

AirPure2100

Powered By



The AirPure 2100 is medical grade technology proven to eliminate > 99.9% of bacteria, spores and 100% of viruses in the air.



Education



Government Offices



Churches



Lobbies



Non-Profits



Research Facilities

Introduction

While COVID-19 has been the dominant focus of late, rhinovirus, influenza, rotavirus, and bocavirus have been concerns for facilities managers for decades. These viruses are transmitted through respiratory droplets produced when an infected person coughs or sneezes. Those droplets can land in the mouths or noses of nearby people or possibly be inhaled in the lungs. As a result, air contamination has emerged as a critical driver of on-site infection rates.

Due to the outbreak of Airborne SARS-COV-2 in late 2019, facilities across the United States and the globe have emphasized practicing infection control to mitigate the spread. The global infection control market is projected to reach US\$42.907 billion by 2026, from US\$21.384 billion in 2019, mainly due to the COVID-19 pandemic (Global Infection Control Market - Forecasts from 2021 to 2026, October 2021).

Our proprietary photolytic chamber and technology was developed in 2013 with a mission to improve outcomes and decrease infection rates in high-risk surgical procedures for the most prestigious operating rooms throughout the world.

The **Airpure2100** is a Portable Air Disinfection System that provides quiet, continuous operation that is safe to use in occupied areas, most specifically:

- Schools
- City Halls
- Fire Stations
- Police Stations
- Building Departments
- Churches
- Public Works and other Government Buildings
- Museums
- Non-profits
- And many more



This is the only device that uses our patented technology of using real-time ultraviolet irradiation to disinfect the air in critical operating room settings, classrooms, waiting areas, and staff lounges to reduce infection risk in a single pass. And, most importantly, **we can prove it...**

Our technology has been tested by three independent Third Parties, peer-reviewed by 28 independent medical researchers and doctors, and the subject of two separate case studies in hospitals across the US.

Thank you for taking the time to learn more about our groundbreaking technology. Please feel free to reach out to us at any time with questions or concerns. We look forward to working with you,

The
AirPure2100
team

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What is the problem?

Infection Control

Infection Control is the practice and procedures which can be used to minimize the risk of spreading infections and viruses, especially in hospitals and human care facilities. The diseases caused by bacteria or viruses can spread easily from human to human and via human contact with infected surfaces.

The emergence of drug-resistant bacteria, such as MRSA underscores the need to eliminate pathogens in the environment before human hosts are affected. Due to the outbreak of Airborne SARS-COV-2, facilities have emphasized practicing infection control as the virus is person to person transmissible.

Air contamination has emerged as a critical driver of on-site infection rates.

Germicidal ultraviolet radiation is an effective and accepted method for inactivating microorganisms in healthcare environments. However, its utility in removing microorganisms from the air has been limited due to engineering constraints. **Simply exposing moving volumes of air to ultraviolet radiation is ineffective because the radiation requires significant exposure time to penetrate microorganisms.** What is needed is a safe and practical ultraviolet system that can safely and effectively inactivate air microorganisms at high air volumes in a positive healthcare environment.

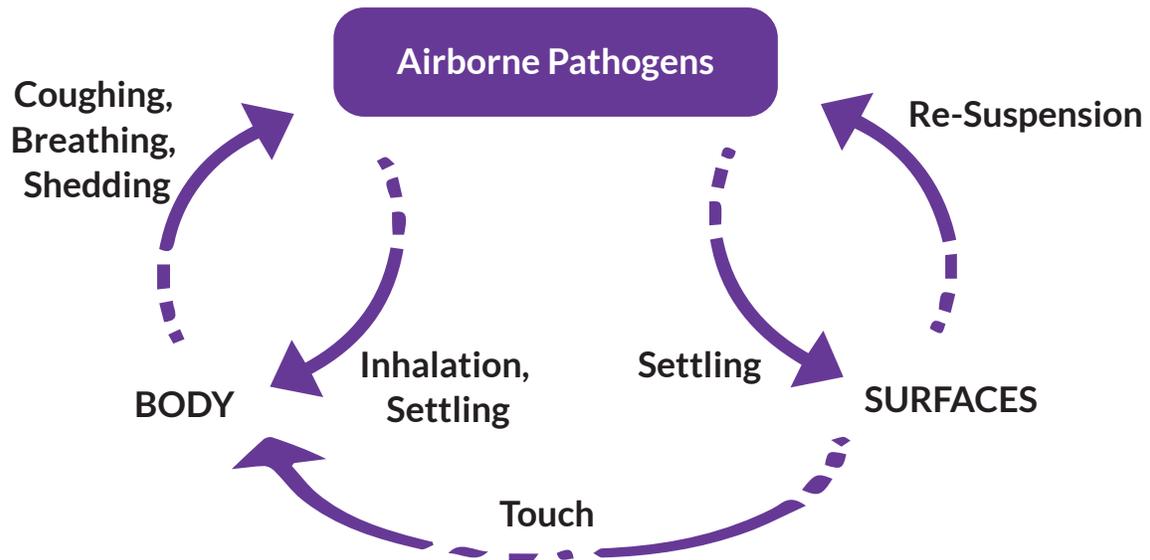
“You don’t have an air problem; you have a people problem.”

To truly understand the value and benefit of this groundbreaking technology, we must first take a step back and understand the basics of Aerobiology.

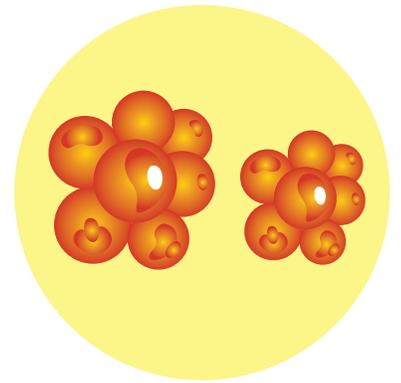
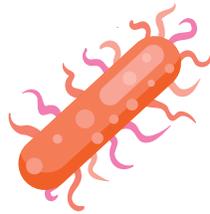
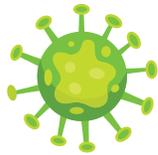
Aerobiology

Aerobiology studies airborne microorganisms, such as pollen, spores, seeds, and more - especially as infectious agents.

PATHOGENS TRAVEL FREELY BETWEEN AIR, BODY AND SURFACES



Airborne bacteria travel on micro-droplets called **bioaerosols**, which are typically 5-10 micrometers wide. An individual bacterium is about 1 micrometer wide.

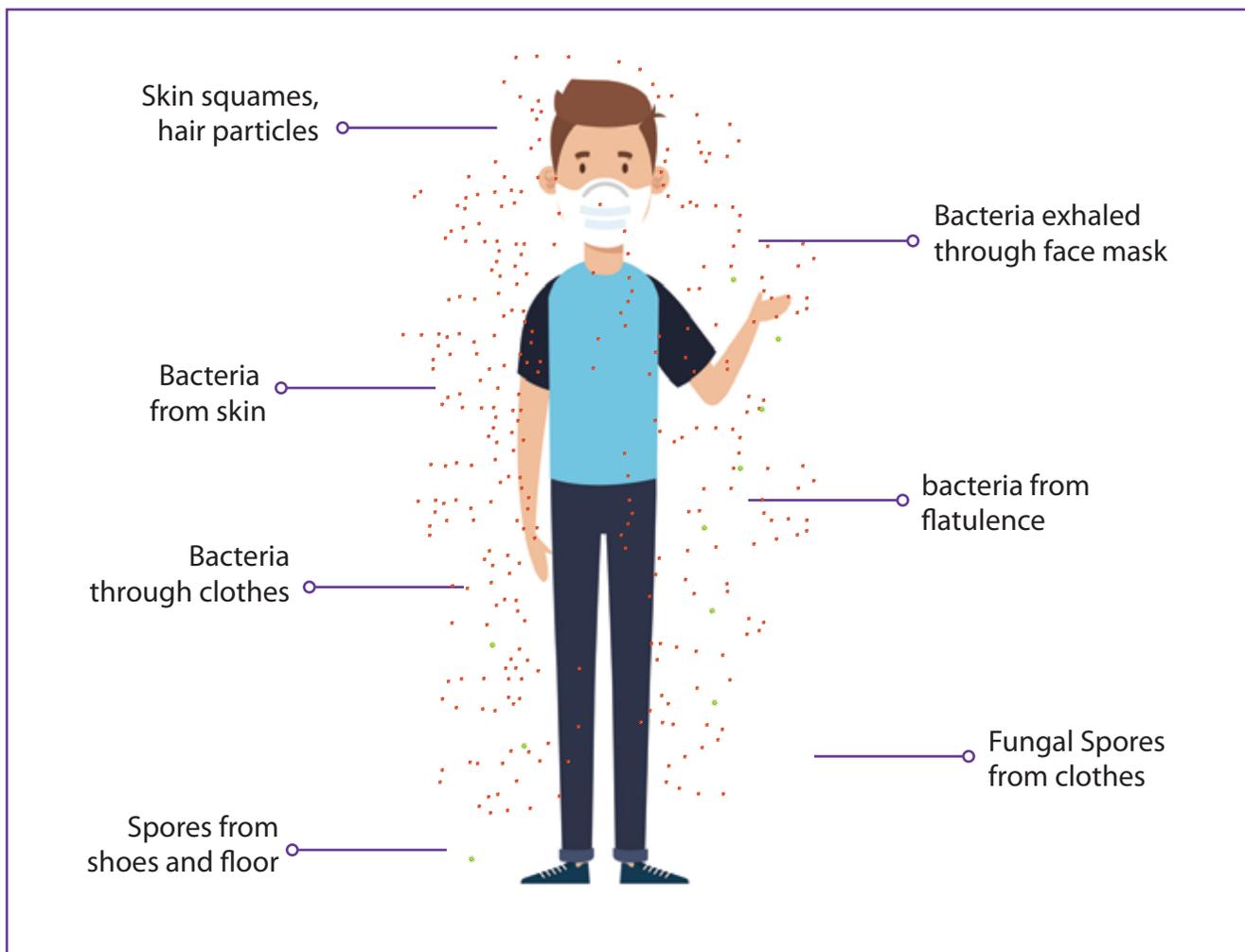


.1 μm	.3 μm	1.0 μm	10 μm
DUST	VIRUS	BACTERIUM	BIOAEROSOL

Bioaerosol

A bioaerosol is an airborne collection of biological material. Bioaerosols can be comprised of bacterial cells and cellular fragments, fungal spores and fungal hyphae, viruses, and by-products of microbial metabolism. Indoor bioaerosols are generated and dispersed by mechanical and human activity.

Talking and coughing generate bioaerosols from individuals, some of which may be infectious. Heating, ventilation, and air conditioning (HVAC) systems, water spray devices, and cleaning (e.g., sweeping, and mopping) result in the transport of microbial materials in the air.



The high cost of absenteeism

According to the Office for Civil Rights in the US Department of Education, Public school teachers in the U.S. **miss 9 or 10 days of school every year.**

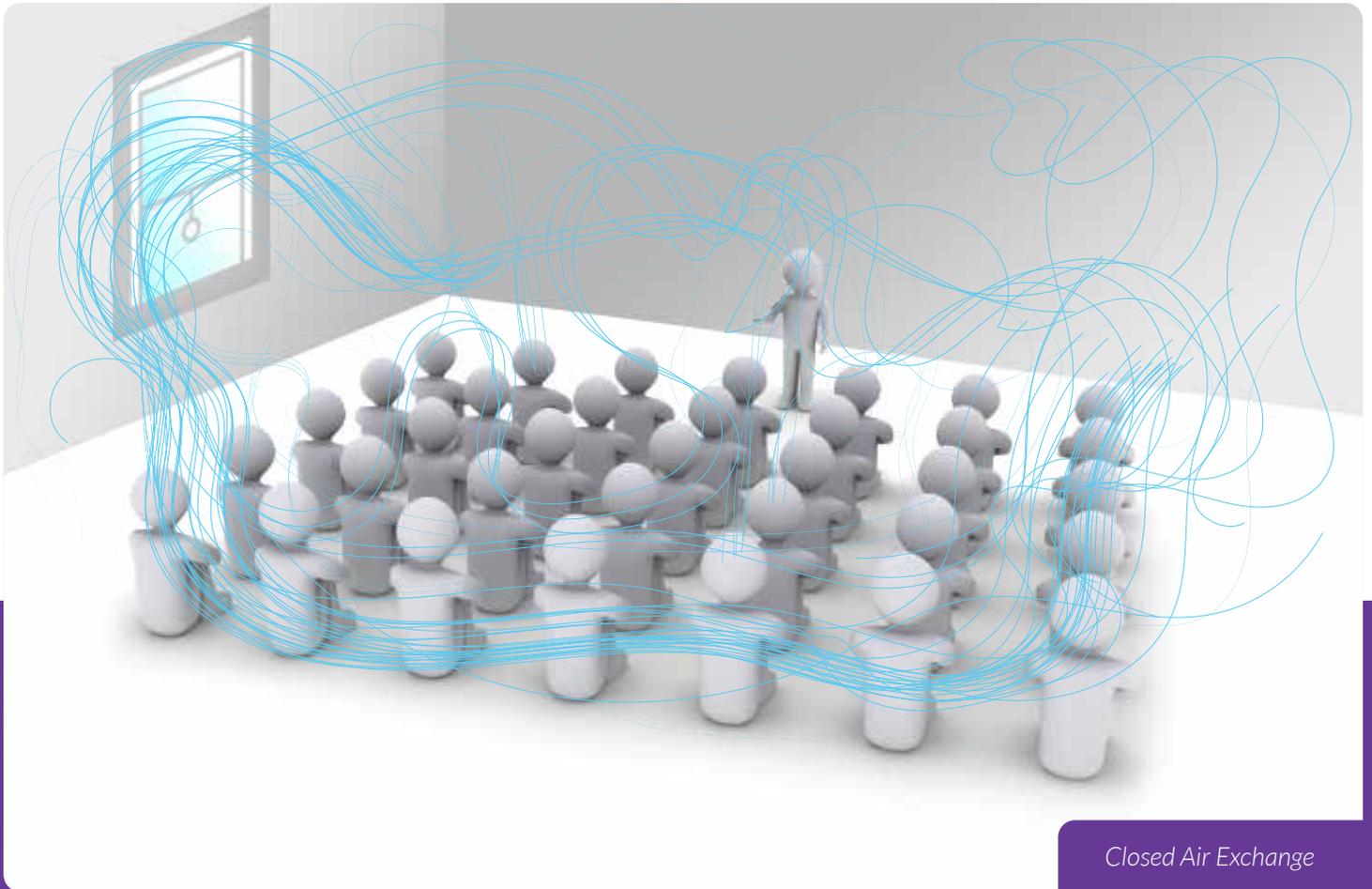
This has implications for both student learning and school finances:

- Researchers have found that being taught by a substitute for 10 days a year has a larger impact on a child's math scores than changing schools and that being taught by a substitute for even one day is more detrimental than replacing an average teacher with a terrible one (Education 2016).
- The annual national cost of teacher absenteeism is estimated at **\$25.2 billion**, with **\$4 billion** due to stipends for substitutes and associated administrative costs (Education 2016).
- Poor health is one of the main causes of chronic absenteeism (missing 15+ days of school) among students. The U.S. Department of Education calls chronic absenteeism “a hidden educational crisis” that leads not only to higher dropout rates, but also poorer outcomes later in life. In the 2015-2016 school year, about 1 in 6 children was chronically absent (Education 2016).

"Exposure is a function of concentration and time" – Joseph G. Allen, Director of the Harvard Healthy Buildings program and Assistant Professor at Harvard's T.H. Chan School of Public Health

SAMPLE AIRFLOW IN INDOORS

Let's take two typical classroom air flow patterns. One with the windows closed, one with a window open. During a normal meeting period.



Even patrons who look healthy may be asymptomatic carriers who can transmit the virus. Let's see what happens when we introduce an infected person to the mix.

- **Notice the airflow as patrons and staff breathe in and exhale out.**

Now, let's introduce an infectious person into the room.

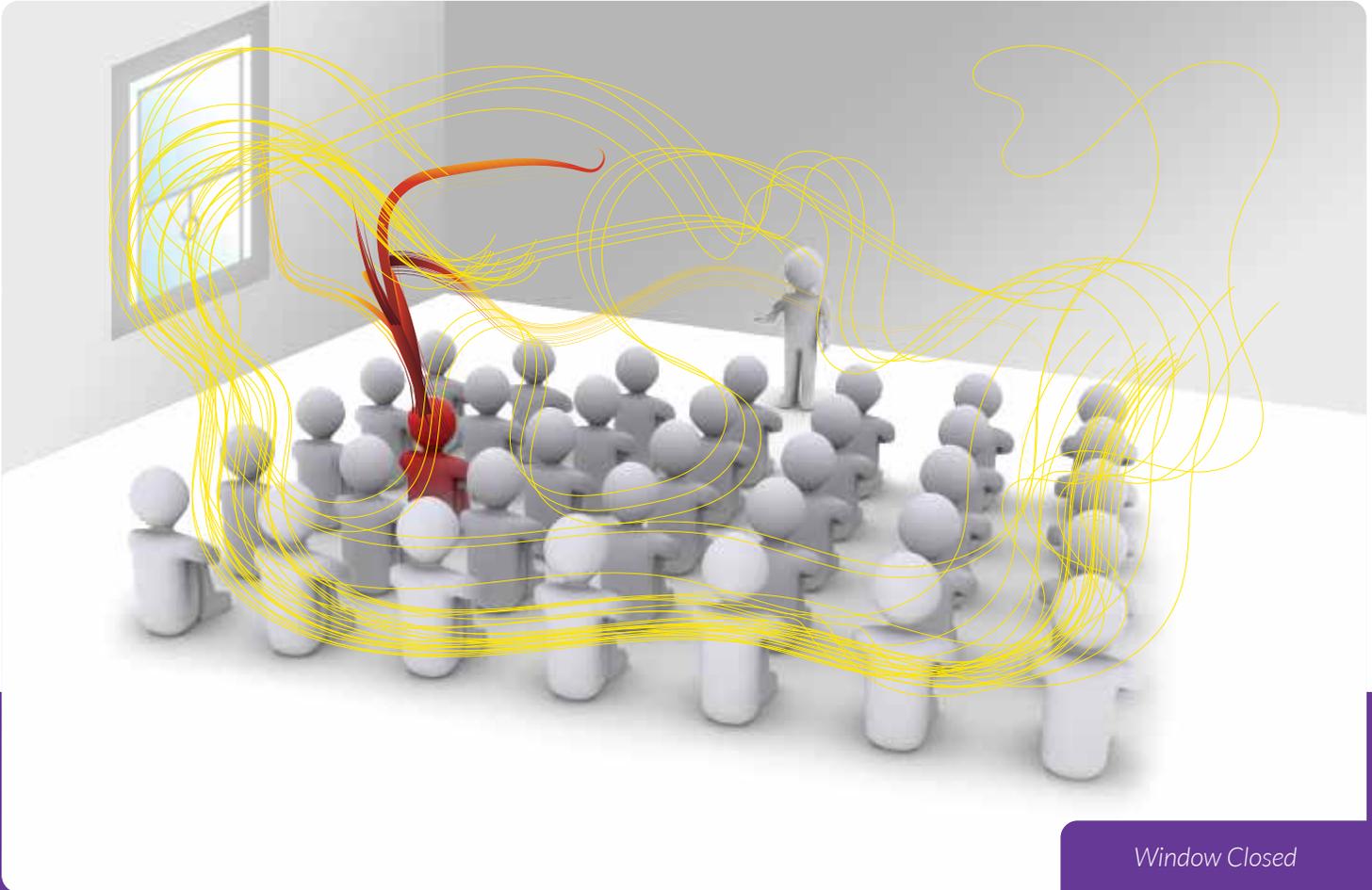
Notice how quickly infectious air is spread throughout the room.



Window Closed

These lines trace the person warm breath as it rises and begins to disperse contaminated respiratory aerosols throughout the room. The contaminants are most concentrated where the lines are darkest.

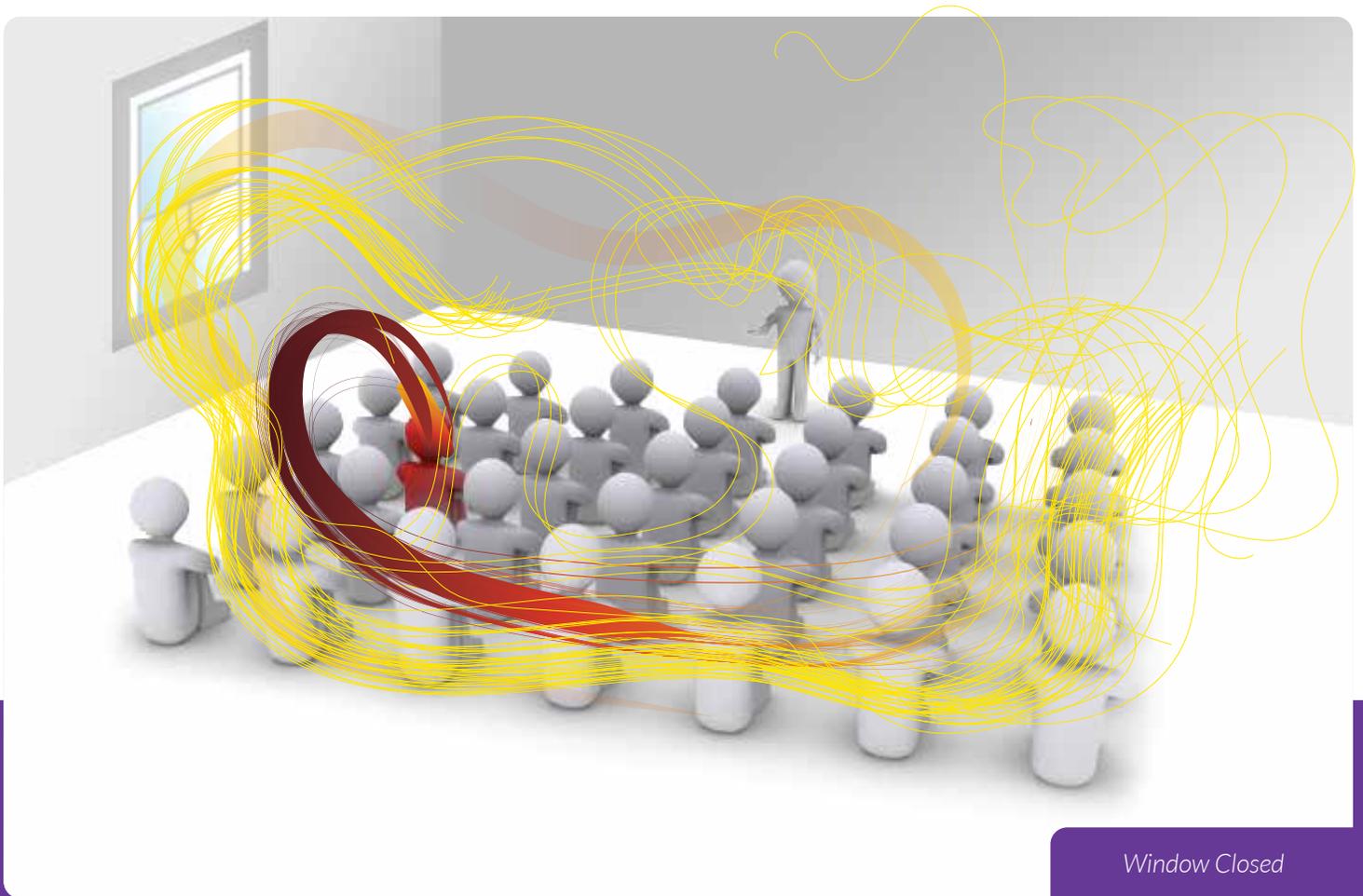
After only a few minutes..



Window Closed

While we still do not know exactly what level of contamination presents the greatest risk of infection, “exposure is a function of concentration and time,” said Joseph G. Allen, the director of the Harvard Healthy Buildings program an environmental health expert.

The airflow from the infectious person makes its way throughout the room before the meeting ends.

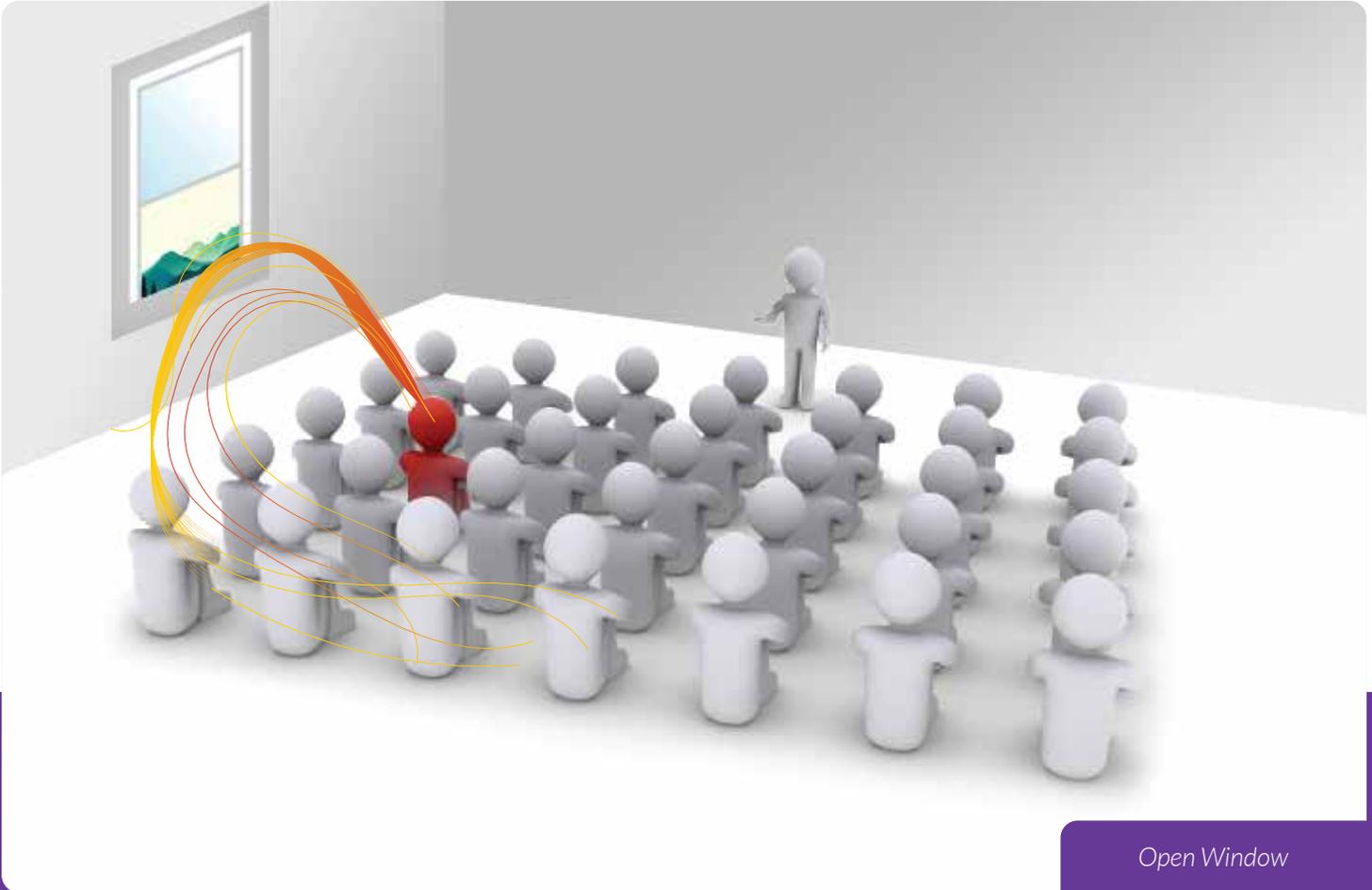


Window Closed

Now, everyone in the room is potentially infected.

Open Air Exchange

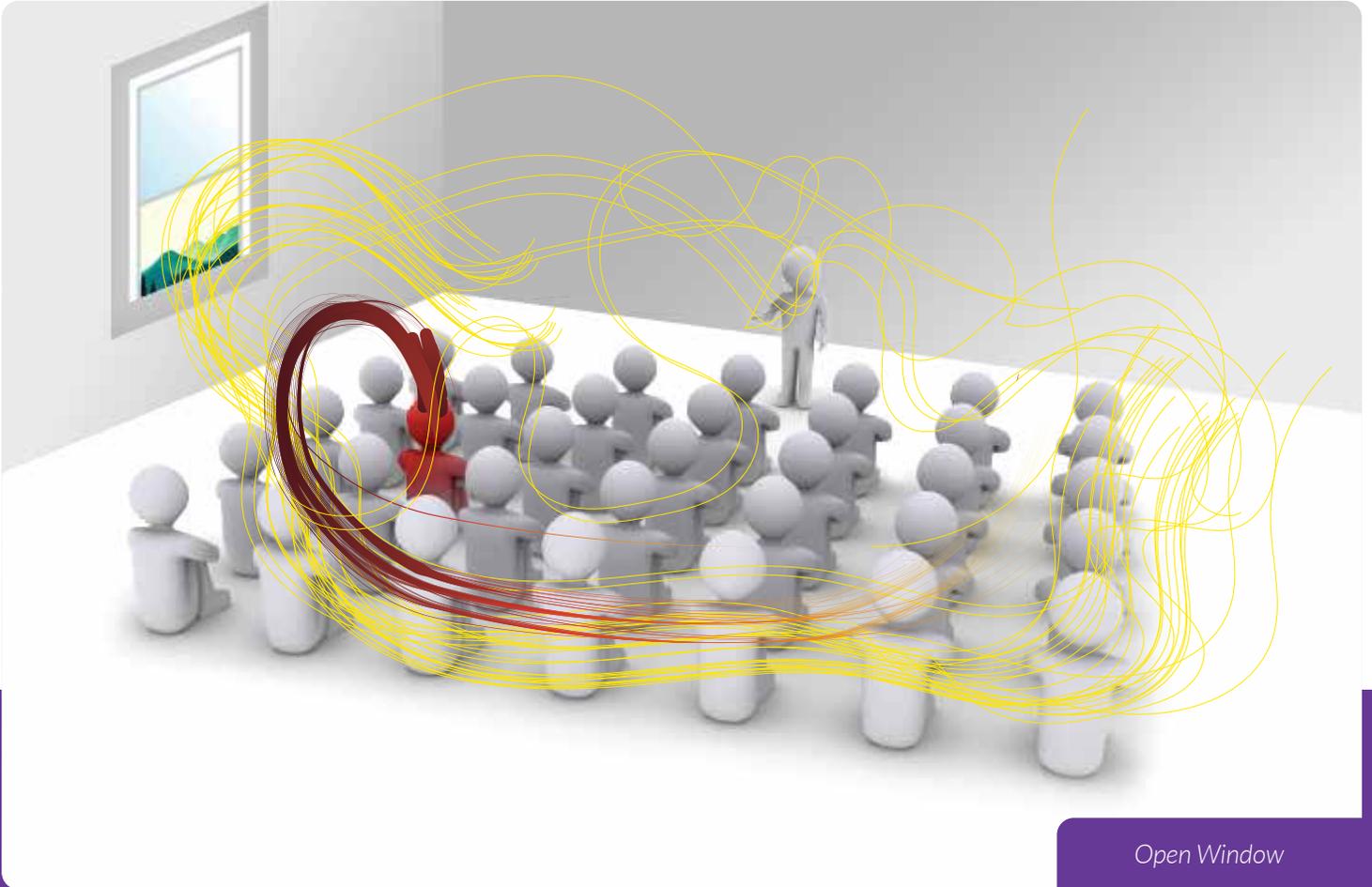
Now let's look at the same room, but with an open window. Same time period.



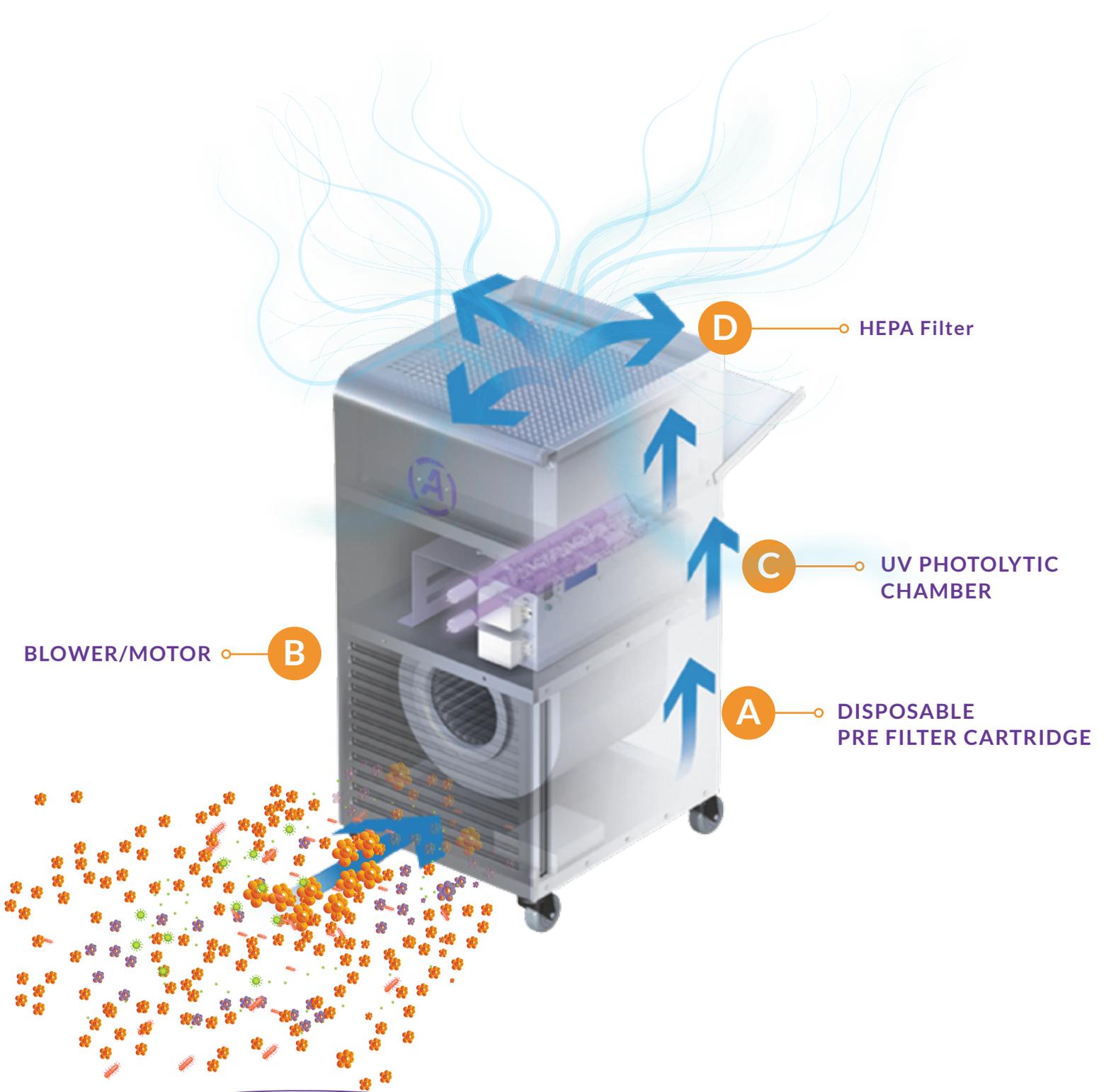
Open Window

New York City mandated every classroom have at least one window open in it with ventilation, even in the winter. So let's see what happens when we open a window.

Airflow is disrupted, but the infectious air still makes its way throughout the room.



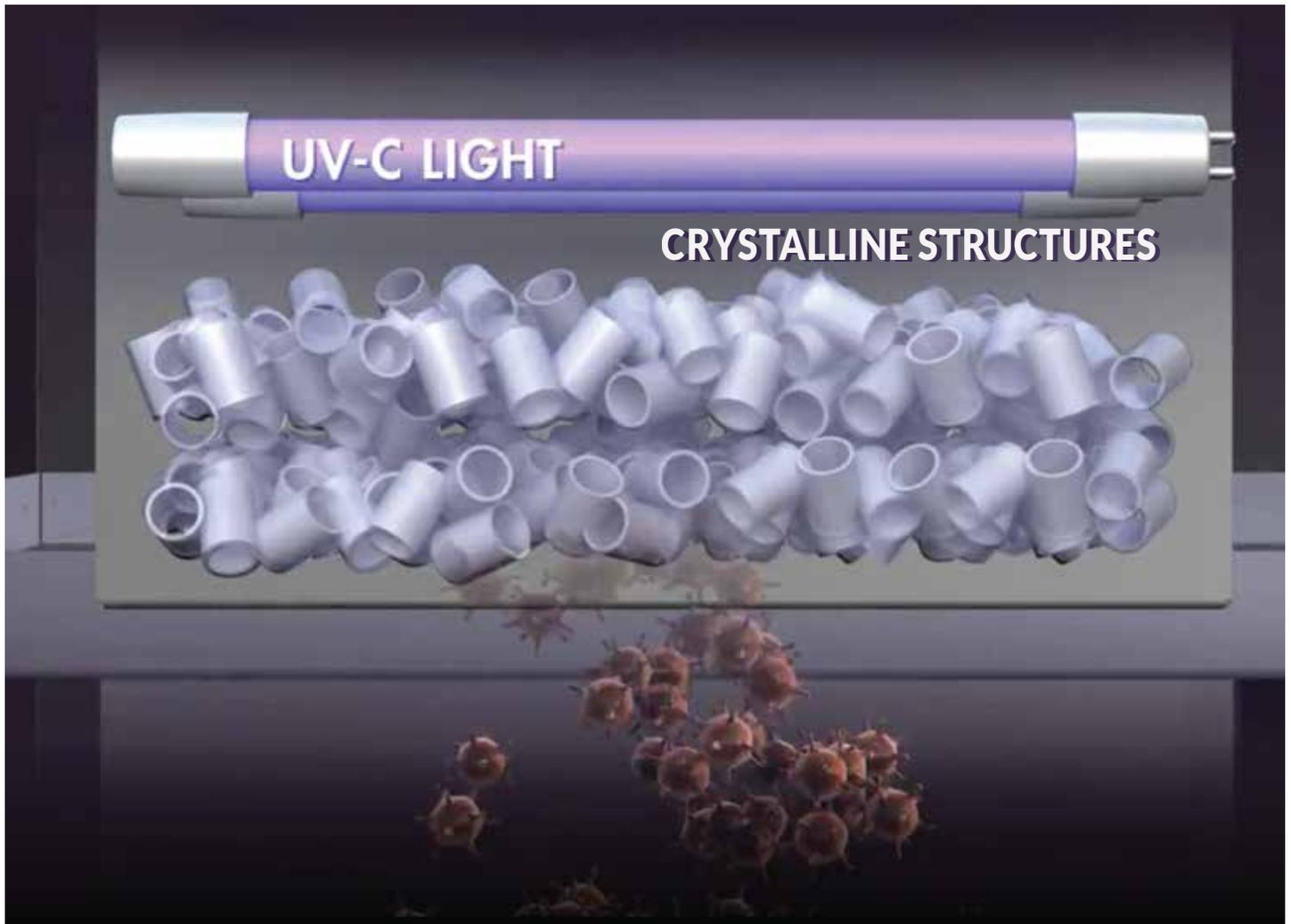
The fresh air dilutes the contaminants as they move around the room. "Simple and inexpensive measures can make schools much safer," said Scott E. Frank, whose engineering firm JB&B assisted with these simulations.



How AirPure2100 works

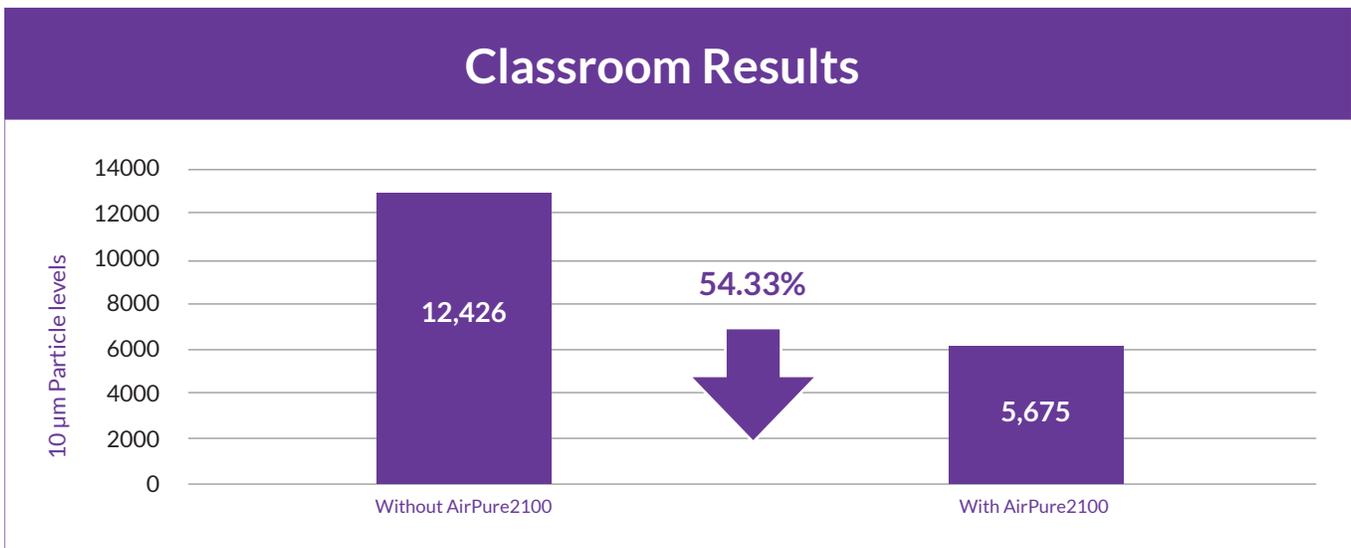
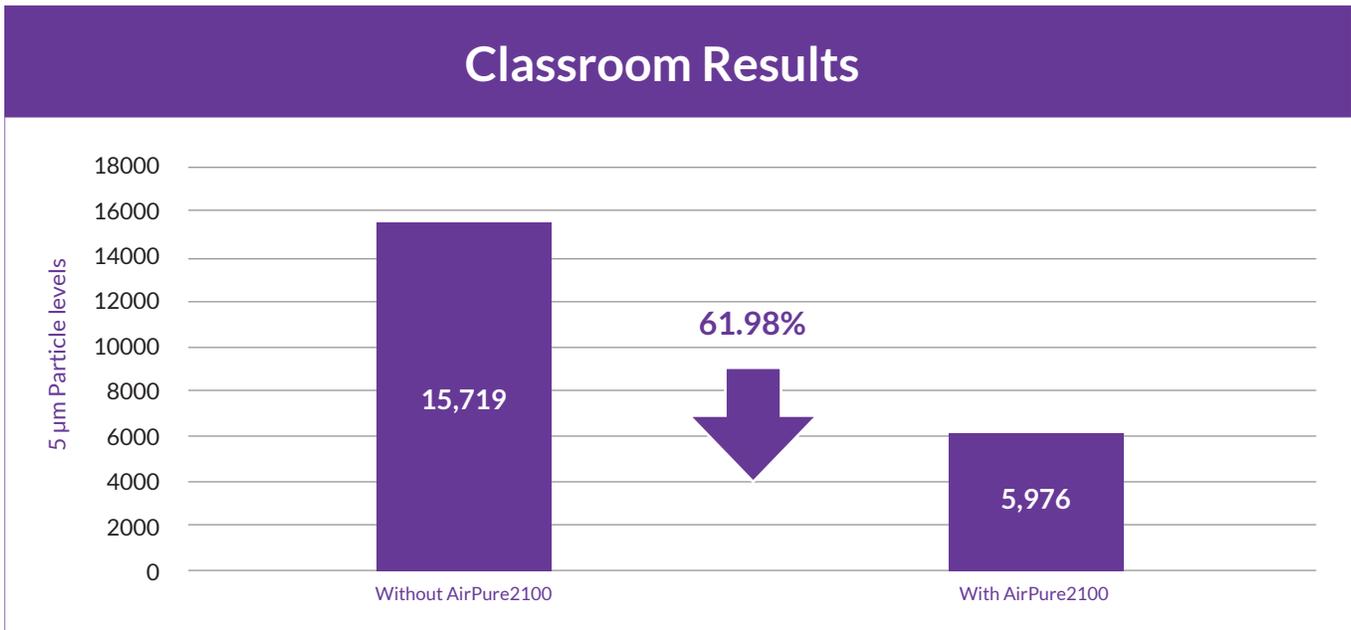
The Photolytic Chamber

- Utilizes a solid Crystalline medium which is permeable to gas and radiation.
- A contaminated airstream is directed through the irradiated medium.
- Suspended biologicals such as bacteria, viruses and spores are slowed and agitated in the medium while being irradiated, prolonging exposure time.
- The solid medium is continuously irradiated with germicidal radiation of 254nm wavelength (UVC).
- Bioaerosols are inactivated at much higher flow rates than direct irradiation alone.
- Increases kill rate for *B. atropheus* by a factor of over 100.
- All in a **SINGLE PASS.**



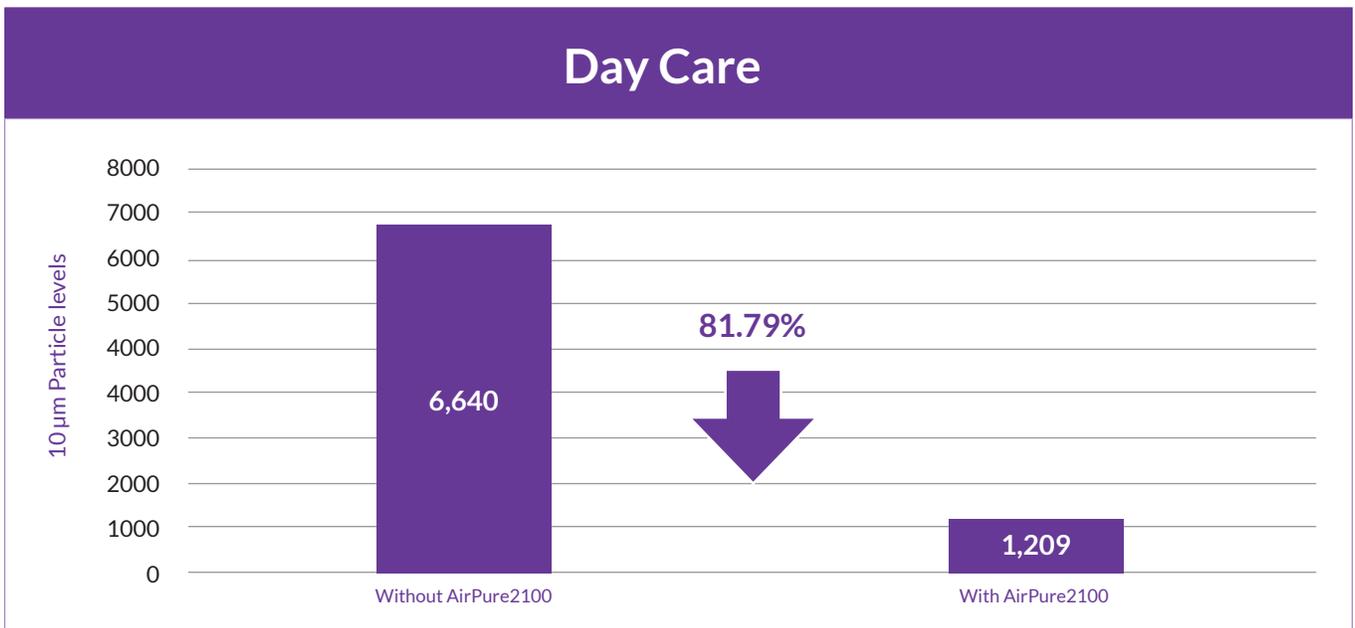
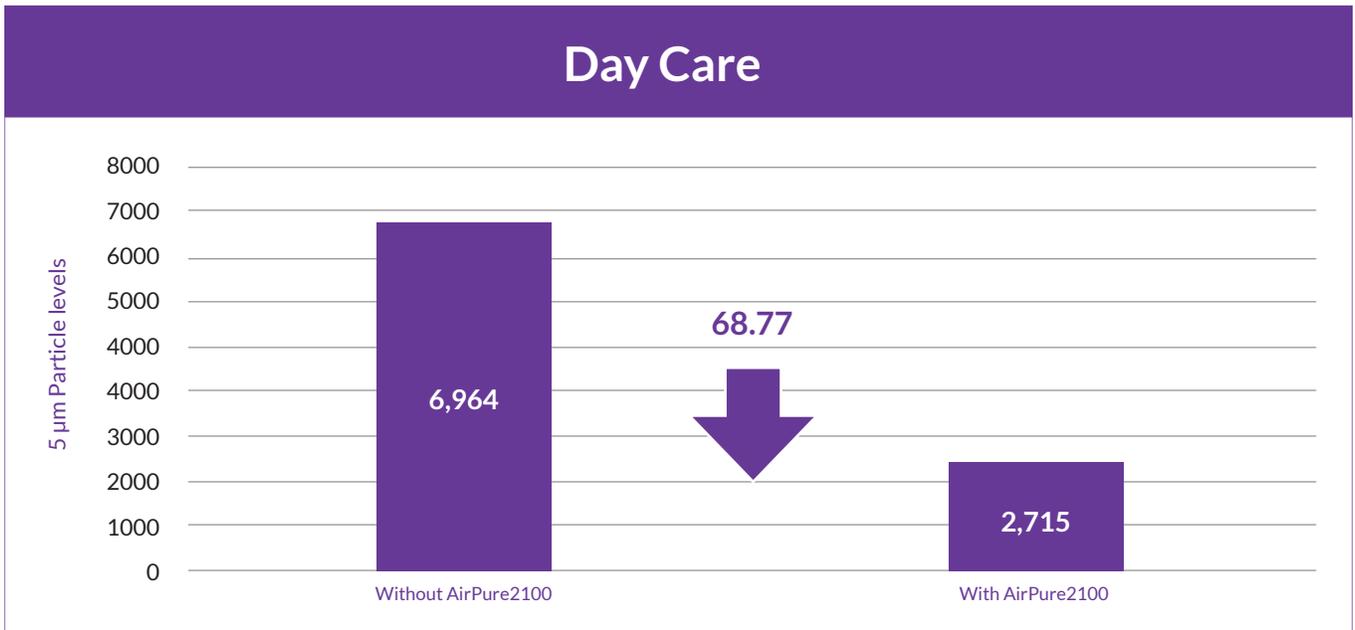
Real-world results

After one day in use, the AirPure2100 was able to reduce the 5m (micron) particle levels by 61.98% and the 10m (micron) particle levels by 54.33% in an Elementary school classroom.



Day Care Center

These figures went up to 68.77% of the 5m (micron) particle levels and 81.79% of the 10m (micron) levels in a day care center.



Purchasing an AirPure2100

Do you Qualify for Federal Grant Assistance?

Our Grant team will develop, write, and manage the entire grant process for you. Our professionals have helped hundreds of organizations over the last 15 years. Simply complete our inquiry form and let us get to work for you.

FEMA Public Assistance COVID-19

The President declared that the COVID-19 pandemic is a Major Disaster under the Stafford Act. As a result, eligible state, tribal, territorial, and local governments and private non-profit entities can now receive Federal funding for COVID-19 related cleaning and disinfection expenses.

FEMA assistance is available for emergency protective measures to protect public health. Grants are available for eligible costs in excess of \$3,500. Although there is no ceiling for Public Assistance grants, costs of \$139,800 and below are awarded based on estimates. 100% of the grant must be applied to cleaning and disinfecting costs incurred. Until April 1, 2022 Public Assistance grants are available with no cost share (White House 2021). Normally, FEMA assistance covers 75% of the cost.

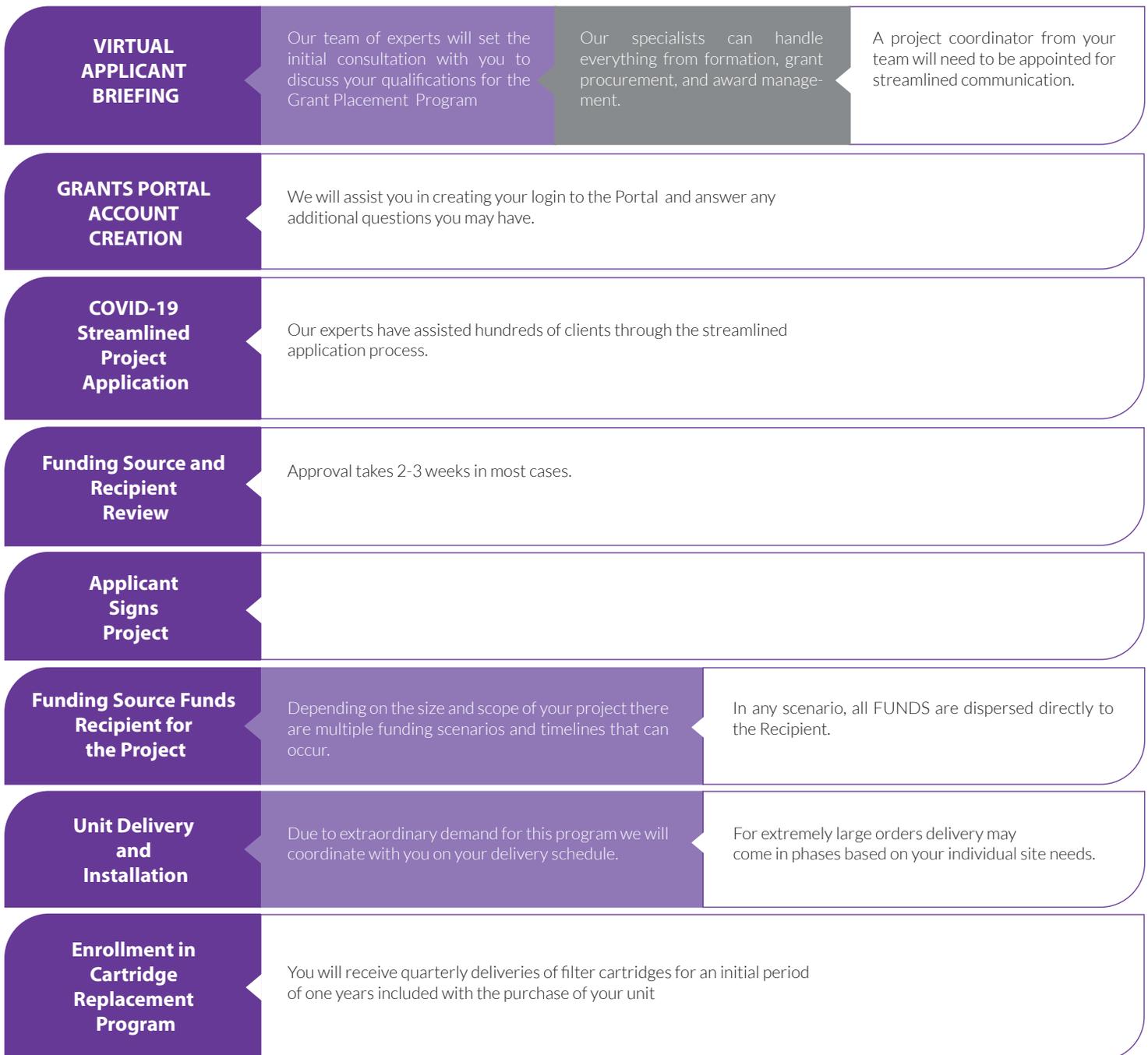
Timelines, Milestones, and Funds flow for your Grant

✓	Organization Name and type (NPO, Local, State, Tribal)			
✓	EIN			
✓	DUNS #			
✓	Primary and Alternate contact information			
	(a) Name	(b) Title	(c) Phone	(d) Email
✓	Primary Location			
	Alternate Location address if different than mailing address			

We will begin the process by setting an initial consultation with our experts to review the size, square footage, capacity, and use of your facility to develop a cost estimate.

Once approved to apply, we will set a follow up consultation to discuss the application process, any additional documentation required and set expectations for a timeline based on the scope and the overall size of your project.

The illustration below will help guide you through the process and establish realistic expectations for timelines and milestones.



Frequently Asked Questions

UV-C Light

What is germicidal UV, and what is UVGI?

Germicidal UV (GUV) refers to using ultraviolet radiant energy to inactivate bacteria, mold spores, fungi, or viruses. When the process is applied in a given location, it has generally been referred to as ultraviolet germicidal irradiation (UVGI). Because of the public’s concern about ionizing radiation (e.g., X-rays and gamma rays), the term GUV avoids needless concerns about a link with that type of radiation. Another non-technical term is germicidal light, although “light” is technically only visible radiation (IES Photobiology Committee, 2020).

Is all ultraviolet considered germicidal ultraviolet (GUV)?

No. Germicidal ultraviolet (GUV) – refers to short-wavelength ultraviolet “light” (radiant energy) that has been shown to kill bacteria and spores and to inactivate viruses. Wavelengths in the photobiological ultraviolet spectral band known as the “UV-C,” from 200 to 280 nanometers (nm), have been shown to be the most effective for disinfection, although longer, less energetic UV can also disinfect if applied in much greater doses. UV-C wavelengths comprise photons (particles of light) that are the most energetic in the optical spectrum (comprising UV, visible, and infrared) and therefore are the most photochemically active. (See Figure 1.)

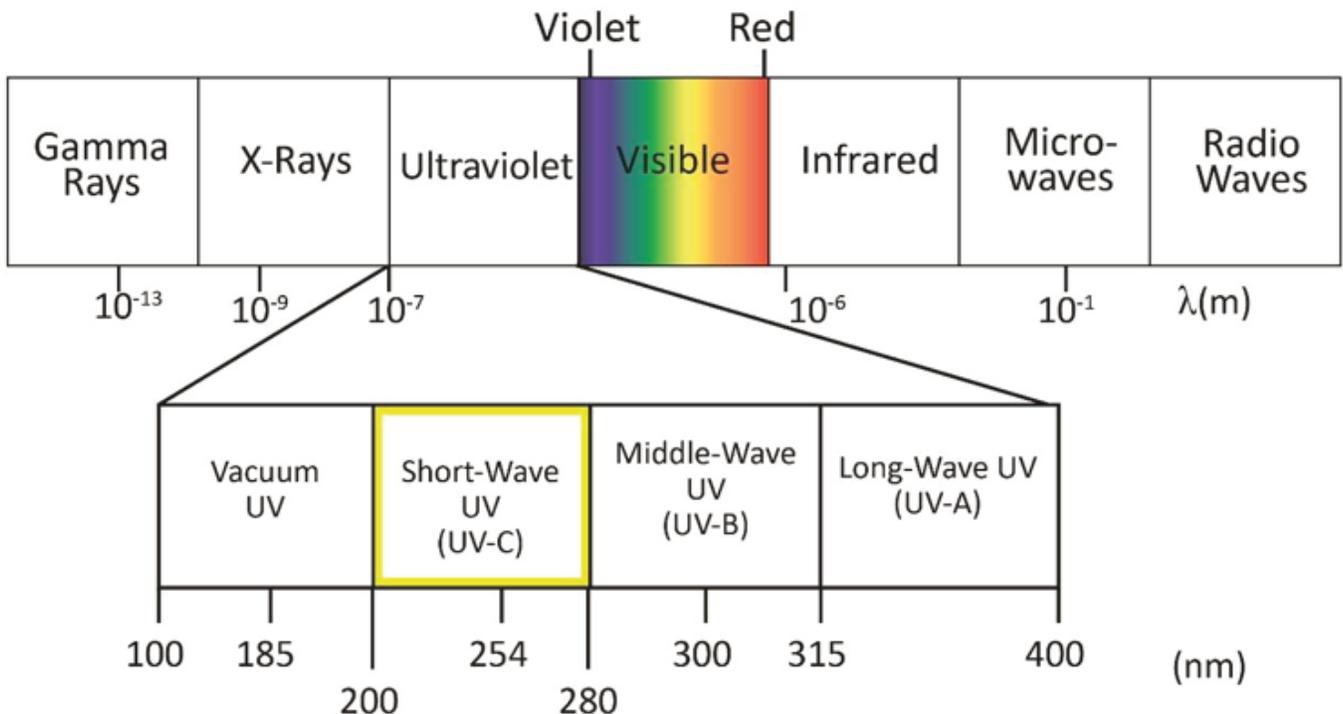


Figure 1-1. The ultraviolet portion of the electromagnetic spectrum.

Can UV-C kill viruses as well as bacteria?

Yes, UV-C kills living bacteria, but viruses are technically not living organisms; thus, we would correctly say “inactivate viruses.” Individual, energetic UV-C photons photochemically interact with the RNA and DNA molecules in a virus or bacterium to render these microbes non-infectious. This all happens on the microscopic level. Viruses are less than one micrometer (μm , one-millionth of a meter) in size, and bacteria are typically 0.5 to 5 μm (IES Photobiology Committee, 2020).

Can UV-C effectively inactivate the SARS-CoV-2 virus, responsible for COVID-19?

Yes, if the virus is directly illuminated by UV-C at the effective dose level. UV-C can play an effective role with other disinfection methods, but individuals must be protected to prevent UV hazards to the eyes and skin. UV-C should not be used to disinfect the hands!

Can near-ultraviolet (UV-A) lamps, such as UV insect traps, be used for GUV?

No. UV-A and longer (visible) wavelengths do not have germicidal effective emission wavelengths to inactivate viruses. Their relative disinfection capability is very minimal on the order of 1,000 times less effective in terms of fluence rate than the low-pressure mercury germicidal lamp. There have been only very special applications of wavelengths in the UV-A and violet (e.g., 405 nm), which require very high doses not practical in an occupied environment and were not recommended for viral sterilization. The trace amount of UV-B that is emitted from some white-light fluorescent lamps probably has similar efficacy.

Light-emitting diodes (LEDs) have been available for some time in the UV-A region. The advantage of UV-A or visible-light LEDs would be that they can easily be incorporated into LED-based luminaires, and there might be no need for protective gear. However, the efficacy of violet or UV-A energy that is not harmful to the skin or eyes is minimal (IES Photobiology Committee, 2020).

Medical-grade HEPA filtration

What is a HEPA filter?

HEPA is a type of pleated mechanical air filter. It is an acronym for "high-efficiency particulate air [filter]" (as officially defined by the U.S. Dept. of Energy). This type of air filter can theoretically remove at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns (μm). Look out for terms such as HEPA-type, or HEPA-style, as there's no guarantee that products with either of those designations will conform to industry regulations (US EPA, 2019).

Do air purifiers protect you against COVID-19?

The ability of air purifiers to combat the spread of COVID-19 particles has been widely discussed in recent months, and a study backed by the United Kingdom's Department for Health and Social Care is currently taking place across 30 UK primary schools to assess the effectiveness of air-cleaning systems and their ability to eliminate the virus.

“Viruses are below the limits set by HEPA filters. However, viruses are usually in aerosol, so an air filter might trap viruses where the aerosol has evaporated off, which could have some benefit. It will, however, deal with bacteria, which are mostly about 0.3 microns.” - Dr. John O Warner OBE, Emeritus Professor of Pediatrics, National Heart and Lung Institute, Imperial College London

What is a MERV Rating?

Minimum Efficiency Reporting Values, or MERVs, report a filter's ability to capture larger particles between 0.3 and 10 microns (µm).

- This value is helpful in comparing the performance of different filters
- The rating is derived from a test method developed by the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
- The higher the MERV rating, the better the filter is at trapping specific types of particles.

MERV Rating	Average Particle Size Efficiency in Microns
1-4	3.0 - 10.0 less than 20%
6	3.0 - 10.0 49.9%
8	3.0 - 10.0 84.9%
10	1.0 - 3.0 50% - 64.9%, 3.0 - 10.0 85% or greater
12	1.0 - 3.0 80% - 89.9%, 3.0 - 10.0 90% or greater
14	0.3 - 1.0 75% - 84%, 1.0 - 3.0 90% or greater
16	0.3 - 1.0 75% or greater

Bipolar Ionization

Can air cleaning devices that use bipolar ionization protect me from COVID-19?

Bipolar ionization (also called needlepoint bi-polar ionization) is a technology used in HVAC systems or portable air cleaners to generate positively and negatively charged particles. Provided manufacturers have data to demonstrate efficacy, manufacturers of these devices may market this technology to help remove viruses. One of them is SARS-2-CoV, the virus that causes COVID-19 from the air or to facilitate surface disinfection of surfaces within a treated area.

This is an emerging technology, and little research is available that evaluates it outside of lab conditions. As typical of newer technologies, the evidence for safety and effectiveness is less documented than for more established ones, such as filtration. Bipolar ionization can generate ozone and other potentially harmful by-products indoors unless specific precautions are taken in the product design and maintenance. Suppose you decide to use a device that incorporates bipolar ionization technology. In that case, EPA recommends using a device that meets UL 2998 standard certification (Environmental Claim Validation Procedure (ECVP) for Zero Ozone Emissions from Air Cleaners).

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Research and Results

Data and Studies

Correlation of the air–surface nexus of bacterial burden during routine patient care

Werner E. Bischoff MD, PhD¹ and Gregory Russell MS²

Infection Control & Hospital Epidemiology (2020), 1–2, doi:[10.1017/ice.2020.436](https://doi.org/10.1017/ice.2020.436)

(Received 8 June 2020; accepted 5 August 2020)

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Reduction of Particles in the Operating Room Using Ultraviolet Air Disinfection and Recirculation Units

Published: December 02, 2017

Gannon L. Curtis, MD, Mhamad Faour, MD, Michael Jawad, BS, Alison K. Klika, MS*, Wael K. Barsoum, MD, Carlos A. Higuera, MD

The Journal of Arthroplasty, Volume 33, Issue 7, Supplement, S196-S200, July 2018

Department of Orthopaedic Surgery, Cleveland Clinic, Cleveland, Ohio

The Impact of Supplemental Intraoperative Air Decontamination on the Outcome of Total Joint Arthroplasty: A Pilot Analysis

Thomas M. Cook, DO^a Caleb J. Piatt, DO^a Sue Barnes, BSN^b, Charles E. Edmiston Jr., Ph.D. c, *

The Journal of Arthroplasty, Volume 34, Issue 3, P549-553, March 01, 2019

Published: December 07, 2018

, 1–2, doi:[10.1017/ice.2020.436](https://doi.org/10.1017/ice.2020.436)

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Effectiveness of a plasma treatment device on microbial air quality in a hospital ward, monitored by culture

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- (g) Health Research Board Clinical Research Facility Cork, Cork, Ireland
- (h) APC Microbiome Institute, University College Cork, Cork, Ireland

A Summary of Peer-Reviewed Studies

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49.5% to 56% reduction in air particles in SPD. Reduced air contamination rates in active surgical sterile processing department using HEPA-Ultraviolet Air Recirculation System.

Third-Party Testing

Aerobiotix technology reduced SARS-CoV-2 below detectable levels with concentrated bioaerosols. Battelle Biomedical Research Center, West Jefferson, OH, August 2020.

Aerobiotix air cleaner inactivates 100% viruses, 99.97% bacteria and 99.91% spores. RTI, Research Triangle Park, NC, April 2013.

Reduction of airborne tuberculosis (MTB) was 99.9%. The Illuvia air decontamination device was tested against airborne Mycobacterium tuberculosis (MTB H37Ra). National Institute for Occupational Health, Immunology & Microbiology Section, Johannesburg, South Africa, 2018.