Manicure Environmental Issues

Allergies and Other Hazards

Other common problems associated with nail products are allergic reactions, such as contact dermatitis, a skin rash characterized by redness and itching and sometimes tiny blisters that ooze.

Certain nail ingredients are known for their tendency to cause allergic reactions. Residual traces of the basic building blocks of acrylic resins ("acrylics") used in artificial nails, for example, can cause redness, swelling and pain in the nail bed. In some cases, the reaction is so severe that the natural nail separates from the nail bed, and although a new nail usually grows in, it may be imperfect if the nail root has been damaged.

Nail strengtheners that contain "free formaldehyde" may cause an irritation or reaction, as can certain other chemicals in nail glues and polishes.

In the late 1970s, use of methyl methacrylate (MMA), then a common ingredient in artificial nail products, resulted in the FDA receiving a number of reports of injuries and allergic reactions, including damage and deformity of fingernails and contact dermatitis. The ingredient now is rarely used because of legal action against a former manufacturer of methyl methacrylate-containing products and numerous seizures and recalls of such products. Methyl methacrylate has since been replaced with other chemicals, such as ethyl methacrylate (EMA). However, according to John Bailey, Ph.D., acting director of FDA's Office of Cosmetics and Colors, the

replacement chemicals have never been fully studied for safety, and they may be as harmful as methyl methacrylate.

"Our current guidance is that products containing ethyl methacrylate (EMA) should be used only by trained nail technicians under conditions that minimize exposure and skin contact because of their potential to cause allergies," he said.

Whatever the cause, allergic reactions usually take place where the product has been applied or where it has inadvertently come in contact with other skin surfaces, such as the face, eyelids and neck. When the offending agent is no longer used, reactions clear up. Sometimes, the user can identify the chemical causing the allergic reaction and avoid it.

Though rare, some nail products can cause illness and even death, particularly if ingested by children. The Consumer Product Safety Commission requires household glue removers containing more than 500 milligrams of acetonitrile in a single container to carry child-resistant packaging. This includes glue removers for artificial nails.

Nail products also can be dangerous if they get in the eyes. And they can easily catch on fire if exposed to the free flame of the pilot light of a stove, a lit cigarette, or even the heating element of a curling iron.

The Importance of Ventilation

The ventilated table is the most important engineering control for getting rid of EMA in the fingernail salon because the vented table places local exhaust ventilation close to the work area.

- ***Place local exhaust ventilation*** as close to the EMA source as possible. Exhaust this air outdoors. Charcoal filters that allow the air to be used over again are not recommended because it is hard to know when the charcoal is full.
- ***Build a ventilated table***, or change a table you already own into a ventilated one. Ventilated table sizes will vary from nail salon to nail salon. Choose a wood for your ventilated table that will not soak up the chemicals. If the table acts like a sponge, it may actually expose you to the chemicals you want to avoid. A veneer-coated particleboard works well for the table material.

Make a hole in the tabletop for an air intake (called the downdraft face). This downdraft face should be placed on the technician's side of the table. Cover the hole with a screen-like cover (or perforated plate) to prevent things from falling in.

The client's side of the table should be a little higher than the technician's side. This will allow the client's hands to hang over the downdraft face and be as close as possible to the local exhaust ventilation.

- ***Make sure enough air blows through the table downdraft*** to get rid of the EMA. The amount of air exhausted depends on its speed as it moves through the downdraft face and on the size of the table opening. However, too much air rushing past the fingernails may cause the artificial nail product to crystallize.

An air speed of 620 feet per minute, directly above the 13- by 4-inch downdraft face works well. A 22-inch baffle should surround the downdraft face to pull the moving air closer to the client's hands.

Different drying times are needed for different fingernail products and different application techniques. Although a stronger and larger airflow will collect more dust during filing and dry the color coat faster, a slower and lower airflow gives better results for the artificial fingernail product.

- ***Choose an exhaust fan*** that can exhaust at least 250 cubic feet per minute of air and has 1/4-inch static pressure. A 1/8-horse power centrifugal fan should work well. You can find a fan supplier by looking in a directory called "Thomas Register of American Manufacturers." Look under the headings of "fans" or "fans, centrifugal." Your public library should have this directory. The fan supplier may be able to install your fan, as well as supply the ductwork and other needed materials.

- ***Provide enough makeup air*** to replace the exhausted air. If the makeup air is too weak, there will be negative pressure areas and perhaps drafts. The air intake, which pulls outdoor air inside, should not be placed near the building exhaust. If the exhaust and intake vents are too close, dirty air will be pulled back into the room.

- ***Comfort fans*** should not blow directly on the downdraft face because the strong air movement can interfere with the exhaust airflow.

Keep Dispenser Bottles Closed

Use dispenser bottles that have small openings, only large enough for an application brush to enter. The bottle stoppers should be pressure sensitive. A dispenser bottle with a pressure-sensitive stopper and small opening will result in less evaporation of the fingernail liquid and, thus, will cut down on possible exposures to methacrylates.

Change Your Work Habits

Nail technicians can also lower their exposures to these airborne chemicals by changing some of their work habits:

1. EMA-soaked gauze pads should be placed in a sealed bag before being thrown in the trashcan.
2. Trashcan liners should be changed daily.
3. No more than the needed amount of fingernail liquid should be poured into the closed dispenser bottle.
4. Nail technicians should wear personal protective clothing and glasses. When technicians remove artificial nails, chips of acrylic often fly off, creating a need for eye protection. In addition to safety glasses, technicians also should wear long sleeves and gloves to protect their skin from acrylic dust.
5. Technicians should wash their hands, arms, and face with mild soap and water several times throughout the day to remove potentially irritating dust.

6. Eating and drinking should not be allowed where artificial fingernails are applied or in other working areas. Methacrylates in nail dust can be carried accidentally to the mouth or face on a cup or other food item, and this contact may cause a skin rash. Also, many other chemicals are used in a salon that could cause health problems if swallowed.
7. Smoking should be banned for the entire salon because many of the chemicals in a beauty shop, including nail products, catch fire easily.

Air Quality Concerns

Nail Salons are businesses that must be very conscious of air quality. As such, manicurists should be aware of ways to improve air quality in their environment. This section, from an EPA study on managing air quality addresses just that, and should be paid special attention.

The indoor environment in any building is a result of the interaction between the site, climate, building system (original design and later modifications in the structure and mechanical systems), construction techniques, contaminant sources (building materials and furnishings, moisture, processes and activities within the building, and outdoor sources), and building occupants.

The following four elements are involved in the development of indoor air quality problems:

Source: there is a source of contamination or discomfort indoors, outdoors, or within the mechanical systems of the building.

HVAC: the HVAC system is not able to control existing air contaminants and ensure thermal comfort (temperature and humidity conditions that are comfortable for most occupants).

Pathways: one or more pollutant pathways connect the pollutant source to the occupants and a driving force exists to move pollutants along the pathway(s).

Occupants: building occupants are present. It is important to understand the role that each of these factors may play in order to prevent, investigate, and resolve indoor air quality problems.

Sources of Indoor Air Contaminants

Indoor air contaminants can originate within the building or be drawn in from outdoors. If contaminant sources are not controlled, IAQ problems can arise, even if the HVAC system is properly designed and well maintained. It may be helpful to think of air pollutant sources as fitting into one of the categories that follow. The examples given for each category are not intended to be a complete list.

<u>Sources Outside Building Contaminated Outdoor air</u>

- Pollen, dust, fungal spores
- Industrial pollutants
- General vehicle exhaust

<u>Emissions from nearby sources</u>

- Exhaust from vehicles on nearby roads or in parking lots, or garages
- Loading docks
- Odors from dumpsters

- Re-entrained (drawn back into the building) exhaust from the building itself or from neighboring buildings
- Unsanitary debris near the outdoor air intake

Soil gas

- Radon
- Leakage from underground fuel tanks
- Contaminants from previous uses of the
- Site (e.g., landfills)
- Pesticides

Moisture or standing water promoting excess microbial growth

- Rooftops after rainfall
- Crawlspace

Equipment HVAC system

- Dust or dirt in ductwork or other components
- Microbiological growth in drip pans, humidifiers, ductwork, coils
- Improper use of biocides, sealants, and/ or cleaning compounds
- Improper venting of combustion products
- Refrigerant leakage

Four elements— sources, the HVAC system, pollutant pathways, and occupants—are involved in the development of IAQ problems.

Human Activities

- Smoking
- Cooking
- Body odor
- Cosmetic odors

Housekeeping activities

- Cleaning materials and procedures
- Emissions from stored supplies or trash
- Use of deodorizers and fragrances
- Airborne dust or dirt (e.g., circulated by sweeping and vacuuming)

Maintenance activities

- Micro-organisms in mist from improperly maintained cooling towers
- Airborne dust or dirt
- Volatile organic compounds from use of paint, caulk, adhesives, and other products
- Pesticides from pest control activities
- Emissions from stored supplies

Building Components and Furnishings

- Locations that produce or collect dust or fibers
- Textured surfaces such as carpeting, curtains, and other textiles
- Open shelving
- Old or deteriorated furnishings
- Materials containing damaged asbestos

Unsanitary conditions and water damage

- Microbiological growth on or in soiled or water-damaged furnishings
- Microbiological growth in areas of surface condensation
- Standing water from clogged or poorly designed drains
- Dry traps that allow the passage of sewer gas

Given our present knowledge, it is difficult to relate complaints of specific health effects to exposures to specific pollutant concentrations, especially since the significant exposures may be to low levels of pollutant mixtures.

Chemicals released from building components or furnishings

- Volatile organic compounds
- Inorganic compounds

Other Sources

- Spills of water or other liquids
- Microbiological growth due to flooding or to leaks from roofs, piping
- Fire damage (soot, PCBs from electrical equipment, odors)

Special use areas and mixed-use buildings

- Smoking lounges
- Laboratories
- Print shops, art rooms
- Exercise rooms
- Beauty salons
- Food preparation areas

Redecorating/remodeling/repair activities

- Emissions from new furnishings
- Dust and fibers from demolition
- Odors and volatile organic and inorganic compounds from paint, caulk, adhesives
- Microbiological released from demolition or remodeling activities

Indoor air often contains a variety of contaminants at concentrations that are far below any standards or guidelines for occupational exposure. Given our present knowledge, it is difficult to relate com-plaints of specific health effects to exposures to specific pollutant concentrations, especially since the significant exposures may be to low levels of pollutant mixtures.

Mitigation

Over the years many types of mitigation (correction) strategies have been implemented to solve indoor air quality problems. The purpose of this section is to provide an understanding of basic approaches to mitigation and the various solutions that can be effective in treating commonly encountered IAQ (indoor air quality) problems. It is not intended to provide detailed instructions for using each type of mitigation approach but rather to give guidance in selecting a mitigation strategy and in judging proposals from in-house staff or outside consultants. Mitigation of indoor air quality problems may require the involvement of building management and staff representing such areas of responsibility as:

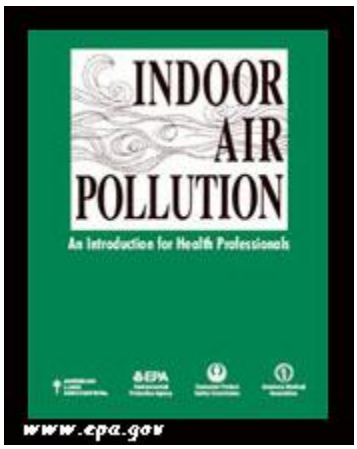
- Facility operation and maintenance
- Housekeeping
- Shipping and receiving
- Purchasing
- Policymaking
- Staff training

Successful mitigation of IAQ problems also requires the cooperation of other building occupants, including the employees of building tenants. Occupants must be educated about the cause(s) of

the IAQ problems and about actions that must be taken or avoided to prevent a recurrence of the problems.

Controlling Indoor Air Problems

Efforts to control indoor air contaminants change the relationships between these factors. There are many ways that people can intervene in these relationships to prevent or control indoor air contaminant problems. Control strategies can be categorized as:



- Source control
- Ventilation
- Air cleaning
- Exposure control

Successful mitigation often involves a combination of these strategies.

Source Control

All efforts to prevent or correct IAQ problems should include an effort to identify and control pollutant sources.

Source control is generally the most cost effective approach to mitigating IAQ problems in which point sources of contaminants can be identified. In the case of a strong source, source control may be the only solution that will work. The following are categories and examples of source control:

- Remove or reduce the source

- Prohibit smoking indoors or limit smoking to areas from which air is exhausted, not re-circulated (NIOSH regards smoking areas as an interim solution)
- Relocate contaminant-producing equipment to an unoccupied, better ventilated, or exhaust-only ventilated space
- Select products which produce fewer or
- Less potent contaminants while maintaining adequate safety and efficacy
- Modify other occupant activities
- Seal or cover the source
- Improve storage of materials that produce contaminants
- Seal surfaces of building materials that emit VOC's such as formaldehyde

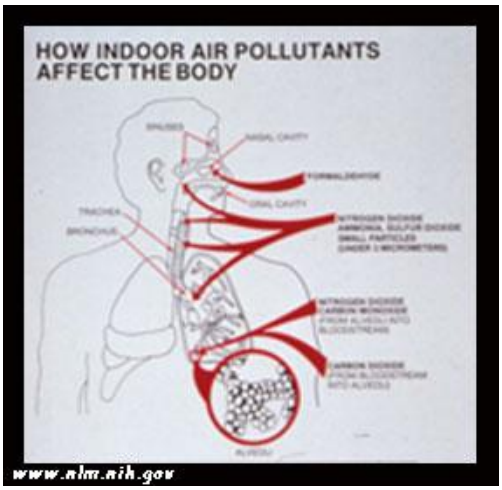
Modify the environment

After cleaning and disinfecting an area that is contaminated by fungal or bacterial growth, control humidity to make conditions inhospitable for regrowth.

Source removal or reduction can sometimes be accomplished by a one-time effort such as thorough cleaning of a spill. In other cases, it requires an ongoing process, such as establishing and enforcing a non-smoking policy.

Sealing or covering the source can be a solution in some cases; application of a barrier over formaldehyde-emitting building materials is an example. Sealing may also involve educating staff or building occupants about the contaminant-producing features of materials and supplies and inspecting storage areas to ensure that containers are properly covered.

In some cases, modification of the environment is necessary for effective mitigation. If the indoor air problem arises from microbiological contaminants, for example, disinfection of the affected area may not eliminate the problem.



Regrowth of microbiologicals could occur unless humidity control or other steps, such as adding insulation to prevent surface condensation, are taken to make the environment inhospitable to microbiologicals.

Ventilation

Ventilation modification is often used to correct or prevent indoor air quality problems. This approach can be effective either where buildings are under ventilated or where a specific contaminant source cannot be identified. Ventilation can be used to control indoor air contaminants by:

- Diluting contaminants with outdoor air
- Increase the total quantity of supply air (including outdoor air)
- Increase the proportion of outdoor air to total air
- Improve air distribution
- Isolating or removing contaminants by controlling air pressure relationships
- Install effective local exhaust at the location of the source
- Avoid recirculation of air that contains contaminants
- Locate occupants near supply diffusers and sources near exhaust registers

- Use air-tightening techniques to maintain pressure differentials and eliminate pollutant pathways
- Make sure that doors are closed where necessary to separate zones

Diluting contaminants by increasing the flow of outdoor air can be accomplished by increasing the total supply airflow in the complaint area (e.g., opening supply diffusers, adjusting dampers) or at the air-handling unit, (e.g., cleaning the filter on the supply fan). An alternative is to increase the proportion of outdoor air (e.g., adjusting the outdoor air intake damper, installing minimum stops on variable air volume (VAV) boxes so that they satisfy the outdoor air requirements of ASHRAE 62-1989).

Studies have shown that increasing ventilation rates to meet ASHRAE Standard 62-1989 (e.g., from 5 to 15 or 20 cfm/person) does not necessarily significantly increase the total annual energy consumption. The increase appears to be less than 5% in typical commercial buildings. The cost of ventilation is generally overshadowed by other operating costs, such as lighting. Further, improved maintenance can produce energy savings to balance the costs that might otherwise result from increased ventilation.

Select an IAQ Manager

IAQ management will be facilitated if one individual is given overall responsibility for IAQ. Whether or not this person is given the title of "IAQ Manager," he or she should have a good understanding of the building's structure and function and should be able to communicate with tenants, facility personnel, and building owners or their representatives about IAQ issues.

The IAQ manager's ongoing responsibilities might include:

- Developing the IAQ profile
- Overseeing the adoption of new procedures
- Establishing a system for communicating with occupants about IAQ issues
- Coordinating staff efforts that affect indoor air quality, and making sure that staff have the information (e.g., operating manuals, training) and authority to carry out their responsibilities

- Reviewing all major projects in the building for their IAQ implications
- Reviewing contracts and negotiating with contractors (e.g., cleaning services, pest control contractors) whose routine activities in the building could create

IAQ Problems

- Periodically inspecting the building for indicators of IAQ problems
- Managing IAQ-related records
- Responding to complaints or observations regarding potential IAQ problems
- Conducting an initial walkthrough investigation of any IAQ complaints

<u>Review IAQ Profile and Other Existing Records</u>

If the IAQ manager was not actively involved in developing the IAQ profile, one of the first tasks will be to review the profile carefully. The manager can start by also identifying building locations with a potential for IAQ problems, staff and contractors whose activities impact indoor air quality, and other building occupants whose activities impact indoor air quality. In addition

to information from the IAQ profile, it may be helpful to review lease forms and other contractual agreements for an understanding of the respective legal responsibilities of the building management, tenants, and contractors. Incorporation of IAQ concerns into legal documents helps to ensure the use of proper materials and procedures by contractors and can help to limit the load placed on ventilation equipment by occupant activities.

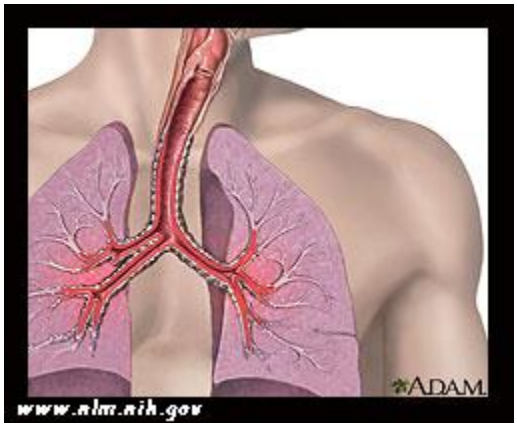
Assign Responsibilities / Train Staff

The assignment of responsibilities varies widely between organizations, depending upon the routine activities to be carried out and the capabilities of the available personnel. It would not be appropriate for this document to suggest how IAQ-related responsibilities should be allocated in your organization. For example, issues of access in buildings with tenant-occupied space highlight the need for cooperation between building managers and the IAQ management will be facilitated if one individual is given overall responsibility for IAQ.

Using information from the IAQ profile, the IAQ manager should work with staff and contractors to ensure that building operations and planning processes incorporate a concern for indoor air quality. New procedures, record keeping requirements, or staff training programs may be needed. (Growing interest in IAQ is stimulating government agencies and private sector organizations to develop training programs. The flow of information between the IAQ manager and staff, occupants, and contractors is particularly important. Good indoor air quality requires prompt attention to changing conditions that could cause IAQ problems, such as installation of new equipment or furnishings, increases in occupant population, or new uses of rooms.

Facility Operation and Maintenance

Indoor air quality can be affected both by the quality of maintenance and by the materials and procedures used in operating and maintaining the building components including the HVAC system. Facility and staff who are familiar with building systems in general and with the features of their building in particular are an important resource in preventing and resolving indoor air quality problems. Facility personnel can best respond to indoor air quality concerns if they under-stand how their activities affect indoor air quality. It may be necessary to change existing practices or introduce new procedures in relation to:



Equipment operating schedules- Confirm that the timing of occupied and unoccupied cycles is compatible with actual occupied periods, and that the building is flushed by the ventilation system before any occupants arrive. ASHRAE 62-1989 provides guidance on lead and lag times for HVAC equipment. The building staff may be limited in its access to tenant spaces and tenants may not have access to building operations areas such as mechanical rooms, yet both tenants and building management have responsibilities for maintaining good indoor air quality. Facility personnel are not generally trained to think about IAQ issues as they go about their work. Even though building staff may be observing events and conditions that would indicate potential problems to an experienced IAQ investigator, the staff member's attention may be directed elsewhere. As new practices are introduced to prevent indoor air quality problems, an organized system of record keeping will help those practices to become part of routine operations

and to “flag” decisions that could affect IAQ (e.g., renovations, new tenants). The best results can be achieved by taking time to think about the established channels of communication within your organization, so that new forms can be integrated into decision making with minimum disruption of normal procedures.

A clean mechanical room, free of tracked-in dirt and stored chemicals, is an important element in the prevention of indoor air quality problems. Airborne contaminants in the mechanical room can be drawn into ductwork through return air openings or unsealed seams in return ducts and circulated throughout the building.

Chemical Inventory

Take inventory of chemicals stored or used in the building for cleaning, maintenance, operations, and pest control. Keep an updated copy of an MSDS (Material Safety Data Sheet) for each chemical (as required).