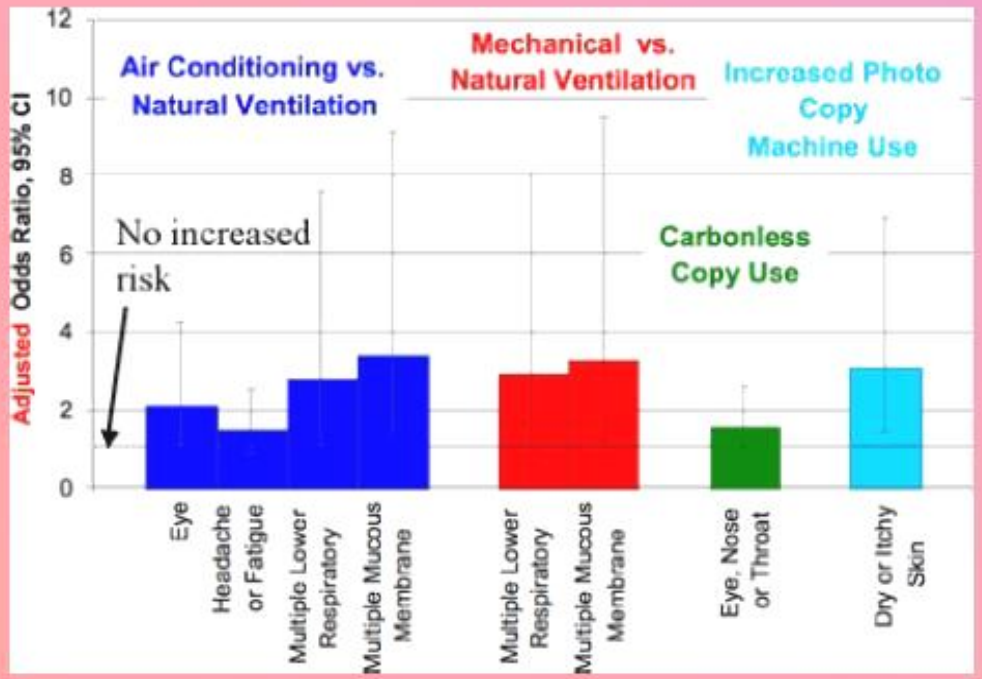
NIOSH *Updates*: Volume 4, Number 20, 2011

OSH INFO:

Sick Building Syndrome (SBS)

People working in some old buildings develop allergic-like symptoms (sneezing, runny nose, and itchy eyes) or 'sick building' symptoms (one or more of the following temporally related to work: headache, fatigue, stuffy nose, irritated eyes, dry facial skin or sore throat). These symptoms disappear when the worker is away on holidays and also over long weekends. The symptoms recur when the people return to the building for their regular work. Many studies show that the prevalence of most symptoms associated with the sick building syndrome decrease by 40% to 50% after the workers move to a building with an improved ventilation system. Bioaerosol (specifically airborne fungus e.g. Alternaria allergens and house dust mite allergens) concentrations in office environments are responsible for the allergy and the sick building syndrome. The presence of airborne Alternaria allergen at work sites was significantly associated with poor ventilation system and this was in turn associated with lower efficiency of the filters. In Malaysia the ducts associated with the central cooling system is loaded with fungal and bacterial growth and is most likely the cause of sick building syndrome. The ducts are rarely cleaned and the accumulated fungal and other growth can be substantial in these ducts in an old building. Many people with true allergy may suffer from exposure to the fungal spores or dust mites in offices located in the tropics. The high concentration of fungal material present in old buildings may also aggravate true allergies in people working such buildings.



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Symptoms of Sick Building Syndrome

Sick building syndrome involves a variety of seemingly unrelated symptoms, much like other unexplained conditions such as chronic fatigue syndrome (CFS), and Gulf War syndrome (GWS) do. Some authorities have attempted to separate the symptoms into distinct categories such as 'allergic' and 'non-allergic', or 'chemical related' and 'microbe related'. Since there is yet no concensus on these distinctions, **the common symptoms of SBS are listed here together:**

Headache
Eye, nose, and throat irritation
Dry cough
Dry, itchy skin, rashes
Dizziness and nausea
Difficulty in concentrating
Fatigue
Sensitivity to odours

Sensitivity to odours is the definitive symptom of the related condition multiple chemical sensitivity (MCS). Both SBS and MCS are thought, at least in part, to be due to exposure to VOC's in the air.

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Causes of Sick Building Syndrome.

Although in many cases the exact mechanism by which a building, or substances within the building, are causing the occupants to become ill is unknown, the problem areas can usually be identified and remedial action taken. **In many SBS cases poor building design, maintenance, and/or operation of the structure's ventilation system may be at fault. The ventilation system in particular is often found to be at the heart of the problem, and can itself be a source of irritants.** In addition, a poor ventilation system can result in a buildup of pollutants within the building, in which case the indoor environment can often have air quality much lower than the outdoor air, even in a heavily polluted city centre with it's clouds of vehicle exhaust and other pollutants. Interior design factors, such as the arrangement of individual offices and cubicles, may also interfere with efficient functioning of ventilation systems. Essentially poor office design and maintenance of the ventilation system can amplify the negative health effects of various factors, both biological and chemicals, that we'll discuss below.

It has also been suggested that very low levels of specific pollutants, such as VOCs, that are present inside a building may act synergistically, or at least in combination, to cause symptoms of illness. The chemical industry is not strictly regulated, with the majority of the many thousands of chemicals in everyday use having not been tested for health effects before their introduction. Chemicals have traditionally been thought to be toxic only above certain concentrations but scientists are now finding they often have health damaging effects at much lower levels, previously considered to be safe. In the case of small amounts of multiple different chemicals acting in combination to cause illness, there is virtually no research on this to refer to, so any effects are entirely unknown

The symptoms of SBS are likely the result of a combination of factors. Many of the symptoms can be attributed either to the known toxic effects of high levels of certain chemicals. Other symptoms are typical of allergic reactions which could be triggered by various allergens in a building. Still other symptoms are very reminiscent of those experienced by sufferers of multiple chemical sensitivity and many of the indoor pollutants identified in sick buildings are also those said to cause symptoms in those suffering from MCS. It's likely that all of these mechanisms and associated pollutants are involved in SBS