

Important Role for Standalone Indoor Air Purification Systems

INTRODUCTION

Most people pay little attention to their indoor air quality, despite the fact that US EPA states that 68% of human diseases are spread through indoor air. [1] Why is this the case? People believe that their heating, ventilation, and air conditioning (HVAC) systems are taking care of 'cleaning' their indoor air. But HVAC systems are primarily designed to maintain the indoor air temperature at comfortable levels. Even when HVAC systems have filtration components they are not always as effective as they need to be in cleaning the air, especially when it comes to infection control.

HEALTH CARE FACILITY INDOOR AIR QUALITY

Many areas in health-care facilities can benefit from special air purification including: examination rooms used by high-risk patients, rooms for isolation of patients with infections, and lab environments.

SOURCES OF INFECTIOUS PARTICULATE IN INDOOR AIR

Humans are a key source of airborne agents which infect people. Measles, influenza viruses and the tuberculosis bacteria are known to be transmitted by means of shared air between people.

Laser plumes and surgical smoke can be a source of airborne contaminant as they release a plume that includes particles, gases, tissue debris, and offensive smells. Some viruses and bacteria (e.g., human papillomavirus HPV, HIV) have been detected in laser plumes. [2]

Increased concentrations of airborne red blood cell pathogens lead to acute lung infection and, conversely, increased rates of mortality and morbidity. [3]

In addition to infectious bioaerosols, non-infectious particulate must also be addressed by health-care facilities including sensitizing and allergenic agents (e.g., ethylene oxide, glutaraldehyde, formaldehyde, hexachlorophene, and latex allergens). Asthma and dermatologic and systemic reactions often result from exposure to these chemicals. Anesthetic gases and aerosolized medications (e.g., ribavirin, pentamidine) can be hazardous to health-care workers.

CLEANING INDOOR AIR IN HEALTH CARE FACILITIES

Containment of the hazardous aerosol at the source is a key first level of control. The combination of filtration equipment and airflow rates

are often underappreciated for the effect they have on the concentration of infectious agents. If the filter efficiency and/or air change rate is high enough, a larger number of infectious agents can effectively be removed before they spread and affect people.

THE ROLE FOR STANDALONE AIR PURIFICATION SYSTEMS IN HEALTH CARE FACILITIES

There are two transmission patterns: (i) within-room exposure, and (ii) transmissions beyond a room through corridors, and through the HVAC system which recirculates air throughout the building. Standalone air purification systems have been used as an effective first level control solution with respect to both transmission pattern types. Specifically when a solution is needed to: (i) temporarily recirculate air in rooms with no general ventilation, ii) augment systems with inadequate airflow, and iii) provide increased effectiveness in airflow.

CHOOSING A STANDALONE AIR PURIFICATION SOLUTION

Standalone air purifier effectiveness is dependent on the: i) filtration system, ii) air handling capacity, and iii) operating sound level. Portable units should be capable of recirculating air through medical grade filters, and the units should be designed to achieve the equivalent of 12 air cleanings/hour (ACH). [2] These systems must also be capable of operating at noise levels that do not inhibit occupants from performing their necessary tasks, otherwise they will be 'turned down' which can negate their full efficacy. One example of a highly effective system is the Cascade White (6000C) from Surgically Clean Air.

SUMMARY

Today, more and more well-known hospitals, health care institutions, and medical labs have taken proactive steps to take care of their indoor air quality and established a new school of thought on the use of standalone medical grade air purifiers in managing infectious and non-infectious airborne particulate.

REFERENCES

- [1] U.S. Environmental Protection Agency 'Indoor Air Quality' www.epa.gov/indoor-air-quality-iaq
- [2] U.S. Department of Health & Human Services Centers for Disease Control & Prevention (CDC) Atlanta, GA
- [3] Babaev A, Pozzi F, Hare G, Zhang H (2014) Storage of Red Blood Cells and Transfusion-Related Acute Lung Injury. *Anesth Crit Care Open Access* 1(1): 00002. DOI: 10.15406/jaccoa.2014.01.00002



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