How Sick Is Your Building...

And What Can You Do About It?

by Ritch C. Shoemaker, M.D. Part I

Do you remember the gasoline shortages of the 1970s, when OPEC flexed its supply-muscles bigtime, and the lines at the gas station often stretched to the distant horizon. Everywhere you turned in that frantic Jimmy Carter-era, government economists and oil industry experts were giving speeches on the need to "make sure that we never allow ourselves to become vulnerable to 'petroleum blackmail' again!"

Question: does that scenario sound a bit ... familiar?

Of course it does. If you're like most Americans of middle age, you probably also recall how the gas crunch inspired a lot of automakers to get out there and design cars that "sipped" fuel, rather than gulping it by the gallon. Remember those "waves of imports" (mostly Japanese, of course) that boasted of "getting 40 miles to the gallon on the open highway?"

Suddenly, all those tail-finned highway monsters of the 1960s were "out'll replaced by needle-nosed, supremely fuel-efficient cars like my 1972 Subaru, which racked up 42 miles to the gallon and never looked back.

Ah, the good old days. Was it Yogi Berra (or Lao-Tze?) who once described the world of ever changing and ever returning fashion by pointing out: "It's *deja vu* all over again?" Welcome to the brave new world of the New Millennium, in which more and more folks seem to be driving $28,000 Sport Utility Vehicles (but without the tailfins), and in which the Arab Emirates are once again leveling their petroleum-gun at our heads.

Why can't we learn? Twenty-five years ago, the experts in the environmental think tanks talked endlessly of solar energy, ethanol-based gasoline, wind power, geothermal power, hydroelectric power, methane recycling and a dozen other "alternative energy" sources that were going to "free us" from dependence on fossil fuels. Back then, the conventional wisdom said: "Diversify your supply, don't get into a place where you must depend for your energy needs on a single source!"

But it didn't happen. For reasons that remain crystal-clear, the great energy corporations continued to put all their eggs in the basket marked "internal cornbusion engine," and the rest of us continued to empty our wallets every time we pulled into a gas station. Ask yourself. do you really think the Shells and the Texacos of the world would have continued sitting on their hands in the research labs, if there had been enough Big Dollars available from these new energy sources to offset the loss of making capital improvements to the petroleum infrastructure?

Unlike the oil moguls, however, the nation's building industry *did* respond aggressively to the 1970s demand for increased fuel efficiency They probably didn't do it out of civic high-mindedness, though. Most of the developers simply realized early on that designing and constructing airtight buildings was in their own best financial interests.

Enter the era of the "sealed" office building or shopping emporium, in which the sweet promise of "climate control" seemed to offer homo *sapiens* an endless, balmy springtime-along with clean, crisp "recirculated" air that would remain forever untainted by contact with the outside world. How magical it all seemed ... the idea that we could solve such problems as smog, high humidity, cigarette smoke-and even the energy shortage -by simply manipulating the HVAC system!

It was a pleasant enough daydream. But then reality showed up, in the form of various nasty fungal species that seemed to thrive in the moist, warm air being wafted their way by computer operated heating and air conditioning systems guaranteeing a steady 73 degrees, as well as changeless humidity.

There's no doubt that these new building designs and climate controlled HVAC systems have saved America some energy dollars in recent years. Almost overnight, millions of homeowners and office workers were gazing at the outside world through "double-paned, fixed windows," secure in the knowledge that the Breath of Winter would never gain entry.

And so what if these hermetically sealed fortresses never allowed their occupants a single lungful of fresh air? (Nor is the problem limited to office buildings, by the way, in a world where climate-controlled homes are rapidly becoming the norm.)

The same philosophy-" Lower Costs, At All Cost!"-also helped to shape new construction methods aimed at reducing the need for maintenance by owners. Just look at the vinyl siding on all those new tract houses springing up across the land. Or take a few minutes to read the fine print on the can of indoor paint, along with the chemically treated wall coverings and rugs, in a typical new home. Supposedly, these treated materials will make life much more difficult for the kind of bacteria and fungi that used to gnaw happily away at floors, walls and baseboards, in the bad old days before we found a "chemical fix" for virtually all of life's problems.

Ask yourself: what role do the built-in fungicides really play, in that can of latex paint that just went on the wall? What are the unexpected human health effects that can be triggered by a wall-covering treated with chemicals engineered to kill bacteria and fungi? Sure, these nifty contrivances serve to "reduce maintenance" . . . but what *other* unintended consequences may flow from such high-tech devices, without our even knowing it?

These days, the computers purr contentedly inside the sealed buildings, and we tell ourselves that we've finally managed to engineer the various "risk-factors" completely out of our new office buildings and increasingly popular "smart houses."

Too bad it isn't true. Like every other weapon in the struggle for space among living organisms, our nifty engineering designs and our toxin-sprayed wallpaper and chemically treated throw rugs all have a "downside"-a price that must be paid for relying on this particular strategy of self-defense.

Take that "climate-controlled" heating and air conditioning system I mentioned a minute ago, for example. Sure, it's "energy-efficient." But what happens when you trap the same stale air inside a system for weeks and months at a time? Answer: It becomes a *habitat—a world* in which one or more biological species can "feed and breed." And that's the key theme of *Desperation Medicine,* really: the recognition that changing the habitat frequently opens the door to new organisms that can threaten human health. If we are going to live safely in our spiffy new homes, we must not ignore the eco-niches we are creating with all of our wondrous new technology.

One of the key problems in any interior environment is that we humans need some airborne moisture (I recommend 40 percent humidity in the home at all times, by the way), in order to prevent our mucous membranes from drying out and then triggering attacks of ear, sinus or lung infection.

Some moisture is good, then. But when the humidity climbs too high in a home or office—or when "standing water" is allowed to remain on the premises for more than a few hours-we soon find ourselves confronting a host of pathogens designed by nature to thrive in this more tropical environment, with potentially serious consequences for our own good health.

In order to understand why water is the real "enemy" in the enclosed human habitat, let's step back for a moment and imagine that we're about to buy a new home. In this imaginary scenario, I'll use a few useful tips gleaned from the "Historic Remodelers of the Eastern Shore," an extraordinarily savvy group of home-design and engineering experts. (I'll also assume that you aren't putting too many toxic chemicals into your house and that your windows open!)

The first important thing we need to remember, says Historic Remodelers, is that the lower you go in a building that contains a water problem, the more likely you are to encounter health-threatening toxins (aka "mycotoxins") spawned by various fungal species. Example: *Stachybotrys,* a particularly versatile toxin-former (at least 24 different toxins identified so far) grows better in sub-basements than basements and better in basements than on ground floors. (But don't forget that upper level-entry of water can contaminate a home from top to bottom with numerous other toxin-spewing fungi, in addition to *stachybotrys.)*

So how can you quickly determine if your new home is fungi-free or not? The quickest approach, of course, would be to conduct a Contrast Sensitivity (CS) Test on the former owners . . . while also examining the school records of the children who lived there before you, in order to make certain that they weren't learning-disabled due to neurotoxins caused by fungi. But since that kind of interrogation probably won't happen ("You want to do *what?*"), you'll probably prefer to follow the steps described below.

First: start with the simple things. Remember that a "wind barrier" placed 80 feet from the north and west sides of your new home will lower heating costs dramatically. At the same time, it will blunt the wind's ability to drive water into your home. Make sure the barrier includes both deciduous trees (for pleasing summer shade) and conifers (their evergreen limbs provide an efficient, year-round windbreak). If possible, plant shrubs that taper in height to improve the aerodynamics of the break. This foliage will provide cover and food sources for the new species that will soon be arriving to enjoy your new ecosystem. Just make sure the vegetation isn't quickly gobbled up by deer!

The south and east sides of the house should be outfitted with a variety of deciduous shade trees. Plant your best "ornamentals" here, and you'll enjoy an earlier spring and a later fall season of blooms. The shade will help in summer, and the early morning winter sun will provide almost as much radiant heat as you'd get from a wood stove. And who can forget the thrill of watching a flock of cedar waxwings flutter through an ornamental crabapple tree at dawn, outlined in the burnt gold luminescence flooding from the just risen sun?

Remember, too, that planting your windbreak too close to your foundation will defeat the purpose. That's because thick plantings retain moisture at the foundation line. Their roots tend to wick surface water beneath the house or into

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the basement. For best results, plan exactly how you're going to move water that gets dumped on your house quickly away from it.

Other key moisture-problems include interior leaks from overflowing washing machines, shower faucets that drip water and condensation that occurs beneath the house. You should also take a careful look at your roof. Has the flashing been properly installed at the junction with the masonry? (Look for stains on the brick and watermarks on the joists, underneath.)

Make sure, also, that at least 18 inches of flashing protects every junction where a roof fine joins the side of another wall. Look for algae growing on the northwest side of a roof joining a wall ... a likely sign that you've got too much water (or two little airflow) in that section of the roof.

As for the windows: don't forget that they let in a lot more than just sun and air. Install flashing atop each, with double caulking on the sides and bottom. The window stool should feature enough angle and lip to drain water off at the top and not behind the siding.

Next step: make certain that your attic has adequate ventilation. Soffit and ridge pole treatments usually work well together. Remember, too, that attic heat on a summer day can make any air conditioner's duct-joints sweat up a storm. But not to worry, you can easily find a flexible glue that will prevent water entry from this source.

Now it's time to inspect your outside walls. Remember that any vapor barriers you install should go on the outside of your plywood, but under your siding. That's because moisture infiltration is greater during warm, humid days. You don't want a lot of wet, outside air penetrating through your house sheathing to a vapor barrier beneath your drywall ... or to an impermeable wall covering. So build your barrier while remembering that a stiff interior wall covering (such as luan plywood or paneling) may wind up giving the indoor toxim-forming fungi the habitat they love most: cellulose from your drywall, moisture from the inside of the house that's retained by the outside vapor barrier, heat and darkness.

So far, so good. But now it's time to step into the watery world of the bathroom. Here I enthusiastically recommend that you spend a few extra dollars for a cement backer for your tiled shower--and especially for your pre-fab insert shower stall. Don't settle for a "water-resistant" drywall! The cement is heaver, and takes more time to install and seal. But remember: Every tile treatment will eventually leak (along with the factory-made, plastic enclosure).

Another bathroom tip: make sure you have a good exhaust system from your bathroom to the outside, and that you aren't venting all that moisture into a closet. You do not want to open the door to your winter coats and get a summer's worth of spores, toxins, and enzymes in your lungs. Remember, also that you should never vent exhaust into your attic or crawl space.

Be sure to vent your dryer with a downslope and a short run to the outside. To show you why, let me describe one of the worst examples of "bad dryer venting" I ever witnessed. It occurred in the for-sale home of a nearby prominent builder, whose dryer exhaust inexplicably ran uphill, then through a cold closet and a heated room en route to the outside. As you might expect, the lint collected at the junction of cold and warm pipes, where it soaked up moisture and contributed to a leaky pipe in a wall cavity behind a child's headboard. Even worse, every time the dryer door opened, outside air whirled fungi toxins into the device ... and into the bathroom. Remember that "out of sight is definitely not out of mind" (or lung, for that matter). If you happen to live at the bottom of a slope, don't make your basement or crawl space the local "birdbath." In this situation, you'll have to build terraces, swales, or dry wells ... or maybe even install lawn pipes to direct the water away from your living spaces. Do it! The effort will be rewarded, each time you realize that you can breathe freely at night. Besides, your interesting water-control structures will attract an incredible diversity of species, including amphibians and birds. Beautify your yard, even as you save your basement! Water really does run downhill, and you can't change that. Use it to your advantage, instead.

Another suggestion: build a ventilated shed for your firewood. Do you really want the water from three cords of green wood evaporating into your basement?

Now here's a warning: if you're looking at a dirt floor in your crawlspace, you're also looking at a moisture factory. I've heard many pros and cons about crawlspaces, and I'll tell you flat-out: I don't like them. But if you're forced to live with one, remember a key rule: If you close off your ventilation grates in summer (reducing the flow of hot, humid air), be sure to open them in the winter to let in the cold-so that the fungi population doesn't increase over the winter. And never put a vapor barrier on the house-side of your sub-floor. (Try and tell that to a contractor who insists on putting his sub-flooring on the moment his floor joists are in place.) The construction will go a bit more slowly, but you'll keep moisture out of your living space.

To solve the crawlspace problem, cover your dirt floor with a 20-mil sheet of plastic, then secure it with a thin layer of ballast stone. An exhaust fan can help keep the moisture level lower ... but don't mount it on the wood-joists for your floors, because you'll feel and hear it constantly after that, no matter how quiet it's supposed to be.

It helps to remember that basements are always the worst offenders, when it comes to home-acquired fungal illnesses. To defend against them, study your basement water inputs first. Example: a hot water heater can easily trigger condensation and create pools of standing water. Insulate that heater. And don't forget that if you have a humidifier attached to your central heat, it should not become a fungus hatchery.

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Keep it dry and clean by applying a five percent solution of chlorine bleach (no more) regularly.

Never forget that the key to protecting your basement is to keep water out. Downspouts shouldn't stop at the foundation line, for example. If you can't waterproof the basement concrete walls, the best solution is to excavate the outside of the foundations so that you can then apply waterproof paint to the exterior of basement walls. Better yet, in new construction, apply the wall treatment at the start of the process, not the finish.

Think it through! One mycotoxin patient of mine back-filled the outside of his basement walls with 20 inches of pea gravel enclosing perforated drainpipes that were covered with red resin paper on the uphill sides of his basement. The pipes ran around the house on the downslope side. He then built eight-by-12 foot fish ponds under each of the screened exhaust ends of the pipes. Now he enjoys a clear waterfall year-round, and it doesn't freeze up, even in the dead of winter. His neighbors still don't quite understand why his ponds don't freeze. This gentleman's basement remains quite dry, thank you-because he knew how much water pressure was being exerted on his basement walls. Make water a friend and not an enemy!

I think it's quite helpful to know that you can be creative with your "water solutions." Like ag chemicals, water is safe in the right amounts, and at the right times, and in the right places. Otherwise, that unruly H20 can provide the necessary habitat for toxin-formers that will grow fast if you let them.

And one final recommendation: If you do fall prey to fungal toxins in your home, don't panic. You can easily obtain quick, inexpensive and effective treatment by consulting your physician and launching a regimen of cholestyramine therapy.

Take heart, but don't forget that fungal organisms don't stop growing just because we don't see them. To be effective, any "building remediation plan" you come up with (after water entry is controlled) should include liberal use of dilute bleach, or a quaternary ammonium cleaning compound. Anything else is a standing invitation for continued illness.

I also recommend that you contact an approved indoor environmental engineering firm before launching renovations aimed at restoring healthy air quality. Ask about their expertise in mycotoxin analysis, however. Remember that the new growth industry of indoor engineering has attracted plenty of "experts" outfitted with plenty of get-rich-quick schemes.

Don't let them get rich at your expense!

You won't want to miss out on a follow-up article in our July/August Issue of Filtration News entitled "Getting Behind Sick Building Syndrome". These excerpts, published with the permission and courtesy of Dr. Ritchie C. Shoemaker, represent small portions from his book, "Desperation Medicine". . stories of patients and the 'inside story' of how an American doctor discovered a threatening new family of environmental diseases . . . and how to stop them. For more information, contact Ritchie C. Shoemaker, 1604 Market St., Pocomoke City, MD 21851.

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