Timothy Dwight Elementary School

1600 Redding Road, Fairfield CT

Presentation of Findings & Recommendations to Date

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June 6, 2025

Background

Asked to evaluate concerns regarding indoor air quality at Timothy Dwight Elementary School



- Indoor air quality
  - Exposures?
  - Ventilation?
  - Fresh air?
- Potential health effects
  - Is the school safe for me, my child?
- Recommendations to improve indoor environment

Indoor Air Exposures - Conditions

1) Sources of exposure
2) Ventilation
3) Populations impacted – differences in susceptibility
    - Students – children can be more vulnerable
    - Teachers – typically longer duration in school, same classroom
    - Underlying health conditions

Pre-emptive strike Envir Inspections

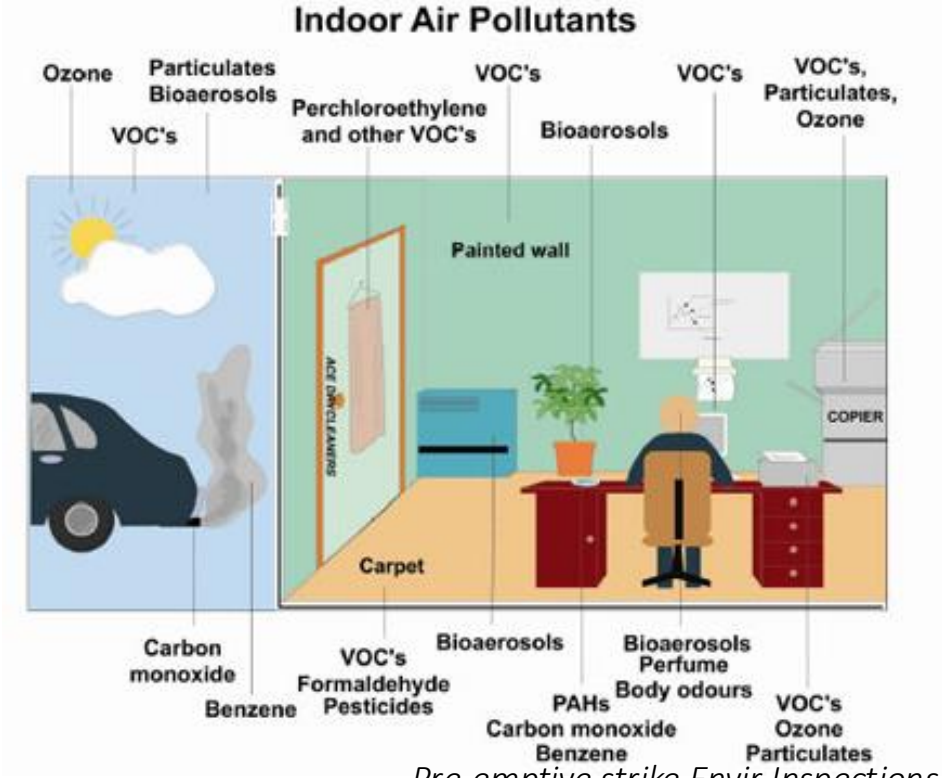
Indoor Air Exposures - numerous

Outdoor
- PM, ozone, NO2, VOCs, fungi, allergens

Indoor sources
- Furniture, building materials
- People - personal care products
- Cleaning products
- Carpeting
- School supplies
- Allergens (dust mites, pets, mice)

Temperature – Humidity

Home vs School Indoor Environment



Pre-emptive strike Envir Inspections

Impact of Indoor Exposures / Environmental Conditions

1) Health

Upper airway – eyes – respiratory track

- Allergies, rhinitis, sinusitis, eye irritation
- Asthma

Headaches

Skin - rashes, eczema

NOT cancer, autoimmune disease, cardiac or GI disease

2) School / work performance – sick days, concentration, test scores

YOEMP Approach

- Site visits March 5th and 10th, 2025
  - Met subset of staff, parents on March 5th
- Reviewed available past reports on the school
- Online anonymous survey for staff and parents to assess concerns regarding the school environment, possible health effects
- Presentation to involved parties (parents, teachers, staff, administration)
- Report of findings and recommendations (in progress)

YOEMP Approach

Reviewed available test reports:

- December 2024 comprehensive IAQ survey
- November 2024 limited IAQ assessment – Room 18
- November 2022 radon testing
- Spring 2022 building-wide HVAC systems evaluation and recommissioning
- 2018 asbestos testing and limited IAQ testing

IEQ Monitoring

- Despite widespread concerns, few regulatory standards or guidelines for quantitative measurements
  - Building code and ASHRAE for ventilation
  - Carbon dioxide (C02) widely used to assess excessive occupancy or insufficient fresh air
  - Temperature and humidity - guidelines
  - Airborne mold – no standards, relative comparisons,
  - Particulate matter – compare to EPA outdoor ambient air stds
  - **US EPA, CDC, & CT DPH do NOT recommend air monitoring as first step!**

CT DPH Guidance on IAQ

The Results of Indoor Air Testing Rarely Provide the Information Needed to Solve the Problem

Although indoor air testing might seem to be the logical response to health complaints, the results rarely provide information about possible causes or what is needed to solve the problem. In some cases, indoor air results can be misleading.

- While certain basic measurements such as temperature, relative humidity, and carbon dioxide (CO2) can provide a useful snapshot of current building conditions, sampling for specific chemicals or mold is usually not required to solve the indoor air problem and can be misleading because test results will almost always find detectable levels (background levels) that may or may not be related to the health complaint.
- Background Exposures — Most indoor pollutants (mold, particles, volatile chemicals) are present in all buildings at "background" levels. These contaminants are present in most buildings without causing adverse health effects. Testing indoor air will likely find chemicals or mold at levels typically found in most buildings that have no significance with respect to reported health complaints.

Therefore, TESTING IS NOT RECOMMENDED:

- **if the results cannot be interpreted using health-based standards**
- **if the results will add no meaningful information**
- **just because someone wants it done**

December 2024 Testing

- TRC Environmental
- Full building walk-through and measurements for:
  - Temp and % rel humidity
  - Carbon dioxide and carbon monoxide
  - PM10
  - Moisture levels in surfacing materials
  - Plus qualitative (odors, stains, visible mold growth)

December 2024 Testing, con't.

- No odors, staining, or visible mold growth
- Normal parameters with exception of low % RH due to winter

  (but sampling was performed after schools hours !)
- Confirmed split system coil / blower unit removed from Room 18 (room of prior concern and testing in November 2024)
- Recommendations:
  - Periodic cleaning/HEPA vacuuming of HVAC diffusers and split system filters
  - Preventive maintenance on HVAC equipment
  - Consider increasing %RH in dry winter

November 2024 Testing (room 18, 19, hallway)

- TRC Environmental
- Limited assessment of Room 18 due to concerns (Room 19, hallway, and outdoors for comparison)
  - "Normal" results, slight musty odor in Room 18 and 19, with bioaerosols higher in other spaces and outdoors than Room 18
- Recommendations:
  - Repair sink leak and clean / disinfect and repaint stained area
  - Replace stained ceiling tiles in Room 18 restroom
  - Clean/maintain diffusers and wall mounted split system filter

Other Testing (Radon, Asbestos)

- Building-wide **radon** testing (Fuss & O'Neill) 2018:
  - Prior low levels
  - Randomly placed in subset of rooms
  - All samples ≤ 0.2 pCi/L (EPA limit 4.0 pCi/L)
  - No further actions needed
- 2018 **asbestos** sampling before repairs in Room 10
  - whiteboard glue daubs + 2% chrysotile
  - burlap and wallboards not detected
  - Appropriate actions taken

October 2018 Testing

- Prompted by damp wet conditions in certain classrooms
- Limited IAQ assessments in Rooms 10, 15, 17, roof, and ceiling plenums and use of boroscope to examine interior wall cavities in rooms 8, 10, 15, and 17
- Identified fungi on some surfaces and behind walls
- Air sampling – indoor mold levels < outdoor levels
- Led to disinfection and repainting of impacted surfaces in Rm 17
- Mold air testing found mostly higher values outdoors than indoors

2022 HVAC study

- Spring 2022 building-wide HVAC engineering study and recommissioning (Van Zelm Engineers)
- Repairs needed to some equipment
- Existing systems do not provide fresh outdoor air or means to filter air

Building Survey Findings

- Visited all indoor rooms and support spaces, perimeter of building, and accessed roof
- 50+ year old structure
- “City” water
- On-site septic for sanitary
- Design and construction common to that time period:
  - Single story, flat roof, concrete block and brick exterior, metal framed exterior windows and doors
  - Ceiling tiles, mostly painted block walls, and tile floors (VAT 9”x9”, replaced in part with 12”x12” VCT)

Building Survey Findings, con't.

- Heating and cooling:
  - Perimeter radiator heat
  - Original "Dedicated Outdoor Air System" with make-up air through windows and infiltration
  - Portable multifunction air purifiers widely deployed
  - Cooling systems:
    - Only handful of rooms with ducted AC
    - Approx ½ of classrooms retrofitted with "split" system ACs

Building Survey Findings, con't.

- Observations at time of our visit:
  - Despite age, found in well-maintained condition
  - No stained ceiling tiles, stained or blistering wall paint
  - No damaged floor tiles
  - Absence of odors (but noticed on day of presentation)
  - Exterior walls and foundations in generally good condition, but some rusting on exterior classroom doors and thresholds
  - Newer roof, penetrations well flashed, and absence of standing water

Survey / Questionnaire

Table 1: Survey Respondents (n = 56)	
Role	n (%)
Parents of students	44 (79%)
Teachers/Staff	12 (21%)
Teachers	8 (67%)
School Administrators or staff	4 (33%)
Student Educational Levels (n = 57)	
Kindergarten	11 (19%)
Grade 1	11 (19%)
Grade 2	10 (18%)
Grade 3	14 (25%)
Grade 4	4 (7%)
Grade 5	7 (12%)
Hours Worked by Teachers/Staff (n = 12)	
Part time	2 (17%)
Full-time	10 (83%)
Length of Employment by Teachers/Staff (n = 12)	
< 1 year	1 (8%)
5 years – 10 years	5 (42%)
> 10 years	6 (50%)

Survey / Questionnaire

Table 2a. Environmental Conditions Reported at TD Elementary School (n = 56)	
Too Hot / Humid	50 (89%)
Insufficient Ventilation, Stale Air	42 (75%)
Strong Odor	34 (61%)
Mold, Mildew	28 (50%)
Too Cold	21 (38%)
Rodent, Pest, Animal Problems	12 (21%)
Other Complaints or Observations (from write in comments)	13 (23%)
Sewage Problem/Smell	5 (9%)
Perceived Allergen or Irritant	3 (5%)
Poor Building Conditions	1 (2%)
Dampness	3 (5%)

Survey / Questionnaire

Table 3. Health Conditions Reported by Parents and Teachers/Staff		
Health Condition	**Students** (n = 57)	**Teachers/Staff** (n = 12)
Recurrent Resp Infections	12 (21%)	4 (33%)
Environmental Allergies	30 (53%)	6 (50%)
Recurrent Rhinitis/Sinusitis	9 (16%)	3 (25%)
Eczema, Skin Condition	11 (19%)	0
Heart Disease	0	1 (8%)
Asthma	10 (18%)	4 (33%)
Other Chronic/Persistent Conditions	8 (14%)	2 (17%)
Migraines	3 (5%)	1 (8%)
Respiratory problem (chronic cough)	2 (4%)	0
Nose bleeds	2 (4%)	0
Celiac disease /Unspecified	2 (4%)	0
Autoimmune disease	0	1 (8%)

Most reported symptoms / condition worse at school, improved away from school

Survey / Questionnaire

Table 5. School Locations of Concern for Poor Environmental Conditions (n = 56)	
All-Purpose Room	17 (30.4%)
Gymnasium	12 (21.4%)
Media Center	13 (23.2%)
Music Room	11 (19.6%)
Reading Room (Speech & Language)	7 (12.5%)
Waiting Room (Main Office, Principal's Office, Health Room)	10 (17.9%)
Room 1	7 (12.5%)
Room 2 (Art Room)	6 (10.7%)
Room 3	9 (16.1%)
Room 4	10 (17.9%)
Rooms 5, 6	8 (14.3%)
Rooms 7, 8	7 (12.5%)
Rooms 9, 10	8 (14.3%)
Rooms 11, 12, 13, 21	6 (10.7%)
Rooms 14, 15, 16,17	9 (16.1%)
Room 18	11 (19.6%)
Room 19	10 (17.9%)
Room 20	7 (12.5%)

Survey: Selected Comments

Table 6: Selected Survey Write-In Comments (n= 25)	
Survey Theme	**Selected Comments**
Poor ventilation and air quality	*"Lack of air conditioning and ventilation - increased irritability, exhaustion, influences ability to comprehend curriculum and focus..."* *"The classrooms get very hot and stuffy and impedes proper learning."*
Extreme indoor temperatures	*"My child says they cannot focus on hot days as they feel like they are melting."* *"Temps reached 90 degrees in September and June. They cannot learn when overheating."* *"Our daughter is incredibly hot in the warm months and cold in the winter. There is absolutely no fresh air or ventilation in the classrooms."*
Plumbing, septic, and odor problems	*"We all notice smells in the school....."* *"Septic is a concern."* *"The septic tank is always overflowing and the odor from the leeching field by the tennis courts can be smelled inside the building, the toilets frequently back up."* *"Odors from septic system outside can be smelled in the main office ....."*
Health impacts on school staff and students	*".... kids are getting sick and being transferred out, and teachers are calling out sick frequently."*
Perceived lack of action and transparency	*"Despite all the tests, stagnant air persists..."* *"We need to acknowledge that there is a problem in order to deal with it..."*
Excessive moisture	*"In certain weather conditions, hallway floors/walls become wet and slippery so much so that adults and children have fallen."* *"In the warmer months, the hallways are visibly slippery due to condensation..."* *"Moisture on floors a concern."*

Preliminary Conclusions

- Overall well-maintained, older school building
- But limited fresh air/ ventilation – which can impact indoor exposures
- Need for more cooling / AC
- Potential specific sources of exposure
  - Septic system
  - Dampness/mold in the past
- Reported health concerns were the types of problems consistent with IAQ issues

Preliminary Recommendations

- Expand cooling throughout building – already recognized but reportedly on-hold due to lack of electrical power capacity
- Ensure longer-term plans include modern air handling units
- Address reports of regular “sewage odors”
- Longer-duration monitoring of temp, %humidity, and CO2
- Regularly inspect and HEPA vacuum all HVAC diffusers
- Ensure rugs in classrooms similarly HEPA vacuumed

Preliminary Recommendations, con't.

- Discontinue use of evaporative ("swamp") cooler in Faculty Rm
- Disable ionizing feature on air purifiers (if not already done)
- Inspect exterior doors, frames, and thresholds for rust / other signs of weather intrusion. Upgrade as needed.
- In Classroom 14, reposition AC condensate drain to increase flow

Questions or Comments?

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