St. Joseph
SCHOOL WILMETTE

WE ARE called

A FOCUS ON INDOOR AIR QUALITY
The Schools of Saints JFX

HOW IS COVID TRANSMITTED, AND WHAT CAN BE DONE TO REDUCE RISK IN A SCHOOL ENVIRONMENT?

There are three main routes to SARS-COV-2/COVID19 exposure: fomites, droplets and aerosols.[1]

FOMITE transmission occurs when viruses that remain on surfaces cause infections. While it has been demonstrated that fomites are not the principle form of COVID transmission, it is still important to wash your hands because droplets can land on surfaces and leave some viable SARS-CoV-2 behind.

DROPLETS are the larger size particles resulting from a cough or a sneeze. These larger particles tend to fall to the floor within a radius of six feet or less. **It is critical that people wear masks, but particularly when they are in close proximity, especially within six feet of distance from others.**

AEROSOLS are smaller micro-droplet particles that are so small that they remain suspended in the air. Aerosols of varying size are expelled by ordinary breathing, and linger in the air for a time that is partially determined by the room's air exchange rate. Because of their small size, they "ride" on air currents. This has led to aggressive communication around the importance of masks.

WHAT CAN WE DO TO PROTECT TEACHERS AND STUDENTS IN OUR CLASSROOMS?

Our exposure to aerosols containing SARS-COV-2 is a function of aerosol concentration and time. In a classroom, we can't often control the time we are present, but we can control the concentration of the aerosol. **If we reduce the concentration of relevant aerosols in the room, we reduce our exposure to the virus, and we reduce the associated risk of contracting COVID19.**

The American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) has issued the following guidelines that mitigate risk. Non-healthcare buildings should have a plan for an emergency response, and the following modifications to building HVAC system operation should be considered:

1—Increase outdoor air ventilation (disable demand-controlled ventilation and open outdoor air dampers to 100% as indoor and outdoor conditions permit).

2—Improve central air and other HVAC filtration to MERV-13 (ASHRAE 2017b) or the highest level achievable.

3—Keep systems running longer hours (24/7, if possible).

4—Add portable room air cleaners with HEPA or high-MERV filters with due consideration to the clean air delivery rate (AHAM 2015).

5—Add duct- or air-handling-unit-mounted, upper room, and/or portable UVGI

devices in connection to in-room fans in high-density spaces such as waiting rooms, prisons, and shelters.

6—Maintain temperature and humidity as applicable to the infectious aerosol of concern.

7—Bypass energy recovery ventilation systems that leak potentially contaminated exhaust air back into the outdoor air supply.[2]

While the final item on the list does not apply to our environment at Saints JFX, we have addressed each of the areas in 1-6. **Our community has made in excess of a $100,000 investment in HEPA and UVGI air filtration devices in preparation for reopening this fall.** HEPA filters are effective at removing infectious particles from the air and were in limited use in our facilities in the past. We have expanded the use of **HEPA filters**, with an emphasis on bathroom and hallway deployment, and added **UVGI light filters** in all classrooms and key common areas (such as the nurses station, faculty lounge, cafeteria and break out rooms). **This significant investment has substantially enhanced the air quality in our classrooms and put us at the forefront of what schools at any level are doing at this time.**

Circulation of air is critical to ensuring that no stagnant air pockets develop within a room. Because aerosols can live for hours, and teachers and students will be spending hours in classrooms, it is also important to filter the air in addition to circulating it. The higher the number of air changes (whether through a vacuum filter, via fresh air induction or central air circulation) the better for a room. Opening the windows and/or relying on central air systems can add 1 or 2 air changes per hour. Our goal is to achieve between five and six air changes in a typical classroom environment. The addition of the UVC light filtration devices along with simple fans (and/or existing overhead fans) to improve basic circulation can aid us in reaching the necessary air change targets. **In many of our rooms, we are effectively achieving medical grade air standards with the sum total of our initiatives. While no indoor environment is perfect, we are confident that these steps make our spaces significantly safer.**

WHERE CAN I LEARN MORE ON THIS TOPIC?

We have consulted with several experts in development of our indoor air safety strategies. Contact information is shared below for families interested in reaching out to learn more.

1—John Schubert, founder and CEO of Schubert Environmental Equipment, www.replaceair.com, john@replaceair.com

A product of Catholic elementary education, John has over 40 years in industrial filtration. Designer and inventor of the ReplaceAir UVC, Ultra High Output Ultra Violet-C High Energy Virus Air Cleaner unit being implemented across both Saints JFX school campuses.

2—Charles J. Weschler, PhD. Adjunct Professor, Rutgers University EOHSI – Exposure Science and Epidemiology, weschlch@rwjms.rutgers.edu

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After completing his Ph.D. at University of Chicago, Dr. Weschler completed postdoctoral studies with Prof. Fred Basolo at Northwestern University. From 1975 to 2001, Dr. Weschler worked in a number of research capacities for Bell Laboratories. In 2001, he retired from Bellcore/Telcordia and accepted positions at the Environmental & Occupational Health Science Institute and the International Centre for Indoor Environment and Energy, Technical University of Denmark. He has continued in those positions through the present. In 2010 he joined the faculty of the Building Science department at Tsinghua University (Beijing) as an ongoing Visiting Professor. He is also an Adjunct Professor in the Rutgers School of Public Health. He is a member of a number of task forces and groups studying airborne pollutants. From 1999-2005 he served on the US EPA's Science Advisory Board. He was elected to the International Academy of Indoor Air Sciences in 1999 and received the Pettenkofer Award, its highest honor.

IN ADDITION TO THE OPPORTUNITY FOR DIRECT CONSULTATION WITH THESE EXPERTS, WE INVITE PARENTS TO REVIEW A NUMBER OF ADDITIONAL ARTICLES THAT PROVIDE HEALTH-BASED PERSPECTIVES ON THE ISSUE OF REOPENING SCHOOLS.

"*We can — and must — reopen schools. Here's how.*" Washington Post, July 27, 2020, Joseph G. Allen and Richard Corsi.

Joseph G. Allen is an assistant professor, director of the Healthy Buildings program at Harvard University's T.H. Chan School of Public Health and co-author of "Healthy Buildings: How Indoor Spaces Drive Performance and Productivity." Richard Corsi is dean at Portland State University's Maseeh College of Engineering and Computer Science.

"NOT OPEN AND SHUT, School openings across the globe suggest ways to keep the coronavirus at bay, despite outbreaks, Science Magazine, August 1, 2020." Couzin-Frankel, Vogel et al

ASHRAE Position Document on Infectious Aerosols. Approved by ASHRAE Board of Directors April 14, 2020. Expires April 14, 2023

Frequently Asked Questions about COVID19 in Classrooms, blog post, by Dustin Poppendieck, an Environmental Engineer in the Indoor Air Quality and Ventilation Group of the Energy and Environment Division (EED) of the Engineering Laboratory (EL) at the National Institute of Standards and Technology (NIST). http://poppendieck.com/IAQ/COVID19%20FAQ.html

HOW WILL WE TEACH AND LEARN SAFELY IN A CLASSROOM THIS YEAR?

As with all indoor environments, classrooms will never be completely safe from the risk of airborne SARS-COV-2 . However, we have taken numerous steps to make in person learning as safe as possible. In particular, we are committed to ensuring we **operate within low community transmission, mandate mask wearing, increase room ventilation, open windows, install MERV 13 filters in HVAC systems, install portable air cleaners, spread**

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students across two campuses, reduce hours spent in a classroom with the use of tented outdoor spaces, wash hands, and clean surfaces. One step alone is not enough. More steps are better. We must acknowledge not all steps will be possible in every case, but we are taking as many steps as we can, and in as many classrooms and common areas as possible.

CAN WE QUANTIFY HOW MUCH SAFER WE HAVE MADE OUR CLASSROOMS AND SCHOOL ENVIRONMENT WITH THE INVESTMENTS MADE TO DATE?

Quantifying the impact of the investments around a safe reopening at Saints JFX can be difficult due to all that is still unknown about COVID-19 and the many environmental variables that affect transmission risk in general.

A conditional probability model (the COVID Aerosol Transmission Estimator) developed by Professor Jose L. Jimenez, Dept. of Chem. and CIRES, Univ. of Colorado-Boulder predicts both the absolute risk of infection in a given community (i.e., how many people may now be infected, say 4% (or 0.04 of a person) AND the conditional risk of another person getting infected if there is already an infected person in the classroom.

Key conclusions of this model for our campuses are:

1—Both parties wearing masks reduces the risk or transmission by ~65%.

2—Effectively opening the windows in classrooms coupled with appropriate light fan ventilation reduces the risk of infection by ~22%.

3—Use of the selected UVC light filtration devices reduces the overall probability of infection by ~50%.

The sum total of all factors relevant to our classrooms (which include but are not limited to room size, window profile, dual mask wearing, allowance for mask non-compliance, fresh air initiatives, UVC or HEPA filtration, number of students in a given room, etc.) suggest that the conditional risk of infection is 1% to 2% with an upper error limit of 4%.

Sources:

[1]Frequently Asked Questions about COVID19 in Classrooms, blog post, by Dustin Poppendieck, an Environmental Engineer in the Indoor Air Quality and Ventilation Group of the Energy and Environment Division (EED) of the Engineering Laboratory (EL) at the National Institute of Standards and Technology (NIST).

[2]ASHRAE Position Document on Infectious Aerosols developed by the Society's Environmental Health Position Document Committee as formed on April 24, 2017, with Erica Stewart as its chair.

[3]Email of August xx, 2020 from Louise Weschler, independent researcher and author in the area of infectious disease transmission.

[4]Verywell Health, June 27, 2019, Elizabeth Boskey, PhD.

Entire FAQ and response from Frequently Asked Questions about COVID19 in Classrooms, blog post, by Dustin Poppendieck, an Environmental Engineer in the Indoor Air Quality and Ventilation Group of the Energy and Environment Division (EED) of the Engineering Laboratory (EL) at the National Institute of Standards and Technology (NIST).