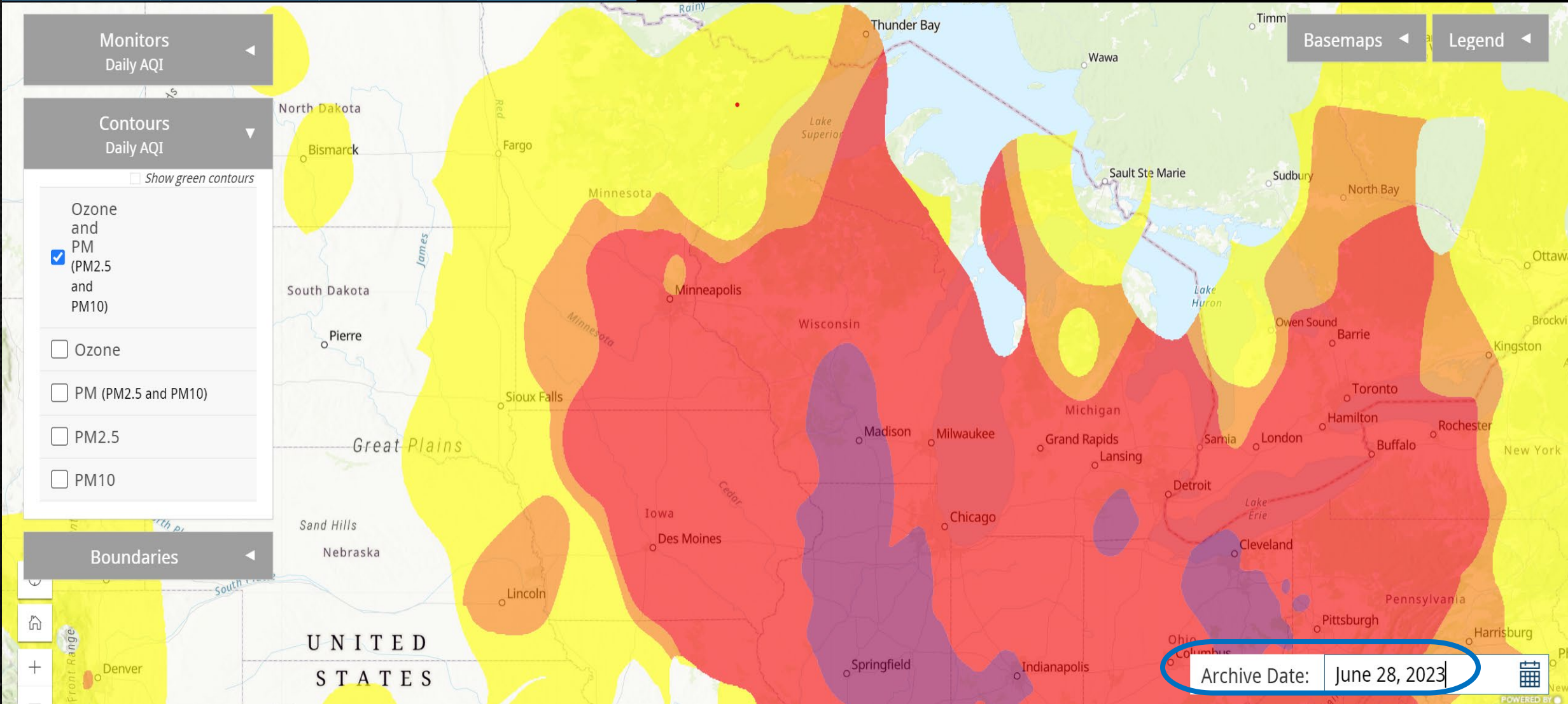
PM2.5

PM10

Boundaries

Basemaps

Legend



Archive Date: June 28, 2023



Action! Days in Michigan 2022-2023

Action! Days This Year



Location	Year	Number	Dates
Ann Arbor	2023	21	4/14, 5/30, 5/31, 6/1, 6/2, 6/8, 6/9, 6/21, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/10, 7/16, 7/17, 7/25, 7/27, 7/28
Benton Harbor	2023	22	4/14, 5/30, 5/31, 6/1, 6/2, 6/8, 6/21, 6/22, 6/24, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/10, 7/16, 7/17, 7/25, 7/27, 7/28
Detroit	2023	21	4/14, 5/30, 5/31, 6/1, 6/2, 6/8, 6/9, 6/21, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/10, 7/16, 7/17, 7/25, 7/27, 7/28
Eastern U.P.	2023	10	6/24, 6/26, 6/27, 6/28, 6/29, 6/30, 7/1, 7/15, 7/16, 7/25
Flint	2023	13	5/31, 6/1, 6/2, 6/8, 6/9, 6/27, 6/28, 6/29, 6/30, 7/1, 7/16, 7/17, 7/25
Grand Rapids	2023	22	4/14, 5/30, 5/31, 6/1, 6/2, 6/8, 6/21, 6/22, 6/24, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/10, 7/16, 7/17, 7/25, 7/27, 7/28
Houghton Lake	2023	7	6/27, 6/28, 6/29, 6/30, 7/1, 7/16, 7/25
Kalamazoo	2023	12	5/31, 6/1, 6/2, 6/8, 6/27, 6/28, 6/29, 6/30, 7/1, 7/16, 7/17, 7/25
Lansing	2023	11	6/1, 6/2, 6/8, 6/27, 6/28, 6/29, 6/30, 7/1, 7/16, 7/17, 7/25
Ludington	2023	17	4/14, 5/30, 5/31, 6/1, 6/2, 6/21, 6/24, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/16, 7/17, 7/25
Saginaw	2023	10	6/8, 6/9, 6/27, 6/28, 6/29, 6/30, 7/1, 7/16, 7/17, 7/25
Traverse City	2023	16	4/14, 5/30, 5/31, 6/1, 6/2, 6/21, 6/24, 6/27, 6/28, 6/29, 6/30, 7/1, 7/4, 7/5, 7/16, 7/25

Action! Days in 2022



Location	Year	Number	Dates
Ann Arbor	2022	5	6/15, 6/25, 7/11, 7/18, 7/19
Benton Harbor	2022	6	6/15, 6/20, 6/21, 6/30, 7/11, 7/19
Detroit	2022	5	6/15, 6/25, 7/11, 7/18, 7/19
Eastern U.P.	2022	0	
Flint	2022	0	
Grand Rapids	2022	6	6/15, 6/20, 6/21, 6/30, 7/11, 7/19
Houghton Lake	2022	0	
Kalamazoo	2022	0	
Lansing	2022	0	
Ludington	2022	4	6/15, 6/20, 6/21, 7/19
Saginaw	2022	0	
Traverse City	2022	0	

Let's go electric
for our children
and the future!



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CONTACT US

Clean School Bus Program

2022 Clean School
Bus Rebates

Application Now Open!

Apply Here



THANK YOU!

Please contact me with questions.

M O M S
clean air
F O R C E

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