Air Pressure Differences

According to data collected by the Heating Refrigerating and Air Conditioning Institute of Canada (HRIA) during monitoring of the mechanical air handling systems for the R2000 program, conclusions included "that air contaminants in air-tight homes can reach unacceptable levels unless fresh air can be introduced to each habitable room, at a pre-determined rate and in a controlled manner. Further monitoring of conventional houses indicated that they too can have indoor air quality problems even though they are more leaky."[1]

The stated scientific facts that indoor air can be contaminated confirms assumptions that are reported by persons with Multiple Chemical Sensitivity (MCS). An underlying assumption that "fresh" air intake contains less contaminant than what may accumulate in the home may not be correct depending on location. If you live in a polluted urban environment then an air cleaner may be required to relieve symptoms of exposures to contaminants. Sources of pollution: http://www.cirf-hub.ca/PEC/location.html

Four factors that combine to create a constantly changing pattern of air leakage in a typical house are:

1. Temperature difference between indoors and outdoors – causing what is known as the "stack effect" – is the most significant factor. This creates a positive pressure in the upper part of the house, which forces indoor air outward (remember warm air rises), and a negative pressure in the lower part of the house, which draws outdoor air inward. On a cold day in winter, these stack pressures can be large, while on a mild day in spring or fall, there may be almost no stack effect at all.

2. Wind creates a positive pressure outside the house on the windward side, forcing air inward, and a negative pressure on the leeward side and over the roof, drawing air outward. Air leakage from wind is the dominant factor on a windy day.

3. Chimneys expel combustion gases from furnaces, boilers, fireplaces, and wood stoves creating a negative pressure in the house by exhausting the air.

4. Ventilation equipment and appliances, such as exhaust fans, clothes dryers, and central vacuums, also create a negative pressure in the house by exhausting the air.

A mechanical ventilation system that includes a heat recovery ventilator (HRV) can equalize pressure efficiently. If an HRV is not economically feasible, ensure that you have exhaust fans in the kitchen and bathroom for removing odours and moisture, and provide a fresh air inlet. [2]

So, if a high tech solution is not available, open a window away from the exhaust fan when it's on.

Links to more information:

CMHC technical publications: http://www.cmhc-schl.gc.ca/publications/en/rh-pr/tech/dblist.cfm?mode=title

Air Cleaners: http://www.globalserve.net/~allertech/AllergyAir.htm

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1 Residential Air System design Manual, Heating Refrigerating and Air Conditioning Institute of Canada, 5468 Dundas St., W., Ste 226, Islington, On, M9B 6E3.

2 Air Leakage Control, Natural Resources Canada, Office of Energy Efficiency. Catalogue No.: M91-2/42-1998E. ISBN: 0-662-23227-5