

PUTTING INDOOR AIR QUALITY IN ITS PLACE

Outspoken consultants Ronald Gots and Edward Sowinski warn of the dangers of overreacting to indoor air quality concerns. They say more science and less emotion should guide the IAQ debate.

By Gregg LaBar

Ronald E. Gots, an occupational physician, cringes when he hears people say that indoor air quality problems are an emerging occupational health epidemic or that approximately 1 million public and commercial buildings in this country may be "sick" due to inadequate ventilation and/or low levels of specific contaminants.

Although Gots believes that indoor air quality's (IAQ) impact on worker health deserves the attention of employers and building managers, he complains that many people's concerns are overblown or misguided. For example, while he regards IAQ-associated problems as "building-related symptoms," many other people use terms like "sick building syndrome" or "tight building syndrome."

"As soon as you call something a syndrome, people think the worst," said Gots, M.D., Ph.D., founder and president of his own medical and toxicology consulting firm, National Medical Advisory Service (NMAS), Bethesda, Md. "There is this perception about indoor air quality that it is an enormous problem, but as far as I can tell, that is a hyped-up concept with little scientific evidence. Indoor air quality in public and commercial buildings is related to comfort and discomfort, not whether or not people are going to get cancer."

Over the years, there have been a couple of serious outbreaks of building-related illness, including 29 deaths from Legionnaire's disease in a Philadelphia hotel in 1976. There are also instances where poor ventilation and/or specific environmental contaminants have resulted in lesser but nonetheless adverse health effects.

These outcomes are relatively rare, however, according to Gots, whose work includes providing expert testimony on behalf of businesses defending

Ed Sowinski (left) and Ron Gots (right) charge that in many cases, the breadth of the indoor air problem in U.S. office buildings and the risks to occupants are being overstated.



themselves in IAQ-related litigation. He estimated that in 70 percent of IAQ cases he's investigated, the indoor air concerns involve either "a nonproblem" with the air or "a nonidentifiable problem." More than half the time, he said, psychosocial factors like stress and job satisfaction, as well as ergonomics and work area lighting, are at least as important in people's perceptions about the quality of the air as the air itself.

In an interview with *Occupational Hazards*, Gots and Edward J. Sowinski, Ph.D., DABT, CIH, of Environmental Health Management and Science Inc. (EHMS), a Hudson, Ohio, affiliate of NMAS, criticized those who say that IAQ problems are a major occupational and environmental health threat. In many cases, they said, the breadth of the problem in U.S. office buildings and the risks to occupants are being overstated.

Nonetheless, they urged employers and building managers to implement comprehensive IAQ management programs, which they said should be performance-oriented, "reasonable," and based on "good science." Mirroring a position paper recently developed by the American Industrial Hygiene Assn. (AIHA), these programs, they said,

should cover ventilation system design and maintenance, identification of causes of IAQ problems, implementation of changes if necessary, and employee participation.

"The vast majority of indoor air issues involve the fine-tuning of worker health," Gots said. "Where reasonable improvements can be made, they should be made."

Here are answers, from the NMAS-EHMS perspective, to some key questions regarding the relationship between indoor air quality and worker health:

OH: What has sparked all of the interest in this subject?

NMAS-EHMS: Gots offered a number of reasons, including "some very real situations" in which people have developed serious illnesses as a result of inadequate airflow or from breathing air that contains bacteria, fungi, or hazardous chemicals. Not surprisingly, such cases have resulted in extensive media coverage, which has further fueled concerns. Sometimes, Gots said, the coverage has gone too far and led people to believe that their building may have similar problems.

In addition, Gots said "solution sellers" — consultants, product manufac-

turers, and other experts in the field — are pushing the issue sometimes in a biased or self-serving way. "Some air conditioning people would try to solve a supposed problem by installing a new air conditioner, even if you don't need one, because that's what they know," he charged. "The old adage — that if all you have is a hammer, everything looks like a nail — applies in this case."

Sowinski said many occupational and environmental health professionals and government agencies (especially states) have latched onto indoor air quality because more people are working in office environments and because physical haz-

ardness because people are beating the drum and saying it's important."

OH: *How big a problem is indoor air quality?*

NMAS-EHMS: Gots doesn't agree with the oft-cited statistics that between 800,000 and 1.2 million public and commercial buildings in the U.S. may have indoor air quality problems and that they cost American business some \$60 billion annually. He doesn't offer alternative numbers because he argues that there is currently "very little good data" to support any estimates. "Mostly what we have are anecdotes," Gots said. "You can't extrapolate that out to the universe of buildings."

Gots noted that it's very difficult to establish cause-and-effect relationships between indoor environmental conditions and symptoms. Many times, he said, it isn't even possible to conclude that certain symptoms are the result of any IAQ problem at all.

OH: *What kinds of problems exist?*

NMAS-EHMS: Despite questioning the overall relationship between IAQ and worker health, Gots acknowledged that some buildings do have significant IAQ problems that need to be addressed. He said they can result in a variety of symptoms, including eye irritation, dry throat, runny nose, fatigue, skin irritation, shortness of breath, cough, and dizziness.

According to Gots, most indoor air problems involve the heating, ventilation, and air conditioning (HVAC) system — that it was not designed and installed properly, is not being adequately maintained, or is simply wearing out. He said these problems are most common in buildings designed to minimize the intake of outside air during the energy-conscious 1970s.

"Despite people's perceptions to the contrary, there are few occasions when symptoms are actually caused by contaminants like formaldehyde or volatile organic compounds," he said. "Most of the time, if there is a problem at all and you can identify it, it is with the HVAC system."

Gots said there are, however, cases where specific agents like chemicals, microbes, and environmental tobacco smoke are the root of indoor air problems. For example, Gots recalled a school environment where the use of a petroleum-based product to remove floor tiles resulted in symptoms

among students and teachers.

He also offered the example of a bank building which had its intake ducts located on top of a flower bed. As a result, molds and peat were being sucked into the office building, which caused workers with allergies to experience eye irritation, runny nose, and other symptoms.

OH: *What role do psychosocial factors play in perceptions about indoor air quality?*

NMAS-EHMS: Gots estimates that at least 50 percent of the concerns that people associate with indoor air are really the manifestation of psychosocial factors. In some cases, he said, people dissatisfied with their jobs or suffering from stress perceive that there is something wrong with the air. In other cases, one or two people experience a real problem with the air, and when they tell their coworkers, everyone develops problems.

Gots mentioned the case of one worker in a large office building in California complaining to his coworkers that he smelled a chemical and that he thought he was being poisoned. Within a couple of days, some 100 people had experienced fainting or dizziness episodes. No IAQ problem was ever identified.

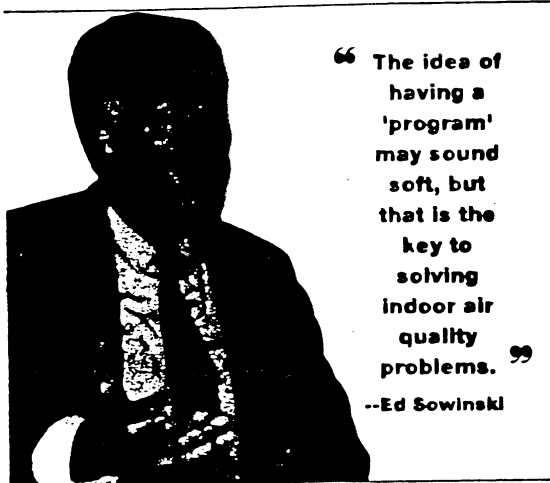
"It's very important not to lose sight of emotional factors," Gots said. "If you go into a workplace and tell workers that you smell what may be a harmful chemical, you will have a lot of sick people on your hands. If you have people who have already decided what their problem is, that can be difficult to overcome."

OH: *What should employers and/or building managers do to ensure the quality of indoor air?*

NMAS-EHMS: "Everyone should have a management program that is tailor-made for a particular building," Sowinski said. He said for small buildings, an IAQ management program can be about as simple as the one he has for the air conditioning system in his house — "Once every two months, I go down in the basement to make sure the filter is clean," he said.

Larger buildings, he continued, need comprehensive, written programs, as suggested in guidelines developed by EPA/NIOSH and AIHA. The AIHA guidelines, which Sowinski helped draft to be used as a model for regulations, highlight four key elements of an IAQ management program:

- Design and performance of HVAC equipment.
- General building conditions, in-

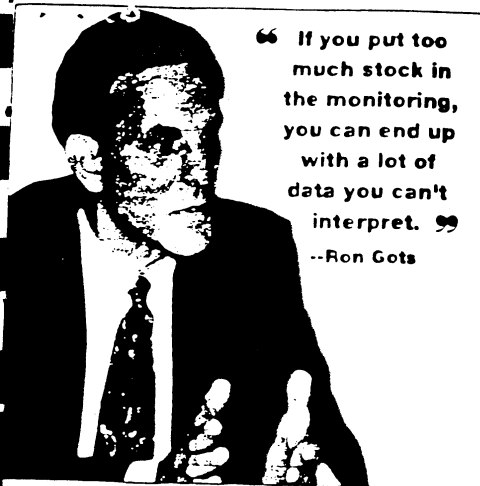


ards, "frank illness," and carcinogens are being substantially addressed.

"The concern about indoor air is in direct relation to the diminution of more serious problems," Sowinski said. "In Eastern Europe, which is faced with massive environmental contamination, it would be a joke to say you're concerned about indoor air. But, in the U.S., we're looking in more obscure corners for the sophisticated and subtle issues."

Another reason for the IAQ frenzy: Consumers and workers, Gots said, are all too willing to believe that indoor air is a serious problem and that an expensive solution is needed. "People perceive themselves as being victimized," he explained. "The fact that they smell something or that you can find 100 bad-sounding chemicals in every indoor environment doesn't mean a whole lot. But people just assume they're in danger, and they want to see you do something about it."

Gots said, "All these reasons taken together have a tremendous amount of force." Added Sowinski, "To a certain extent, indoor air is an emerging issue



“ If you put too much stock in the monitoring, you can end up with a lot of data you can't interpret. ”
--Ron Gots

cluding sanitation, contents, and contaminant sources.

- Determination of airborne contaminant indicators and other environmental factors, and

- Effective communication with building occupants, including responding to complaints within a reasonable time frame.

“The idea of having a ‘program’ may sound soft, but that is the key,” said Sowinski, suggesting that, in the absence of an IAQ regulation, employers address indoor air in a manner similar to the approach taken with OSHA’s performance-oriented hazard communication standard.

OH: Who should administer the IAQ program?

NMAS-EHMS: Gots recommended a “team approach” to dealing with IAQ. Included on the team, according to Gots, should be experts in occupational health or industrial hygiene, HVAC design, employee relations, building maintenance, and engineering, as well as building management and employees. The program administrator, Gots said, should probably be a person with an occupational health or industrial hygiene background, especially if employees are complaining of health problems.

“If you have one person with a headache, that may require a lot less attention and intervention,” Gots said. “You need to have all of these people involved up front and tied in, however, so they’re ready when needed.”

Sowinski said many industrial hygienists are still adjusting to the idea of dealing with indoor air quality, and have some concerns about the relatively low priority placed on monitoring for individual chemicals in the office building environment.

“I sense among some of my colleagues a degree of discomfort with this issue because they don’t see it as classical indus-

trial hygiene,” he said. “But I think it involves the same basic principles — When a person has a complaint, it’s treated as real, and you investigate it.”

OH: What role should employees play?

NMAS-EHMS: Gots and Sowinski recommended that employees be involved in identifying potential problems and solutions. Especially crucial, according to Sowinski, is that people’s complaints are taken seriously, investigated fully, and acted on quickly.

Sowinski pointed out that under the Toxic Substances Control Act, which EPA administers, employees who claim a substantial risk are entitled to a response from the employer within 15 business days. Although not specifically advocating a 15-day response period, Sowinski said employers might consider adopting a similar provision for indoor air.

“The open-door policy of inviting complaints is a cornerstone of the AIHA position paper,” Sowinski said. “There has been a concern that if building occupants are given the right to complain at will, operators of buildings will be deluged with a wide variety of complaints. Experience shows it really won’t turn out that way. In fact, when the attitude is taken that ‘I have all the answers; you wouldn’t understand anyway,’ you foster animosity, resentment, and artificial complaints.”

OH: How should employers/building managers investigate IAQ concerns?

NMAS-EHMS: Sowinski recommends starting with an inspection of the ventilation system to make sure that industry standards, including the recommendation from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) that outside airflow be maintained at 20 cubic feet per minute per person, are being met. He said it is important to check that ducts are not blocked, filters are clean, and fans and motors are in good working order.

He suggested a walkaround inspection of certain work areas to ensure that air intakes are not in close proximity to air vents. He also noted to be aware that when partitions are installed to divide what had been an open air location, some individual sections might be cut off from airflow.

On the controversial issue of whether

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MANAGING INDOOR AIR: AIHA'S ADVICE

Design and performance of HVAC equipment

An HVAC system inspection should include checking filters, drip pans, drainage piping, heating and cooling coils, outdoor air intakes, supply diffusers, return grilles, exhaust grilles, humidifiers, and controls. The inside of air ducts and plenums should be checked periodically for signs of rust, microbial growth, or other contamination.

General building conditions

Structural modifications, introduction of new furnishings, and the use of chemical products can all have a significant impact on indoor air quality. A management program should include procedures to plan for these developments and to address them when they’re in process.

Determination of airborne contaminant indicators

Results of monitoring for specific biological and chemical contaminants cannot always be clearly interpreted. Where monitoring is called for, it should focus on carbon dioxide, volatile organic compounds, formaldehyde, combustion byproducts (nitrogen dioxide and carbon monoxide), particulate matter, and microbiological contamination.

Effective communication concerning building occupant complaints

There should be a standard procedure for receiving, evaluating, and acting on complaints from building occupants. Businesses might consider the 15-day response period in the Toxic Substances Control Act as a benchmark for responding to employee concerns about indoor air.

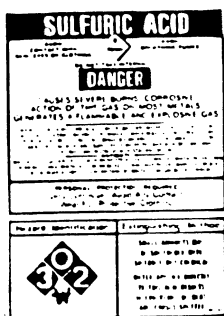
Source: “Guidance on Fundamental Issues Regarding Management of Indoor Air Quality,” *American Industrial Hygiene Assn.*, June 1, 1992.



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or not to conduct air monitoring in indoor air situations, Sowinski, the industrial hygienist and toxicologist, said monitoring can be useful to put indoor air in perspective but is seldom able to identify specific problems. In almost all cases, he noted, levels of contaminants in office buildings will be well below OSHA's permissible exposure limits (PELs) for industry, no matter how bad the IAQ problem is. Thus, Sowinski and Gots do not advocate comparing indoor air levels to existing exposure limits, other than for the purpose of putting air levels in perspective. Nor do they support the idea of developing lower-level exposure limits just for indoor air.

"If you put too much stock in the monitoring, you can end up with a lot of data you can't interpret," Gots said. "The fact that you're at one-tenth of the PEL is not very meaningful from a toxicological standpoint." He said it would be "dangerous" to attempt to set a sub-PEL exposure limit designed to assure "something as subjective as people's comfort."

OH: What still needs to be known about the relationship between indoor air quality and health effects?

NMAS-EHMS: "I'm not sure there are a lot of things we really need to know to solve individual problems because most of them are related to the HVAC system," Gots said.

According to Gots, however, much more study is needed on one key, controversial topic — multiple chemical sensitivity (MCS), the idea that some people can become hypersensitive to chemicals to the point where they suffer from constant fatigue, memory loss, and various physical problems. The issue has divided medical experts and been the subject of a significant amount of litigation.

From Gots' perspective, "At the moment, there are no data to support the proposition that MCS is real. This is an area where theory has been put into practice very quickly. That's not uncommon in medical history, but the history of medicine is littered with the rubble of failed scientific theories."

He estimated that more than 50 percent of the people who believe they're suffering from multiple chemical sensitivity actually have severe psychological problems not related to chemical exposure. "I believe there are a lot of people who are frankly being mis-treated," he said. "If it is true that there

is a subset of people who really have this disorder, there is also a much larger subset of people who are being treated for the wrong thing."

According to Sowinski, in addition to attempting to settle the MCS debate, research should focus on: standardizing air sampling and analytical procedures; demonstration of HVAC technologies within model buildings; methods for determining product emissions prior to marketing; and measurement protocols for carbon dioxide, which can be an indicator of ventilation adequacy.

"Thanks to great advances in the field of analytical chemistry, the methods are there to measure indoor air," Sowinski said. "Advances in toxicology haven't kept up, which is why we don't know what it means when you find a part per billion of 10 or 12 trace contaminants. That is an area where more progress is needed."

OH: In light of what is and isn't known, is it time for the government to step in and regulate indoor air?

NMAS-EHMS: "I think there ought to be some regulations," Sowinski said. "It would be negligent for a big office building to get away with not having an IAQ management program."

Sowinski said OSHA is in the best position to regulate indoor air quality and should do so with a generic performance-oriented standard, analogous to the hazcom standard and the IAQ guidelines developed by EPA/NIOSH and AIHA.

Because there are currently no federal IAQ standards, Sowinski said he's especially concerned about a developing "patchwork quilt of state regulations" — including action in California, Maine, Missouri, New York, New Jersey, Oregon, and Washington. As part of this effort, some states are considering setting sub-PEL standards.

Said Gots, "Good science has to be a part of any regulatory approaches. Setting limits is not good science, but people are trying because of the perception that indoor air is a widespread threat to the public health. I don't think that's accurate. Even if it is, the major thing one would do about it would be to have a management program in place to take care of the HVAC system."

According to Gots and Sowinski, indoor air quality needs to be addressed, but with caution and from the perspective that it is a quality-of-life, not a life-or-death, issue.