

**SENATE . . . . . No. 2440**

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**The Commonwealth of Massachusetts**

PRESENTED BY:

***Cindy F. Friedman, (BY REQUEST)***

*To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts in General Court assembled:*

The undersigned legislators and/or citizens respectfully petition for the adoption of the accompanying bill:

An Act to improve student and staff attendance and performance by ensuring CO2 monitoring in schools throughout the Commonwealth.

PETITION OF:

NAME:	DISTRICT/ADDRESS:	
<i>Eliza Coady Perez</i>		
<i>Susan Perkins</i>		
<i>Ann Marie Faust</i>		
<i>Carmine Lawrence Gentile</i>	<i>13th Middlesex</i>	<i>9/12/2023</i>

**SENATE . . . . . No. 2440**

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By Ms. Friedman (by request), a petition (accompanied by bill, Senate, No. 2440) (subject to Joint Rule 12) of Eliza Coady Perez, Susan Perkins, Ann Marie Faust and Carmine Lawrence Gentile for legislation to improve student and staff attendance and performance by ensuring CO2 monitoring in schools throughout the Commonwealth. Education.

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**The Commonwealth of Massachusetts**

**In the One Hundred and Ninety-Third General Court  
(2023-2024)**

An Act to improve student and staff attendance and performance by ensuring CO2 monitoring in schools throughout the Commonwealth.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

1           SECTION 1. Section 1, relative to the installation and operation of CO2 monitoring  
2 systems, provides that the Commonwealth will collect data, to the extent described in this  
3 legislation, from existing CO2 monitoring systems previously installed in a select number of  
4 schools throughout the Commonwealth. Schools that do not yet possess CO2 monitoring systems  
5 shall be required to install such monitoring systems and begin data collection on or before  
6 January 1, 2024.

7           For purposes of providing students and staff with a safe and healthy environment in  
8 which to learn and work, and to curtail ongoing student and staff absences related to illness,  
9 provisions of this legislation shall apply to all public schools with students between grades K-12  
10 on or before January 1, 2024.

11           SECTION 1(a): for purposes of this section and sections 2 through 4 inclusive of this act:

12 (1) “school facility” means any permanent building or portable structure, building, or  
13 commercial space owned, rented, operated, leased by a local or regional board of education,  
14 including, but not limited to, donated space being used as a classroom or any other space for  
15 educational services, including, but not limited to, classrooms, cafeterias, staff lounges, staff  
16 offices, auditoriums, gymnasiums, libraries, restrooms, and spaces providing multiple purposes.

17 (2) “hours of school activity” means any time throughout the day when students, staff and  
18 community members occupy a school facility.

19 (3) “multipurpose spaces” means rooms and spaces within an educational setting that can  
20 be or are used for multiple purposes, including but not limited to meetings, instructional  
21 activities, dining, and social gatherings.

22 (4) “CO2 monitoring system” is an instrument for the measurement of carbon dioxide gas  
23 and PM2.5 (Particulate Matter less than 2.5 microns in size).

24 (5) “portable HEPA filters” means portable High Efficiency Particulate Air filters.

25 (6) “small particulate matter” means inhalable particles that are less than 10 microns in  
26 size (PM10) and less than 2.5 microns in size (PM2.5), as defined by the Environmental  
27 Protection Agency.

28 (7) “allergen” means a substance that causes an allergic reaction.

29 (8) “Far-UV disinfection systems” mean Ultraviolet Germicidal Irradiation (UVGI)  
30 lamps. UVGI lamps are low-pressure mercury lamps in air ducts of ventilation systems or fixed  
31 fixtures in the upper portion of rooms that kill or inactivate airborne and surface microorganisms.

32 (9)“Mechanical ventilation unit” means the intentional fan-driven flow of outdoor air into  
33 a building.

34 (10)“ventilation verification assessment” means an assessment performed by certified  
35 third-party ventilation contractors to inspect, repair and test all ventilation systems to determine  
36 proper functioning of all components of systems used to mechanically and naturally ventilate  
37 occupied spaces including but not limited to HVAC and mechanical windows so that measured  
38 results meet or exceed design capacity and standards for acceptable air quality.

39 (11) “district officials” means those in authority who have responsibility for the safety,  
40 welfare, and orderly conduct of the District and campus community, or who have had such  
41 authority and responsibility delegated to them, including trustees, officers, faculty and  
42 administrative staff.

43 (12) “certified third-party ventilation contractors” means licensed and certified  
44 professionals and companies such as mechanical engineer, aerosol engineer, HVAC contractors  
45 and air testing and balancing firms, that can perform the analysis, testing, design, construction,  
46 control programming, balancing, commissioning, maintenance and operation of services required  
47 to make the adjustments and achieve the performance included in these recommendations.

48 (13) “ACH” means Air changes per hour (ACH): The total volume of air that flows  
49 through a room in 1 h (cubic meters per hour) divided by the room volume in cubic meters.  $A =$   
50  $Q/V$ , where A is air changes per hour, Q is the air volume that flows through the room in 1 h, and  
51 V is the volume of the room.

52 (14) “aerosol engineer” means a person specialized in the study of aerosols.

53 (15) “aerosols” mean solid particles or liquid droplets dispersed in a gas phase, with sizes  
54 spanning from clusters of molecules (nanometers) to rain droplets (millimeters).

55 (16) “PM2.5” means fine inhalable particles, with diameters that are generally 2.5  
56 micrometers and smaller.

57 (17) “accessible database” means a database accessible via a public website that contains  
58 the real time and historical data produced by CO2 monitoring systems and the status of any  
59 engineering upgrades or mitigations.

60 (18) “HVAC contractors” means a certified professional or company who services and  
61 repairs ventilation systems.

62 (19) “air testing and balancing firms” means a certified professional or company who  
63 identify operating problems in HVAC systems and recommend appropriate procedures to correct  
64 them to ensure optimum performance of all systems and sub-systems in accordance with design  
65 intent

66 SECTION 2. Relative to data collected via each CO2 monitor contained within any given  
67 school facility throughout the commonwealth. Real time and historical data and all engineering  
68 and balancing reports produced by and collected from CO2 monitors is to be made available to  
69 parents, guardians, third-party ventilation contractors, state officials, and constituent groups or  
70 organizations via an accessible database. Data obtained via CO2 monitors will be used to assess  
71 the safety of air quality and ventilation adequacy within each school facility Standards for  
72 acceptable air quality are defined herein:

73 1) CO2 Levels in each classroom and multipurpose space are continuously measured at  
74 or below 600 ppm and PM2.5 at or below 12 µg/m3 while the building is occupied.

75 2) Ventilation systems will maintain an average of 12 ACH while the building is  
76 occupied.

77 3) Far-UV installed in pre-existing ventilation systems; OR Upper-UV installed in each  
78 classroom or multipurpose space at a distance of at least 8 feet above the ground.

79 4) MERV13 filters will be installed and maintained in each existing HVAC system  
80 reliant on interchangeable filters.

81 5) Portable HEPA filters deemed appropriate for room size and occupancy by a certified  
82 third-party ventilation contractor placed in each classroom in the “ON” position at all times  
83 during regular school hours.

84 6) HVAC/Ventilation systems run continuously while the building is occupied and are to  
85 remain in the “ON” position rather than “AUTO.”

86 SECTION 3. Relative to the adequate filtration of air within school facilities. The  
87 commonwealth shall provide:

88 (a) portable HEPA air filters to be placed in each K-12 classroom, health office, library,  
89 cafeteria, multipurpose area. Portable HEPA air filters serve the purpose of physically removing  
90 small particulate matter and allergens.

91 (b) Far-UV disinfection systems for classrooms, cafeterias, auditoriums, hallways, health  
92 offices, and all multipurpose spaces. Far-UV systems work to decrease the proliferation of mold  
93 spores, mildew, bacteria and respiratory pathogens that lead to common upper respiratory tract

94 infections, resulting in potential increased absenteeism amongst school aged children and school  
95 facility employees.

96 (c) MERV13 filters for all existing HVAC systems within school buildings.

97 SECTION 4. Relative to minimum requirements for ventilation in indoor spaces. School  
98 districts across the commonwealth are required to maintain two properly functioning windows  
99 per classroom. Classrooms located within interior areas of a school facility that do not possess  
100 two functioning windows are required to install a mechanical ventilation unit in order to meet  
101 minimum air quality and ventilation requirements.

102 School districts throughout the commonwealth will be required to undergo a ventilation  
103 verification assessment. A ventilation verification assessment will provide a review of current  
104 systems, and/or recommendations for mechanical ventilation implementation as needed on a case  
105 by case basis including incidents in which Standards for Acceptable Air Quality are not met.  
106 Data collected during the ventilation verification assessment shall be made available to impacted  
107 families, students, school personnel, and district officials.