MONTANA
ASTHMA CONTROL PROGRAM

Air Quality in Montana Schools

REPORT HIGHLIGHTS

- **Indoor Air Quality (IAQ)** refers to the air quality in and around buildings and how it affects the health of its occupants.
- Teachers/staff felt most concerned for their health or the health of their students in regards to airborne pathogens, cleanliness of floors and/or surfaces, and wildfire smoke or other outdoor air pollution.
- Nearly **60%** of teachers/staff reported having portable air filters available to use in their classrooms.
- Nearly half of administrators and teachers/staff (**50%** and **48%**, respectively) with portable air filters reported using them **daily** in their schools/classroom.
- Continued communication between administrative staff and teachers is needed for year round clean air quality in schools.

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BACKGROUND

Wildfire smoke has become a global health concern with wildfire seasons becoming longer and more intense each year. While everyone is affected by wildfire smoke, those with asthma are at greater risk for developing symptoms from exposure. Wildfire smoke contains harmful pollutants, including particulate matter (PM), also known as particle pollution. These particles may contain acids, inorganic compounds, organic chemicals, soot, metals, soil or dust particles, and even biological materials (e.g. pollen or mold spores). Particles 10 micrometers (μm) or smaller can enter the lungs, while those smaller than 2.5μm are able to pass into the circulatory system. Wildfire smoke generally contains these smaller particles[1].

The U.S. Air Quality Index (AQI) by the Environmental Protection Agency (EPA) is a tool used to communicate outdoor air quality and health risk. The index contains six categories, ranging from good to hazardous air quality conditions with higher levels of air pollution associated with greater health concern[2]. Indoor Air Quality (IAQ) refers to the air quality in and around buildings. Outdoor air enters buildings via infiltration and natural or mechanical ventilation[3]. Controlling the source is the most effective way to improve indoor air quality. Improving ventilation and providing quality air filtration will help keep harmful outdoor air from traveling inside at an increased rate and keep the indoor air cleaner than outdoor air[4]. Poor indoor air quality can increase the risk of short– and long-term health effects for the general population, according to the EPA. In schools specifically, failure to prevent or address IAQ problems can lead to increased health risks for students and staff, higher absenteeism, reduced academic performance, and shorter lifespan and effectiveness of facility systems and equipment[5].

METHODS

In November 2024, the Montana Asthma Control Program (MACP) sent two Qualtrics surveys; one to Montana school teachers and staff and the other to school administrators. The survey contained 17 similar but tailored questions to each group. The survey aimed to assess schools' IAQ strategies for protecting student and staff health so MACP can identify needed support and resources for schools. The administrators survey had 117 completed responses (70% completion) and the teacher/staff survey had 393 completed responses (79% completion).

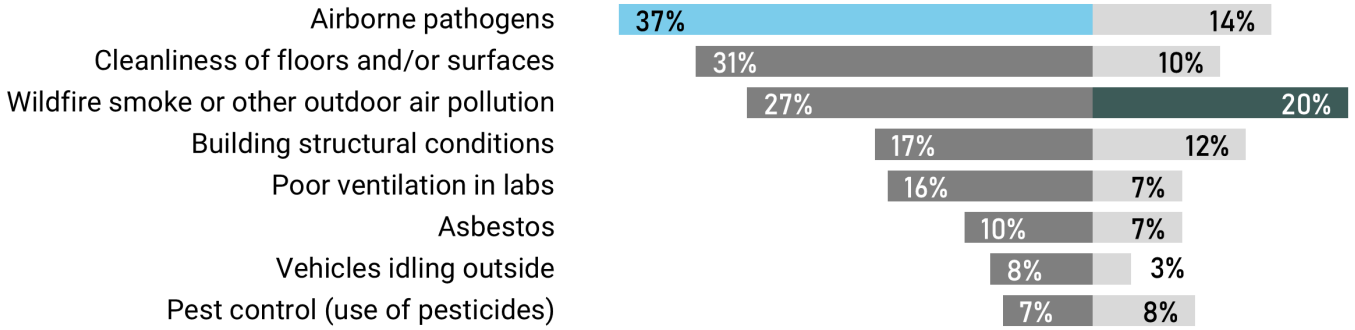
RESOURCES

- The Montana DPHHS Air Quality and Health site provides information on indoor and outdoor air quality guidelines and wildfire smoke response guides. Visit the DPHHS Air Quality site for more information.
- Find more information on wildland fire basics and research from the EPA Wildland Fires and Smoke website.
- Learn more about how the environment can affect asthma and how to manage environmental asthma triggers from the EPA Asthma website.
- The Montana Department of Labor and Industry (DLI) provides an online form to report workplace safety hazards. For more information, visit the Montana DLI workplace safety hazard online form.

AIR QUALITY DATA

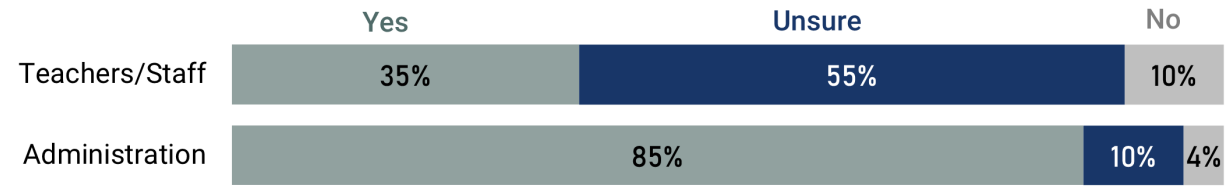
Almost all (99%) of the administrators felt their schools had good or excellent air quality while only two-thirds (64%) of teachers/staff felt similarly. Participants were asked to what extent (Never, Sometimes, Often, and Always) several conditions in school environments, (e.g. airborne pathogens or asbestos) ever caused concern about the health of themselves or their students (Figure 1). More than twice as many teachers reported being frequently concerned about airborne pathogens compared to administrators (37% and 14%, respectively), three times more teachers were frequently concerned for the cleanliness of floors and/or surface (31% and 10%, respectively), and more frequently concern for lack of quality ventilation in science, industrial arts, or art laboratories (16% and 7%, respectively). One-in-five (20%) administrators and over one-in-four teachers (27%) were more frequently concerned for wildfire smoke or other outdoor air pollution.

Figure 1. **Teachers/staff** were most frequently concerned about airborne pathogens while **administrators** were more frequently concerned about wildfire smoke or other outdoor air pollution.



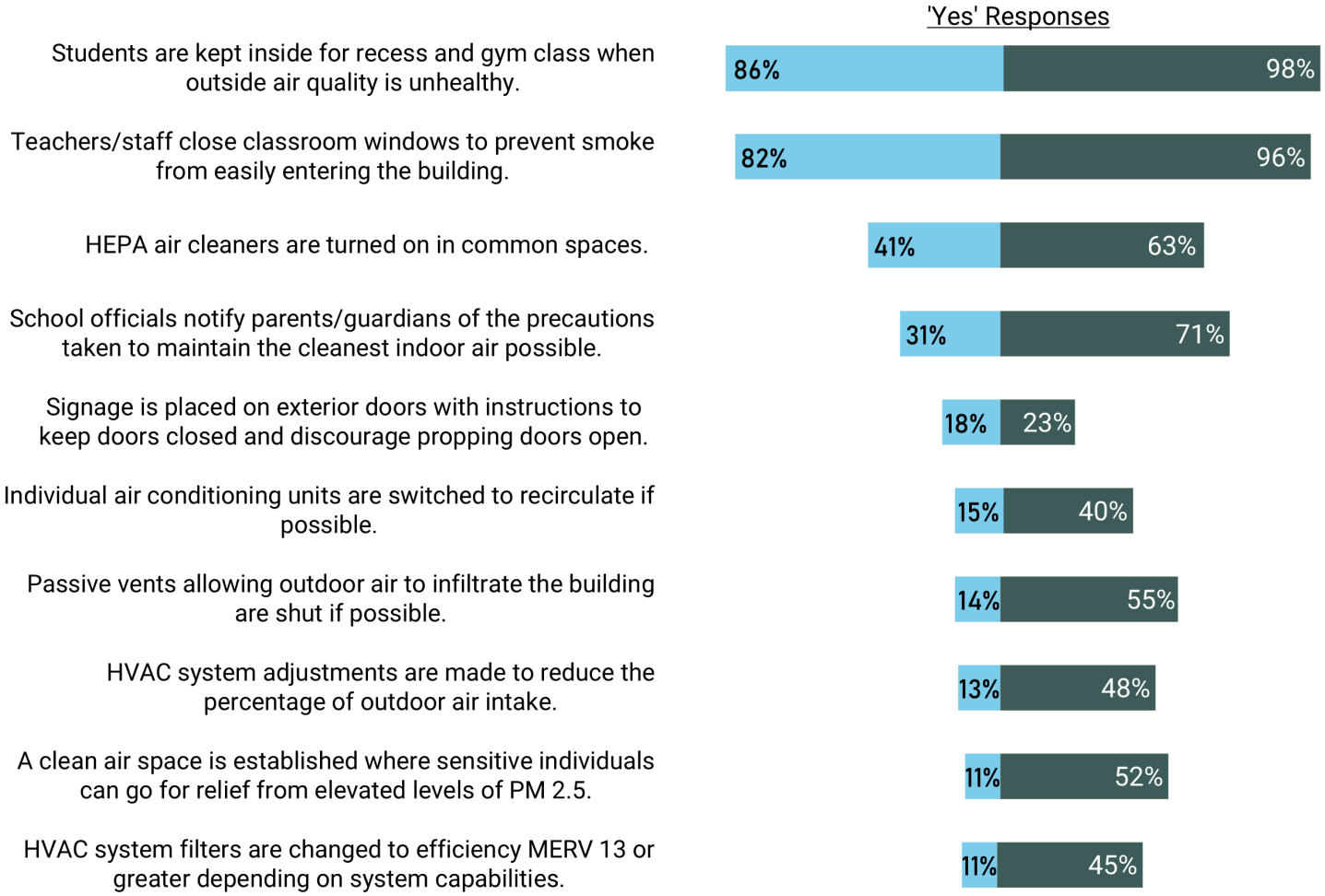
Over a third (37%) of administrators reported that they have not made any changes or that they have no plans to make changes in their school buildings to improve indoor air quality, while two-thirds (66%) of teachers/staff reported they were unsure of or knew that their schools had no plans to make changes to improve indoor air quality (data not shown). Over half of teachers/staff (55%) stated they were unsure if their school had a protocol for responding to wildfire smoke events, however, only 10% of administrators were unsure of any protocols for responding to wildfire smoke events (Figure 2). To those who answered yes, they were then asked if protocol was communicated to school staff, teachers/staff and administrators had similar responses, a majority (83% and 80%, respectively) stated that a protocol was communicated during or before wildfire smoke or other poor outdoor air quality events. Similar results were reported when asked when the protocol was communicated to parents and guardians of students. Over three-in-four (77%) of teachers/staff and four-in-five (82%) administrators reported a protocol was communicated during, prior to, or both for wildfire smoke or other poor outdoor air quality events.

Figure 2. Over half of teachers/staff were **unsure** if there is a protocol for responding to wildfire smoke events.



Teachers/staff and administrators were asked if their school takes ten suggested actions during wildfire smoke events and other poor outdoor air quality events with “Yes”, “Unsure”, or “No” as response options (Figure 3). A large majority of both groups reported closing classroom windows to prevent smoke from easily entering the building (82% and 96%, respectively) and students are kept inside for recess and gym class when air quality is unhealthy for sensitive groups or worse (86% and 98%, respectively). Less than a quarter of both teachers/staff and administrators reported having signage placed on the exterior of doors with instructions to keep doors closed as much as possible and discourage propping doors open (18% and 23%, respectively). Over half (52%) of administrators reported their schools have a clean air space established where sensitive individuals can go for relief; however, nearly half (48%) of teachers/staff were unsure if their schools had a clean air space with only 11% able to say they did have such a space in their schools.

Figure 3. A majority of **teachers/staff** and **administrators** knew to keep students inside for recess/gym and to close classroom windows during unhealthy outside air quality.



Nearly two-thirds (64%) of administrators and two-fifths (41%) of teachers/staff reported their school had received free portable air cleaners through the Air Purifiers in Schools Program administered by the Montana Department of Public Health and Human Services (DPHHS) from 2022 to 2023 (Figure 4). Administrators reported portable air cleaners were less frequently purchased from other sources (Figure 5). Administrators who reported receiving air cleaners from other sources, cited general funds, ESSER funding, donations, the school PTA, and the Red Cross as primary sources of funding.

Figure 4. **Administrators** were able to report their schools receiving free portable air cleaners from DPHHS more than **teachers/staff**.

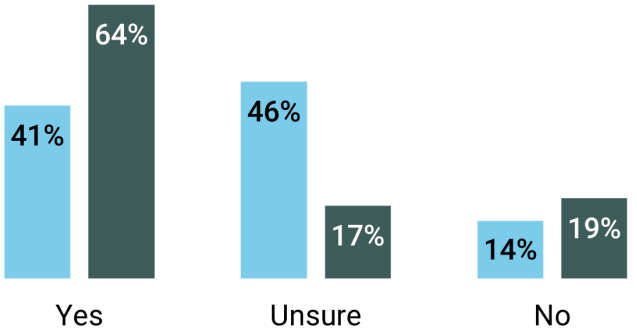
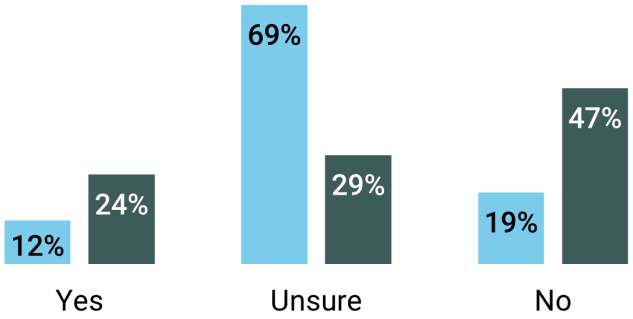


Figure 5. Less than a quarter of **administrators** and **teachers/staff** reported receiving portable air cleaners from sources outside DPHHS.



Nearly 60% of teachers reported they had a portable air cleaner available for their classroom/office (Figure 6). Nearly half of administrators and teachers/staff reported using their portable air cleaners daily (50% and 48%, respectively, Figure 7).

Figure 6. Over half of teachers/staff reported **having** a portable air cleaner available in their classroom/office.

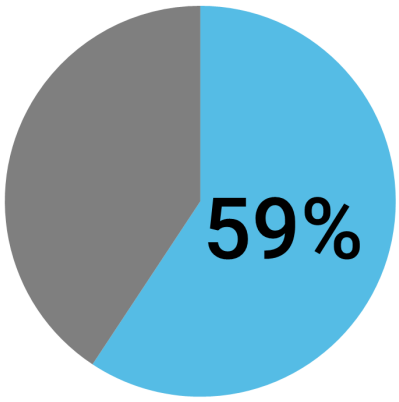
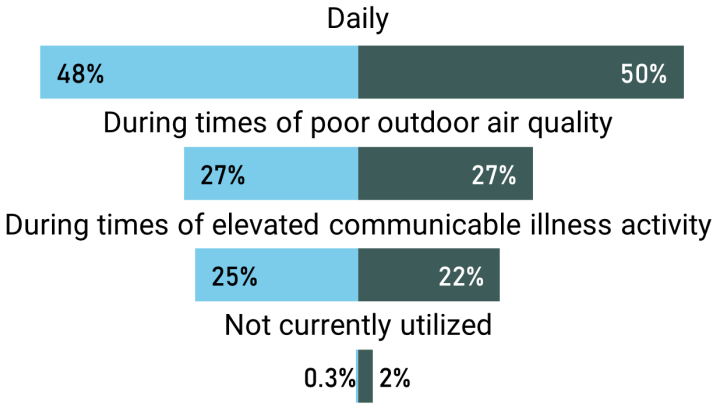


Figure 7. Nearly half of **teachers/staff** and half of **administrators** reported using portable air cleaners daily.



DISCUSSION

Survey results on indoor air quality (IAQ) in Montana schools reveal clear gaps between school administrators and frontline staff in both the perception and understanding of IAQ conditions, protocols, and available resources. While nearly all administrators (99%) reported their school's air quality as good or excellent, only 64% of teachers and staff agreed. This contrast suggests that staff who spend more time in classrooms may be experiencing issues that are not reaching administrative attention.

The differences extend beyond perception. Teachers and staff expressed more concern than administrators about airborne pathogens, cleanliness, and ventilation in specialized classrooms. These discrepancies may result from communication breakdowns or differences in daily exposure and expectations. For example, although 85% of administrators reported their district had a wildfire smoke plan, only 34% of teachers/staff were aware of such a plan. Even when communication systems are in place, their reach and effectiveness appear inconsistent across personnel. Additionally, knowledge gaps persist around specific IAQ tools and interventions. While both groups reported the use of key measures like portable air cleaners and window closures during smoke events, they also both reported low signage usage on exterior doors with instructions to keep doors closed during poor air quality events. Such uncertainties can reduce the effectiveness of IAQ strategies and hinder appropriate action during poor air quality events.

Simple and cost-effective interventions—such as placing signage on doors to prevent smoke intrusion—were among the least frequently implemented. These missed opportunities underscore the importance of reinforcing low-effort strategies that can still have a meaningful impact.

To address these issues, several key actions are recommended:

- **Strengthen Communication**: Schools should prioritize frequent, clear, and multi-format communication regarding IAQ protocols and updates. This includes regular meetings, memos, checklists, and visible signage to ensure all staff understand and can act on current guidance.
- **Enhance IAQ Training**: Targeted training for teachers and staff on HVAC systems, clean air spaces, proper portable air cleaner use with regular filter replacement, and IAQ policies can improve day-to-day operations and emergency responses.
- **Expand and Reinforce Low-Cost Interventions**: Posting door signs, reminders to close windows, and consistent use of portable purifiers should be emphasized and standardized across districts.
- **Ensure Equitable Equipment Distribution**: A thorough inventory and needs assessment should ensure that all classrooms, especially those serving high-risk populations, have access to portable air cleaners and clean air spaces.
- **Use Data to Inform Policy and Resource Allocation**: Continued IAQ data collection and transparent sharing will support long-term infrastructure improvements. Schools should consider integrating localized monitoring tools such as the Montana DEQ's Purple Air Monitors in Schools Program to better understand indoor and outdoor air quality trends and adjust protocols accordingly.

Ultimately, improving indoor air quality in Montana schools is not just about infrastructure—it's about creating a culture of awareness, preparedness, and shared responsibility. Consistent communication, training, and data-informed decision-making are key to protecting the health of both students and staff, particularly as challenges like wildfire smoke and airborne pathogens continue to impact learning environments.

SOURCES

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