Table 2
Expensive Disposables That Unnecessarily Increase Volume of Hospital Waste

- Disposable ventilation tubes
- Disposable pleural drainage systems
- Disposable suction systems
- Disposable redon drainage bottles
- Disposable drainage bags
- Disposable ventilation filters
- Disposable gowns and drapes
- Disposable plastic dressings
- Disposable lumbar, liver, etc. puncture systems
- Disposable scissors and forceps
- Disposable dishes

(continued from page 440)
a huge amount of packing material can be collected daily.

I think it is time that hospital epidemiologists consider the pollution of the environment as a result of the daily infection control activities. It is our experience that cooperation of the hospital personnel in nosocomial infection control has improved since we pay more attention to our environment.

F.D. Daschner
Freiburg, West Germany

Ceiling Maintenance-Why?

To the Editor:

Ceiling maintenance traditionally has been an ignored subject because of the "out of sight--out of mind" syndrome. Preventative maintenance has been limited to painting, further complicating the situation. But this 25% of the room cube probably has more effect on room environment and its occupants than all of the rest of the room put together.

A room's walls usually are made of a hard, generally nonporous material like painted sheet rock or a high density vinyl covering. The floors are similar, with a tile or masonry surface. Carpets are worse because they are not as easily cleaned. Ceilings are usually made of an absorbent material, like mineral based tiles or a plaster spackling. Both of these materials are highly absorbent, with their primary purpose being absorption of sound. The remaining articles in a room are generally furniture or equipment, again made of mostly low absorbency materials.

Now look at Mother Nature's affect. Hot air rises. Not new news, but look at what travels with it. Every person who enters a room leaves some of him or herself and the germs, bacteria, dirt and anything else he or she is carrying in that room. The room itself also contributes through organic deterioration of plants and materials it houses. This is then swept to the ceiling. It should really be called a sponge because it absorbs and retains a little of it all. Then Mother Nature comes into play again. Air circulating in the room picks up and recirculates some of these accumulated "goodies," and the cycle goes on.

People, in their efforts to achieve energy conservation, now add the clincher. Engineering technology has allowed the economical building of tighter buildings. This in turn has reduced air infiltration that tended to dilute indoor air pollution in the past. Now this pollution accumulates and concentrates and is further absorbed in surfaces like ceilings.

What is the effect of all of this? The Environmental Protection Agency (EPA) has found that air pollution is as much as 70 times worse indoors than outdoors in the most polluted cities in the United States. More than 900 individual substances in a single category, volatile organic compounds, have been identified in indoor air, including pesticides, carbon monoxide, formaldehyde and radon gas. The health considerations are important and have long-term legal ramifications.

Even though we have only scratched the surface of the adverse physical health effects of indoor air pollution, there are other considerations. A ceiling generally takes from five to nine years to accumulate enough "hard material" to become aesthetically detracting. Usually after one to two years, a ceiling can be cleaned and produce a noticeable difference in color.

New discoloration takes place gradually and plays a negative role. Rooms begin to get darker with the resulting lower lighting levels and begin to "close in," having unmeasured psychological effects on reduced productivity, attendance, customer attitudes and general behavioral attitudes. The accumulated germs and bacteria in the ceilings also produce a gradual "odor" in the room which has unmeasured effects on the occupants. Research on the effects of indoor air pollution is incomplete, but tends to indicate that the effects could be far reaching on both the physical and mental health of the building occupants.

Indoor air pollution is a subject that is going to have to be addressed on several fronts. Long-term answers must come from the heating and air conditioning industry. The "sick building" syndrome is being addressed through university research and major technical societies, like the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), are addressing the problem through industry research and new technology implementation. Short-term answers will have to be addressed through more active maintenance.

Ceiling maintenance has traditionally been low priority because the primary concern has been aesthetics. Maintenance is important because of the image that either a dirty or clean ceiling creates. The

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primary means of correcting the situation has been to either paint the ceiling or to replace the tile. Painting creates a highly porous surface that will get "dirty" faster and more absolutely. More importantly, painting "traps" everything in the ceiling in a "breeding ground" that will ultimately re-expose itself by "bleeding" back through the paint. Repeated painting ultimately results in replacement. Replacement is expensive, time consuming and generally exposes the plenum and its accumulated dirt to the building.

Ceiling cleaning, chemically treating the entire ceiling plane, is a fledgling industry approximately ten years old. Ceiling cleaning results in lower maintenance costs, generally over 70% in savings. Unfortunately, the choice may not be that easy. Many new companies are unprepared and lack the sophisticated backup required to fully handle the chemical technology to solve the wide variety of possible problems. Every ceiling is different because it has its own set of life experiences. More importantly, the quality of the service has unfortunately become more important than the quality of the product or its price. Because of potential damage with improperly handled, or in some cases, dangerous chemicals, this has truly become one of those industries where you tend to get what you pay for. Check references, liability insurance in force, Master Standard Data (MSD) Sheets, any test data available on compliance with the Occupational Safety and Health Administration (OSHA) air quality standards, compliance with OSHA SARA Title III requirements for handling chemicals, see a test demonstration on your ceiling and then recheck references. It will require a little extra effort up front but the long-term financial and health benefits will be worth the effort.

F. Benjamin Gibbs, PE
Greensboro, North Carolina

Letters to the Editor should be addressed to INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY Editorial Offices, C41 General Hospital, University of Iowa Hospitals and Clinics, Iowa City, IA 52242. All letters must be typed, double spaced and may not exceed four pages nor include more than one figure or table. The editors reserve the right to edit for purposes of clarity or brevity.

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