# Twitter Thread by Joseph Allen

**Joseph Allen**
@j_g_allen

### The GOOD: CDC supports improving ventilation in schools

### The BAD: it's buried in their new guidance

### The SOLUTION: let's unbury it and make sure every school knows about

Item #1 in the report (yes, #1), lists 5 key "Mitigation strategies to reduce transmission in schools"

It doesn't say 'ventilation', but it does say 'cleaning and healthy facilities'. I use 'healthy buildings' for header when talking ventilation, so this looks promising...

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1. Mitigation strategies to reduce transmission of SARS-CoV-2 in schools

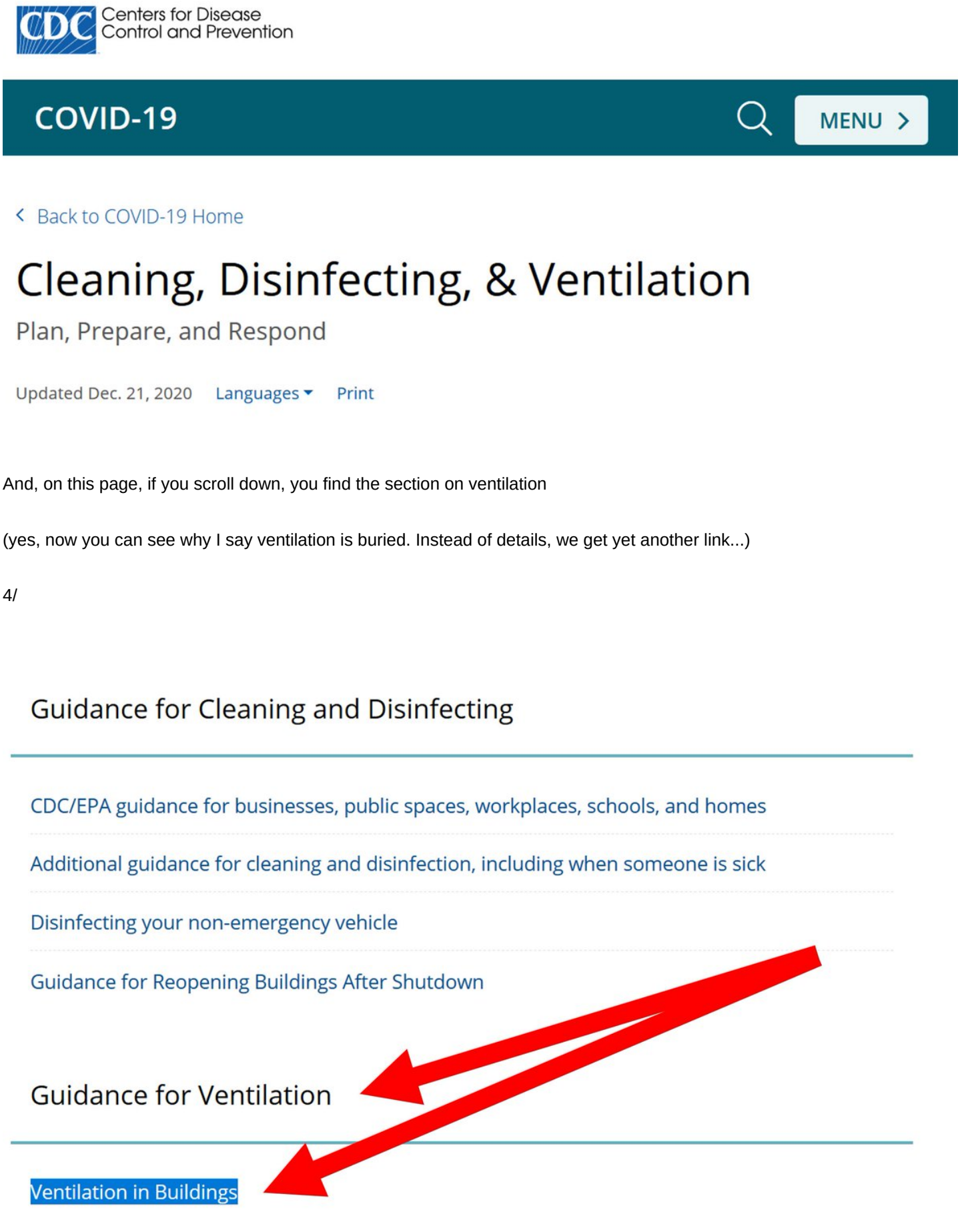
Regardless of the level of community transmission, **it is critical that schools use and layer mitigation strategies**. Five key mitigation strategies are essential to safe delivery of in-person instruction and help to mitigate COVID-19 transmission in schools:

- Universal and correct use of masks
- Physical distancing
- Handwashing and respiratory etiquette
- Cleaning and maintaining healthy facilities
- Contact tracing in combination with isolation and quarantine, in collaboration with the health department

Sure enough, if we click that 'cleaning' hyperlink, it takes us to this CDC page with the title that *does* say ventilation

https://t.co/YlKvTCRslQ

3/




And, on this page, if you scroll down, you find the section on ventilation

(yes, now you can see why I say ventilation is buried. Instead of details, we get yet another link...)

4/

Alright, when we finally click 'ventilation in buildings', we get to this page which actually has the detailed info on ventilation and filtration (side note: this took ~10 months for CDC to produce this page, even though we knew this last winter...)

https://t.co/DTZSadFd29

5/n


And here's the good news - this page is actually full of good information on ventilation, filtration, portable air filtration, demand control ventilation, de-densification...

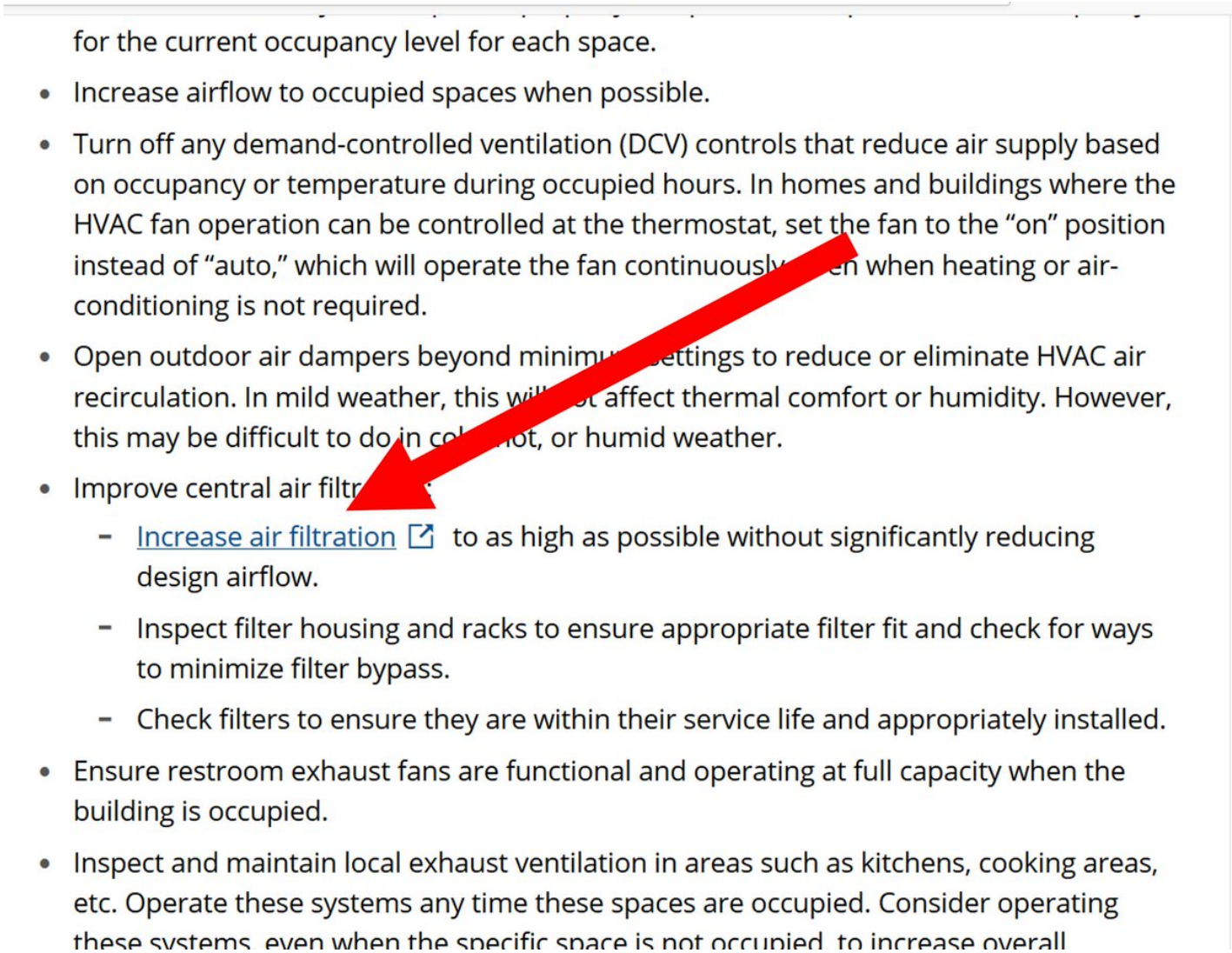
6/n

https://t.co/DTZSadFd29

There is yet another link, but this one I have no issues with.

The topic of ventilation gets simplified (I try to keep it simple too so as not to lose people). But, like all things, the details get technical. CDC does right thing here and links to org that focuses on this

7/n


for the current occupancy level for each space.

- Increase airflow to occupied spaces when possible.
- Turn off any demand-controlled ventilation (DCV) controls that reduce air supply based on occupancy or temperature during occupied hours. In homes and buildings where the HVAC fan operation can be controlled at the thermostat, set the fan to the “on” position instead of “auto,” which will operate the fan continuously even when heating or air-conditioning is not required.
- Open outdoor air dampers beyond minimum settings to reduce or eliminate HVAC air recirculation. In mild weather, this will not affect thermal comfort or humidity. However, this may be difficult to do in cold, hot, or humid weather.
- Improve central air filtration:
  - Increase air filtration to as high as possible without significantly reducing design airflow.
  - Inspect filter housing and racks to ensure appropriate filter fit and check for ways to minimize filter bypass.
  - Check filters to ensure they are within their service life and appropriately installed.
- Ensure restroom exhaust fans are functional and operating at full capacity when the building is occupied.
- Inspect and maintain local exhaust ventilation in areas such as kitchens, cooking areas, etc. Operate these systems any time these spaces are occupied. Consider operating these systems, even when the specific space is not occupied, to increase overall

They link to ASHRAE - the group that focuses on ventilation. They go much deeper.

(if you work in schools, this is the doc that you'd hand-off to your facilities team - they'll 'get' this language and what's in it)

8/n

https://t.co/SA3Vwb2vte

Alright, back to the new CDC guidance document again.

Later in the doc, they do actually mention 'ventilation' by name, this time in the expanded "cleaning and healthy facilities" section.

It's at the bottom, buried, but it's there...

9/n

## Cleaning and maintaining healthy facilities

**Core principle for cleaning and maintaining healthy facilities: Routinely and consistently clean high-touch surfaces (such as doorknobs and light switches). Make changes to physical spaces to maintain a healthy environment and facilities.**

- **Cleaning:** Regularly clean frequently touched surfaces (e.g., playground equipment, door handles, sink handles, toilets, drinking fountains) within the school and on school buses at least daily or between use as much as possible.
- **Modified layouts: adjust physical layouts in classrooms and other settings to maximize physical space, such as by turning desks to face in the same direction.**
- **Physical barriers and guides: Install physical barriers and provide guides such as tape on floors and arrows to promote physical distancing and minimize crowding.**
- **Shared objects:** Discourage sharing items, particularly those that are difficult to clean.
- **Water systems:** Take steps to ensure that all water systems and features (e.g., sink faucets, decorative fountains) are safe to use after a prolonged facility shutdown.
- **Communal spaces:** Close communal use of shared spaces, such as dining halls, if possible; otherwise, stagger use and clean between use. Consider use of larger spaces such as dining halls for academic instruction, to maximize physical distancing.
- **Food service:** Avoid offering any self-serve food or drink options such as hot and cold food bars, salad or condiment bars, and drink stations.
- **Ventilation:** Improve ventilation to the extent possible such as by opening windows and doors to increase circulation of outdoor air to increase the delivery of clean air and dilute potential contaminants. Opening windows and doors should be consistent with school safety protocols and safety plans. Do not open windows and doors if doing so poses a safety risk or a health risk (e.g., risk of falling, triggering asthma symptoms) to anyone using the facility. Opening

They don't give many details beyond 'open windows', and no mention of filtration, which is a big miss.

Again, though, CDC uses a link for more details. The 'ventilation' link here goes directly to page I just mentioned that has lots of good info

10/n

https://t.co/DTZSadFd29

Yes, ventilation/filtration needed to be more prominent with more details on the schools page. But, to be fair, they use links for all other topics, too.

Look at the 'water' recommendation - super thin, like ventilation - and addressed through linking to more info

11/n

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To be clear, I want to see ventilation more prominent. As I told @apoorva_nyc, "CDC gives lip service to ventilation in its report, and you have to search to find it."

Schools needed this info directly and upfront, not buried several links deep.

12/n

https://t.co/WPhW8eyYZG

CDC should have done what we did - make an entire section of schools guidance focused specifically on ventilation.

I think our section on "Healthy Buildings" is still the best guidance out there on this topic (if it wasn't, I'd pull it down)

13/n

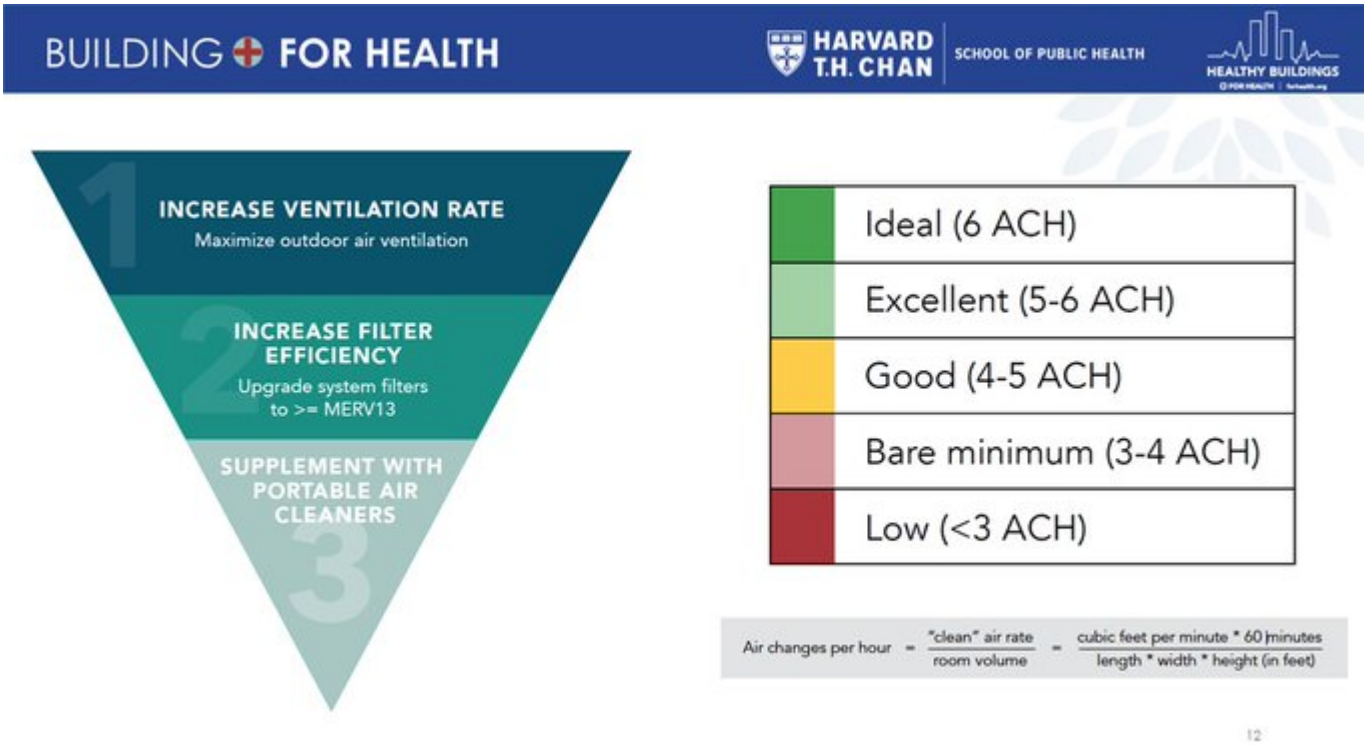
https://t.co/obCEIdxC9L

There's an important topic I wish CDC addressed (and, frankly, where ASHRAE and others have come up very short, too).

Saying 'more ventilation', as these groups do, is not actionable unless you give a target

--> We recommend 4-6 air changes per hour for classrooms

14/n




These 4-6 air changers per hour can be achieved through any combination of ventilation+filtration. We recommend this prioritization:

1: increased outdoor air
2: better filters on recirc air (MERV13)
3: portable air cleaners w/ HEPA

15/n

I also had hoped CDC would go deeper into the recommending portable air cleaners. On the good 'ventilation for buildings' page, the do mention air cleaners, but it doesn't show up directly on the schools page, as it should.

16/n

- Improve central air filtration:
  - Increase air filtration to as high as possible without significantly reducing design airflow.
  - Inspect filter housing and racks to ensure appropriate filter fit and check for ways to minimize filter bypass.
  - Check filters to ensure they are within their service life and appropriately installed.
- Ensure restroom exhaust fans are functional and operating at full capacity when the building is occupied.
- Inspect and maintain local exhaust ventilation in areas such as kitchens, cooking areas, etc. Operate these systems any time these spaces are occupied. Consider operating these systems, even when the specific space is not occupied, to increase overall ventilation within the occupied building.
- Consider portable high-efficiency particulate air (HEPA) fan/filtration systems to help enhance air cleaning (especially in higher risk areas such as a nurse's office or areas frequently inhabited by persons with higher likelihood of COVID-19 and/or increased risk of getting COVID-19).
- Generate clean-to-less-clean air movement by re-evaluating the positioning of supply and exhaust air diffusers and/or dampers (especially in higher risk areas).
- Consider using ultraviolet germicidal irradiation (UVGI) as a supplement to help inactivate SARS-CoV-2, especially if options for increasing room ventilation are limited. Upper-room UVGI systems can be used to provide air cleaning within occupied spaces, and in-duct UVGI systems can help enhance air cleaning inside central ventilation systems.

To help figure out what size air cleaner to buy, use this tool we built w/ @ShellyMBoulder

--> Enter the size of your classroom
--> Enter the device's clean air delivery rate

The tool then tells you how many air changes per hour you are getting

17/n

https://t.co/oJ530G4Mfc

If you want more on 'clean air delivery rate', check out this great post by @CorsIAQ.

18/n

https://t.co/I0rhmNPWZC

> 1/ Clean Air Delivery Rate (CADR). The CADR of a portable filtration system is:
>
> CADR = f x Q.
>
> f is the fractional removal efficiency of particles that pass through a device (value = 0 to 1). Q is the volumetric flow rate of air through the device (e.g., m3/hr, ft3/min). ...
>
> — Dr. Richard Corsi (@CorsIAQ) February 6, 2021

So, in summary, the new CDC guidance on schools comes up short on details on ventilation/filtration.

But, it is there, if you follow the links.

My fear is that many won't, and that means that CDC failed in that regard.

19/n

.@jenkinshelen and I covered the ventilation shortcoming w/ in a recent op-ed on the new CDC guidance.

But...ventilation wasn't the major issue in this report.

The community spread metrics they chose, and the targets, are deeply flawed

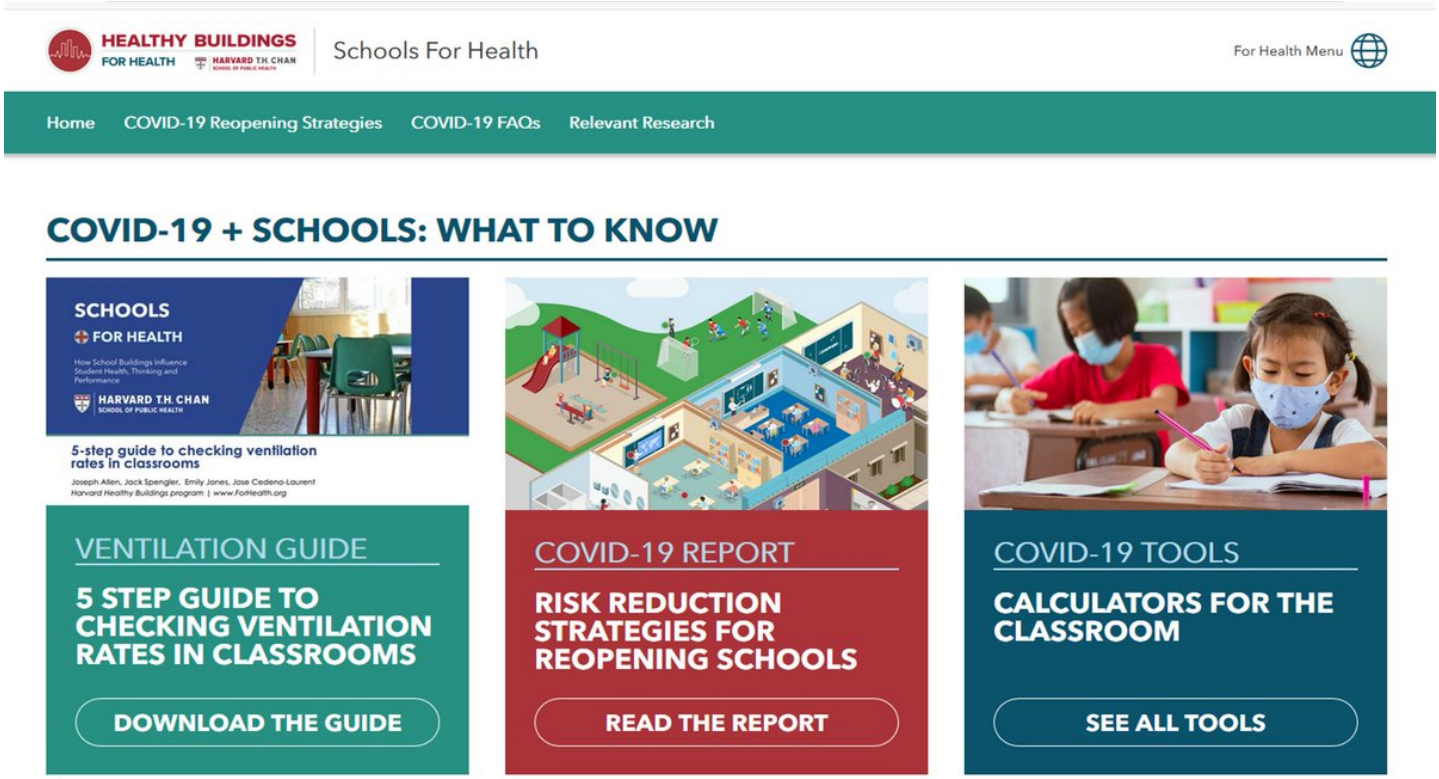
20/n

https://t.co/r1K1ZPMihZ

Sticking to #HealthyBuildings and ventilation+filtration and what schools can do to improve the situation quickly, all of this has been written about extensively.

My team at Harvard has many resources for you: https://t.co/kzObWYPzqc

21/n




And I have many terrific colleagues who put out detailed information on all of these topics. If not already, follow: @CorsIAQ @linseymarr @ShellyMBoulder @jljcolorado @HuffmanLabDU @stephensbrent @IAQinGWN @WaringIAQ @kprather88 @CathNoakes @marwa_zaatari @Don_Milton + many

22/n

To close the thread...

The tools exist. They have for awhile. CDC now has them on their site, they're just buried.

Help us to continue to unbury them.

**Shared air is the problem, not shared surfaces**

--END--

https://t.co/OThTqtiSYg

> I'm not on Team 'Open Schools'
>
> I'm not on Team 'Close Schools'
>
> I'm on Team 'GET YOUR SHIT TOGETHER AND PUT IN THE CONTROLS WE HAVE BEEN OUTLINING SINCE JUNE'https://t.co/hIbaMtMxiZ pic.twitter.com/C0IsYXVEdV
>
> — Joseph Allen (@j_g_allen) January 4, 2021