

# **Boost Your Building's Immunity to Bacteria, Mold and Dust Mites**

Hit them where they live – in ductwork and on your desks, chairs, etc.

Prepared exclusively for the October, 2015 edition of **High Rise Facilities Magazine**

If someone told you there were new ways to solve old problems, how open would you be to learning about them? Consider Building Related Illness (BRI). What do you know about the new ways to mitigate this pervasive problem, which continues to have a huge impact on health and productivity?

## **The Costs of Business as Usual**

According to a US Environmental Protection Agency (EPA) report in 2000, indoor air pollution cost the nation “tens of billions” of dollars per year. That report further suggested that because of the relative magnitude of operating costs, labor costs, and rental revenue in most buildings, modest preventive measures would generate substantial returns.<sup>1</sup> More recently, a 2004 report stated that senior management acknowledges that even small improvements in office worker productivity derived from facility maintenance projects are clearly worth it.<sup>2</sup>

“The primary costs are initially identified and monetized by decreases in productivity, first caused by absenteeism, and worsened by a loss of employee morale...Additional costs are associated with identifying and mitigating the problems, along with lingering negative customer and stake-holder reactions.”<sup>3</sup>

## **Benefits Outweigh Costs**

If treated as part of a preventative maintenance program, the potential bottom line losses noted above will be alleviated, and demonstrable benefits will impact the top line. “Scientific research has firmly established that the office environment can influence people’s health, well-being, and productivity,”<sup>4</sup> with studies showing that keeping an office looking good increases employee productivity.<sup>5</sup> Additionally, “when office workers are satisfied with their environmental conditions, when they can work in greater comfort and control...the cost of employment per worker will drop, and the cost of facilities operation will decrease.”<sup>6</sup>

## **The Origins of BRI**

In 1976, Legionnaire's Disease broke out in Philadelphia at a convention of the American Legion. Within a few weeks, more than 221 cases were tallied with 34 fatalities. Now known as legionellosis (caused by Legionella bacterium), this incident garnered immediate attention. However it took 10 years before incidents like this became subsumed within a larger concept, codified by the World Health Organization (WHO) as Sick Building Syndrome. By then, the WHO estimated that 10-30% of newly built office buildings in the West had problems with Indoor Air Quality (IAQ). Today, “in the developed

world IAQ is a main cause of allergies, other hypersensitivity reactions, airway infections, and cancers.”<sup>7</sup> BRI is now used to describe specific symptoms that can be attributed to known contaminants within a building.

While not always the cause of BRI, ventilations systems are invariably involved. The problem is that “too little attention is paid to the quality and maintenance of HVAC systems, which require not only regular cleaning, but also regular tests against the design values.”<sup>8</sup>

## **Underlying Causes**

According to the EPA, IAQ is based on:

- 1) Introduction and distribution of adequate ventilation air;
- 2) Control of airborne contaminants;
- 3) Maintenance of acceptable temperature and relative humidity.

While there are many potential causes of BRI due to #1 and #3 above, the least addressed until recently has been #2, reducing/eliminating pathogens from bacteria, viruses, fungal spores, pollen, and especially dust mites and their feces dust.

Did you know that in each cubic foot of air, there are millions of these pollutants?<sup>9</sup> It turns out that dust mites and feces dust are responsible for about 25% of all allergy diseases and a factor in 50% to 80% of asthmatics, as well as in countless cases of eczema, hay fever, and other allergic ailments.<sup>10</sup> Moreover, “dust mites may be the most common cause of year-round allergy and asthma”<sup>11</sup>, which “is one of our nation’s most common chronic health conditions”<sup>12</sup> (Note: Technically, people are not allergic to dust mites; people are allergic to enzymes in dust mite guts and feces, which can elicit powerful allergic reactions.)

## **New Techniques Improve Outcomes**

During the last 10 years, there have been major shifts in understanding how to combat pathogens. The old objective was to kill bacteria outright with antibiotics, disinfectants, or antibacterials. That caused numerous problems including making the bacteria resistant and turning them into superbugs (which has created ancillary problems for the medical community). The presumption was that the benefits of killing pathogens outweighed the down-side risks, whether treating sick people or disinfecting surfaces. The old approach has gone too far. We need to stop the indiscriminate killing of bacteria. For example, antibiotics kill both bad and good bacteria in the human gastrointestinal tract which inhibits normal digestion. Worse, it leaves a person exposed because the dead bacteria instantly become food for the next bacteria introduced into the environment. Because all other bacteria have been destroyed, the new bacteria will have no competition. That’s why many people get sick soon after taking antibiotics. This awareness has led to more people taking probiotics (good bacteria) to help them build immunity to bad bacteria and promote better health and digestion.

Based on what has been learned about how probiotics build immunity, scientists recently developed ways to use safe, food-grade probiotics (different from the lacto bacillus in yogurt) to break down

biofilms and clean surfaces of all sorts of pathogens including bacteria, mold, pollen, dust mites, fungal spores and even affect viruses. As a bonus, these probiotics have also proven to be exceptionally effective at eliminating odors. Thoroughly tested and documented to reduce the risk of infection in hospitals, probiotics are now used by hundreds of hospitals (e.g. Shriner's Hospital), hotels (e.g. Hilton) and commercial centers (e.g. Tel Aviv's Dizengoff Center).

Even more recently, scientists have developed methods for stabilizing probiotics in liquid form. Progressive companies are applying these concepts to indoor air systems and injecting these highly-specialized natural and organic probiotic-based aerosols directly into the air supplies before the air even passes over the coils of air handling units. This technique helps slow or eliminate buildup on the coils, which thereby prolongs cleaning cycles, improves thermal transfer and overall air flow and efficiencies, all of which saves organizations money – some studies have shown a 15% decrease in energy costs. The keys are dispersing the right aerosol along with proper distribution throughout the ductwork. Moreover, studies have shown that cleaning air handling systems in hospitals plays a critical role in improving clinical outcomes.

The true beauty of these solutions is that they not only protect the spread of pathogens by forced air circulation, by virtue of using the forced air system to help spread the probiotic throughout a facility, the environments and surfaces therein are thus proactively protected in an ongoing manner. The result is less sickness, infection, and allergic reactions, which literally improves the health of people, buildings, and organizations, and therefore improves bottom lines.

Unfortunately, furnishings are ideal breeding places for disease-carrying pathogens including bacteria, viruses, and dust mites. Therefore, in addition to improving air transport systems, enlightened organizations are combining probiotics (using fogging methods) with preventative maintenance programs (e.g. refurbishing) for their furnishings. Refurbishing by itself is also an overlooked solution that is gaining momentum, specifically because it supports sustainability and overall cost-savings (e.g. one large multinational saved 90% vs. buying new). Curiously, many facility managers do not have standard procedures in place to regularly sanitize some commonly touched surfaces. Often overlooked, furnishings (especially woods, leathers, and upholstery) need to be disinfected and preserved, not just wiped, dusted, or vacuumed. Proven to improve Triple Bottom Lines (Profits, People and Planet), onsite refurbishment is becoming recognized and popular as a new best practice.

## **Conclusion**

Studies have proven that good IAQ enhances occupant health, comfort, and productivity. Poor IAQ impacts cost, specifically by:

- 1) Reducing productivity, in part by increasing absenteeism;
- 2) Accelerating deterioration of furnishings and equipment;
- 3) Straining relations between landlords and tenants, employers and employees;
- 4) Creating negative publicity that could put rental properties at a competitive disadvantage; and
- 5) Opening potential liability problems, especially considering that insurance policies often exclude pollution-related claims.

In a study of 813 buildings supporting over 750,000 occupants, over 75% of IAQ problems were traced to operating faults and/or poor maintenance; over 12% were due to contamination inside the ductwork, with dust and allergic fungi comprising 60% of the pollutants.<sup>13</sup>

Research has proven that the office environment (including aesthetics) influences worker's health and productivity. Keeping facilities clean is worthwhile. That's why organizations use janitorial firms. So taking things to the next level is a natural. Beyond just the basic cleaning, the most proactive and productive leaders are increasingly using preventive measures – to ensure that their indoor air is as unpolluted and odor-free as practicable, and to keep the surfaces that the janitorial firms don't service in hygienic condition.

## Biography

David Ableman is VP Operations for PROTEK, a company founded in 1963, and headquartered in Randolph, MA that specializes in Duct Cleaning & Decontamination Services ([www.protekductcleaning.com](http://www.protekductcleaning.com)) as well as Onsite Refurbishment ([www.protekccorporation.com](http://www.protekccorporation.com)). Mr. Ableman oversees the experienced team that has completed thousands of projects throughout the Northeast. Charged with managing Quality Control and customer expectations, Mr. Ableman is responsible for the day-to-day operations, process improvement, and Onsite, Overnight deliverables. Mr. Ableman received a BS in chemical engineering from Carnegie Mellon University in 1982 and subsequently attended Babson College for an MBA. A member of IFMA, with 30+ years of professional experience, he is an award-winning and respected consultant, speaker, trainer and author.

[Connect with Dave on LinkedIn](#)

---

<sup>1</sup> Ed Bas, (2004): "Energy Cost and IAQ Performance of Ventilation Systems and Controls."

<sup>2</sup> British Council for Offices (2004): "The impact of office design on business performance."

<sup>3</sup> David Ableman, Facility Management Journal Vol. 25, No. 1 (2015): "Sick Building Syndrome Costs Millions."

<sup>4</sup> J Sullivan (2013): "Measuring Productivity in the Office Workplace, Edition 2," Centre for Building Performance Research.

<sup>5</sup> Debra Brinegar Lister, Elisabeth M. Jenicek, Paul Frederick Preissner (1998): "Productivity and Indoor Environmental Conditions Research: An Annotated Bibliography for Facility Engineers," US Army Corps of Engineers.

<sup>6</sup> Carol Lomonaco and Dennis Miller, Johnson Controls, Inc. (2005) "White Paper: Environmental Satisfaction, Personal Control and the Positive Correlation to Increased Productivity."

<sup>7</sup> J Sundell, Indoor Air. 2004;14 Suppl 7:51-8: "On the history of indoor air quality and health"

<sup>8</sup> Pawel Wargocki, Ph.D., Chairman of ASHRAE's Environmental Health Committee (2014)

<sup>9</sup> Ed Bas, (2004): "Indoor Air Quality: A Guide for Facility Managers."

<sup>10</sup> ISRN Allergy, Volume 2011 (2011), Article ID 576849

<sup>11</sup> Asthma and Allergy Foundation of America

<sup>12</sup> National Institute of Environmental Health Sciences

<sup>13</sup> Ed Bas, (2004): "Indoor Air Quality: A Guide for Facility Managers."