My memories of going to the doctor as a child in the early 1950s are not happy ones. Doc Allsopp was revered in our small town for his compassion and willingness to visit the sick, but his office was an old Victorian residence that, to me, conjured images more associated with a scary movie than anything Norman Rockwell was painting at the time.

The large, double-hung windows in the parlor were always closed, and the heavy sheers, no doubt installed for privacy, eliminated any view of the neighborhood from that dimly lit space. The adjacent treatment room had a dizzying aroma of formaldehyde, alcohol and numerous medicines. The vinyl-clad exam table felt cold in spite of the overheated room, and all of the equipment seemed selected to induce the maximum amount of trepidation over how they were used.

The vaccinations, injections and stitches I received in that place engendered a lifelong disdain for needles, and I still get a little squeamish when exposed to “medicine smells.” It was a time when the volunteer fire department ambulance closely resembled a hearse, and one sometimes couldn’t tell if the passenger was coming or going.

Oh How Times Have Changed
My lifelong friend Denny English remembers Dr. Allsopp’s office much the same way. Happily, Denny is now Denny English, M.D., M.M.M., vice president of medical affairs at Magee-Womens Hospital of UPMC (University of Pittsburgh Medical Center). Dr. English embraces the tenets of sustainability in a variety of ways that support Magee’s ongoing effort to be a world-class green health care facility.

Magee is proud of its culture, based on sustainability, which leads by example. It includes community outreach in health and nutrition, as well as collaboration with other health care providers to develop better ways of greening their facilities.

The latter includes the development of green design guidelines that mimic those generated in the design community, including LEED for Healthcare. They ensure no finishes will be specified that compromise the health and safety of those who spend time in a UMPC facility.

When asked how he addresses the everyday challenges of balancing “price, cost and value” in operating Magee, Dr. English replied, “It’s all about the people, and we have great people.”
Having a Green Conscience

One of those people is Judith Focareta, R.N., M.Ed., coordinator of environmental health initiatives. Dr. English refers to Judith as “the conscience of Magee.” He credits her with having impressed the importance of the physical environment on him a decade ago, when Magee’s sustainability initiative was in its early stages. It was about that time Magee administrator Joyce Lewis received a one-year planning grant from The Heinz Endowments to explore the connections between health and the environment, with emphasis on childbearing families.

As an inspiration for her work, Judith cites Florence Nightingale — the first health care professional who understood the importance of a patient’s environment and openly campaigned for better hospital conditions.

Judith fully supports Magee’s mantra of leading and educating by example, including specifying what finishes are incorporated in renovations and new construction. In fact, she heads a multi-disciplined green team that coordinates Magee’s sustainability interests, from electric cars to raising their own organic produce.

Green Team Know-How

Judith acknowledges that interest in green design and a healthy workplace comes naturally to health care providers, but there still will be challenges. She shared the following insights.

You must lead by example. The hospital is used publicly as a teaching tool, through which Judith coordinates environmental initiatives to educate others on various topics, including the importance of green cleaning regimens at work and at home. The entire green team is on the same page and sees continuing education as the key to awareness of the importance of sustainability and green design.
New materials and finishes require scrutiny and vigilance. Harvesting information, doing independent research, attending conferences, and generally keeping well informed never stops. Judith relies heavily on green team members and Magee’s in-house library and research capabilities to study materials and finishes before they are implemented via UPMC’s design guidelines.

Evidence-based design is central to making material and finish decisions. Health care design, construction and maintenance are subject to balancing building programs with operating budgets and other financial constraints. Magee belongs to the national Practice Greenhealth organization and has been recognized for the successful implementation of comprehensive and cost-effective evidence-based green health initiatives.

Patients, staff and visitors are transient. Consequently, the opportunities to educate about finishes must be diverse, direct and effective. Judith generates and disseminates newsletters and brochures for patients and staff, speaks at and attends conferences, and holds regular meetings of the green team. This provides an ongoing forum for discussing a wide range of green health care issues.

Every venue is important, but some are critical. Magee-Women’s Hospital of UPMC is known for its treatment of cancer and a variety of pregnancy and childcare specialties. At Magee, much attention is given to the neonatal intensive care unit (NICU) and oncology treatment areas. VOCs, BEHPs (phthalates), and finishes containing carcinogens, mutagens and endocrine blockers are banned. The new oncology unit is a LEED-certified area which enjoys the soothing benefits of views to green spaces, calming colors and acoustic attenuation for noise control, all the result of adopting green design and human ecology as design determinants.

Finishes in Action with Green Design
To ensure the built environment portions of Magee’s sustainability initiative are successful, Judith and other members of the green team work closely with Mr. Greg Klecan, director of facilities. Like Dr. English and Judith, Greg understands his areas of responsibility must be balanced with Magee’s overarching sustainability initiatives, health care goals and attendant budgets.

I gathered his thirteen years in the Air Force prior to joining the Magee staff three years ago contribute to his “man-on-a-mission, can-do” approach to being the director of facilities of a major hospital. Echoing what others had to say, he added the following insights and lessons learned about finishes.

You must be aware of existing conditions. Like many hospitals, portions of Magee were constructed in the early 1900s. Consequently, lead paint, asbestos and materials that generate airborne particulate when removed must be anticipated and carefully remediated. This process is very complicated in a hospital where services must continue and full occupancy be maintained during renovations and new construction. Dr. English and Greg likened isolating and protecting building occupants during construction to staging “a moon landing,” complete with zoning via tenting, continual monitoring, and maintaining all protective measures throughout the construction process.

General considerations. In all cases, the least permeable, easiest-to-clean finishes are preferred. Floor finishes are typically seamless natural linoleum sheet goods or ceramic tile with dense, cleanable grouts. Solid materials are preferred over composites or laminates. Carpet is used sparingly, but is considered necessary where Lamaze classes are taught with attendees sitting or lying on the floor. Carpet is also used in some offices and conference rooms where acoustics are important. Conversely, two-part epoxies and other highly volatile adhesives, while highly desirable in some construction applications, are not permitted.

Common areas. The finishes and furnishings used in Magee’s patient rooms, offices, waiting areas, lobbies, storage rooms, etc., resemble...
### Health Care Finishes

<table>
<thead>
<tr>
<th>SPACE</th>
<th>FLOOR</th>
<th>WALLS</th>
<th>CEILING</th>
<th>PRIMARY CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance Lobby</td>
<td>Ceramic/porcelain tile, walk-off carpet at vestibule and entry, possibly carpet at seating areas</td>
<td>Durable, usually upgraded materials like granite, stone, or wood in combination with paint.</td>
<td>Acoustic tile</td>
<td>First impression area. Warm and welcoming. Daylight</td>
</tr>
<tr>
<td>Waiting</td>
<td>Resilient flooring (sheet or LVT) and/or carpet/carpet tile</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Multiple seating types in arrangement including single, loveseat, or bariatric. Seating is often gauged to prevent unwanted relocation. Upholsteries are moisture repellant and washable – preferably bleach tolerant.</td>
</tr>
<tr>
<td>Patient Intake/Admitting</td>
<td>Ceramic/porcelain tile, resilient flooring (sheet or LVT) and/or carpet/carpet tile (depending on adjacent areas)</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Privacy and acoustics important. Upholsteries are moisture repellant and washable – preferably bleach tolerant.</td>
</tr>
<tr>
<td>Exam</td>
<td>Resilient tile or sheet flooring</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Privacy and acoustics important. Upholsteries are moisture repellant and washable – preferably bleach tolerant.</td>
</tr>
<tr>
<td>Nurses Station</td>
<td>Resilient sheet</td>
<td>Paint and impact resistant wallcovering</td>
<td>Acoustic tile often combined with gypsum board soffits to contain task lighting</td>
<td>Acoustics. High abuse area. Special consideration for proper wear layers and adhesives. Excessive wear occurs at castered chair locations.</td>
</tr>
<tr>
<td>Patient Room</td>
<td>Resilient sheet with heat welded seams</td>
<td>Paint with impact resistant wallcovering or bumper products</td>
<td>Acoustic tile</td>
<td>Warm color scheme with soft visuals relating to nature. Daylight and views of nature. Lighting options. Acoustics. Special consideration is given to adhesives under bed. If the bond isn’t strong enough, the heavy and pivoting hospital bed will tear the floor.</td>
</tr>
<tr>
<td>Operating Room</td>
<td>Resilient flooring with heat welded seams, or seamless poured epoxy</td>
<td>Special coatings for washability, FRP or sheet wall protection sometimes used</td>
<td>Painted gypsum board</td>
<td>Anti-microbial, durable, highly cleanable, cool colors the complementary of red (blue/green families) usually chosen to reduce surgeon eye fatigue. ORs must last a long time as revenue loss is great if operating rooms are closed for remodeling. Subtle floor pattern designs often employed to avoid monotony. Floor usually has dull finish to make it easier to spot something dropped or debris on the floor.</td>
</tr>
<tr>
<td>Nursery</td>
<td>Resilient flooring with heat welded seams</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Anti-microbial, durable, highly cleanable. Pattern designs often used to establish a residential juvenile theme. Children’s themed accents.</td>
</tr>
<tr>
<td>Oncology</td>
<td>Resilient sheet with heat-welded seams</td>
<td>Paint – soothing colors, softer tones</td>
<td>Acoustic tile – low lighting</td>
<td>Acoustics, reduced lighting and glare. Much consideration given to seating and recliners used for patient comfort, and health care provider accessibility.</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Resilient sheet with custom patterns and multiple colors</td>
<td>Paint sometimes with murals or pediatric themed wallcoverings</td>
<td>Acoustic tile</td>
<td>Child-friendly environment, acoustics important.</td>
</tr>
<tr>
<td>Office</td>
<td>Carpet/Carpet tile</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Cleanable finishes with ergonomic furniture.</td>
</tr>
<tr>
<td>Conference</td>
<td>Carpet/Carpet tile</td>
<td>Paint possibly with other specialty finishes depending on use/area</td>
<td>Acoustic tile sometimes with gypsum board soffits</td>
<td>Acoustics, design for technology.</td>
</tr>
<tr>
<td>Patient Consultation</td>
<td>Carpet/Carpet tile</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Warm and quiet with conversation group seating options away from a desk for patient and family.</td>
</tr>
<tr>
<td>Storage</td>
<td>Resilient tile</td>
<td>Paint</td>
<td>Acoustic tile</td>
<td>Depends on area, but usually the least expensive option.</td>
</tr>
</tbody>
</table>

### OTHER CONSIDERATION IN SELECTING FINISHES:

- **Carpet:** Solution dyed – bleach cleanable. Moisture barrier. Some can be heat welded to resilient flooring.
- **Ceramic Tile:** Porcelain preferred – color-thru and moisture impervious. Epoxy grouts preferred over sanded grouts for cleanability.
- **Resilient Sheet Flooring:** Rubber and Linoleum are the PVC-free choices, still a lot of vinyl in use.
- **Paint:** Always low or no VOC especially in occupied areas.
- **Ceiling:** Acoustic tile available in mylar and fiberglass finishes more washable than mineral fiber sometimes used in “clean” areas.
- **Upholsteries:** Using PVC-free polyurethanes, “Crypton” fabrics, solution dyed nylons and still some vinyls.
- **Cubicle curtain fabric:** Silver-ion technology fabrics available with anti-bacterial properties.
- **Window treatments:** Using perforated shades now over dust collecting blinds.
Today, the finishes and furnishings used in patient rooms, offices, waiting areas and lobbies resemble those used in modern healthy house construction. Though used sparingly, carpet is important for areas where acoustics and noise control are important, as in this waiting room. Photo courtesy of MDC

those used in modern healthy house construction. The cleaning procedures and lessons learned populate the educational literature Judith distributes to patients and staff.

Green cleaning is critical and continuous. All hospitals are concerned with maintaining aseptic or sterile environments, infection control, and general hygiene. Greg noted the importance of such conditions in the NICU and oncology units, and added operating rooms and the pharmacy as places where cleaning takes place continuously. Walls and floors in these areas are scrubbed daily, and the NICUs are tented and air scrubbed. They do not use composite finishes, fabrics, textiles, etc., that cannot withstand rigorous cleaning. Other areas cleaned regularly are still serviced using a green cleaning regimen. Constant cleaning eliminates mold growth in all occupied places, but the maintenance staff is vigilant as to where it could occur elsewhere in the facility.

Acoustics. Finishes that enable good acoustic control are used in areas where quiet is important, especially at night. Acoustic ceiling and wall panels and seamless natural linoleum sheet goods are preferred.

Wear and tear. Hand and chair rails, corner guards, protective wainscoting, and bumpers are usually aluminum or another metal that can withstand impacts and be frequently disinfected. High-impact plastic can be used if the material is nontoxic, does not off gas or require adhesives that are banned.

Way finding. Greg referred to way finding as “a world unto itself” in hospital design. “Hospitals tend to expand over time,” he said, “and way finding becomes a challenge.” Finishes and use of color are parts of an integrated way-finding solution. Each is scrutinized by the green team for content and ease of cleaning, as well as compliance with ADA requirements.

LEED is appreciated but not critical. The new oncology unit at Magee is LEED certified. Those who worked on the project appreciate the contribution LEED for Healthcare has made to the industry, including its advocacy of green finishes, but not all agree the cost or added administrative burden is justified. The essence of LEED for Healthcare is embedded in the guidelines used in the UPMC system, which are shared with the Cleveland Clinic, Kaiser Permanente and others.

Green Design and Well-Being

My UPMC colleagues agree that, while anecdotal, making green design a priority is appreciated by everyone and well worth the effort. This is particularly true in the new oncology unit where staff and patients alike have voiced their appreciation for the environment Magee has created.

Judith contends the daylighting, views to green spaces, natural finishes, soothing colors and indoor air quality all contribute to reducing stress and procedural errors.

Everything Magee and other green health care providers are doing to create healthy, more tranquil and less stressful conditions is especially important to the elderly, whose immune systems are often compromised due to aging and other natural causes.

My sister, Mary Kobet R.N., echoes this sentiment. We have talked at length about how my interest in allergy-free, nontoxic design for people with chemical sensitivities resonates with her need, and that of her patients, for healthy, psychologically pleasing spaces conducive to our physical, mental, emotional and spiritual wellbeing.

The Changing Health Care Landscape

Today, health care is no longer conducted only in traditional venues. The small-town general practitioner who makes rounds in American communities has all but disappeared. Inoculations, blood pressure monitoring, nutrition consulting, etc., can be obtained in retail pharmacies linked to physicians via computerized health care

Natural light, views to green spaces, natural finishes and comforting colors not only contribute to the patient’s sense of well-being but can also reduce stress and procedural errors by staff. Photo courtesy of MDC
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networks. The modern ambulance now is the emergency room, in many cases.

Design challenges include the expanding role of hospitals as community wellness centers, the increased presence of family and other supporting relationships in the healing process, and the desire to provide patients with greater control and purposeful interaction with their surroundings.

These topics and many others are now championed by organizations such as the Center for Health Design, a nonprofit organization founded in the 1990s, and the American Academy of Healthcare Interior Designers (AAHID), founded in 2004.

The Center for Health Design has identified 12 aspects of the built environment that are recognized as part of the healing process. Those that directly involve finish selection include: single-patient rooms; air quality; way finding; light – particularly natural daylight; floor materials; acoustics and noise control; and positive influence through the use of aesthetics, chief among these being the psychology of color.

Others that indirectly impact finishes are: furniture arrangement, although fabrics and colors are very important; windows – while not considered finishes, window treatments often are; ergonomics; access to nature; and building layouts and zoning.

The Center for Health Design is an important source for evidence-based design certification. Evidence-based design (EBD) uses credible data and research to influence design decisions, including those regarding finishes. Evidence-based design accredited and certified (EDAC) professionals can be utilized as qualified providers of EBD planning and design.

Karen Huffman, IIDA, interior designer with Makovich & Pusti, Architects, Inc., says finishes must be scrutinized through the eyes of patients and caregivers alike. Her firm does not specify yellow hues in pediatric wards, for instance, because they compromise the ability to accurately determine skin color, an important indicator of health. Conversely, our corneas yellow with age, so designers advocating EBD sometimes use yellowed film to determine how the colors will be sensed by the elderly, whose diminished vision and reduced mobility need clear contrasts to interpret intersecting planes and surfaces. (See the accompanying table on page 21 for more of Karen’s recommendations.)

What Is an Acceptable Finish?

Debates over what constitutes acceptable finishes are sure to continue, and some will take time to resolve. The alleged negative environmental impact of vinyl has played out in the popular press and green building circles. Yet, luxury vinyl tile (LVT) is increasingly prevalent in health care design because of its performance, ease of maintenance and less institutional feel. It provides a wide variety of design options and is easy to install and maintain. Unfortunately, not all vinyl finishes enjoy the industry scrutiny inherent in FloorScore or Ecoscore ratings. LEED V4 for Healthcare includes requirements for environmental product declarations (EPD), healthy product declarations (HPD) and lifecycle assessments (LCA) for health care finishes.

The sheer number of finishes involved makes pursuing the credits a daunting task. However, once the research is done, the finish material’s information can be used repeatedly in other projects as long as the material ingredients do not change.

Some say LEED V4’s revision of its Materials and Resources category with new product transparency requirements is long overdue. Others wonder if LEED V4’s requirements are too ambitious. The Living Building Challenge, sponsored by the International Living Future Institute, takes the more stringent step of banning vinyl completely, adding more fuel to the green finishes debate.

We’ve come a long way since the days of Florence Nightingale and Doc Allsopp, but I believe they would join me in thanking all those dedicated to making green health care facilities the standard in the industry.

Notes
1 https://practicegreenhealth.org
2 “Specifying Flooring for Healthcare Environments,” Interiors and Sources, July 1, 2014
4 http://living-future.org/lbc

About the Author
Robert J. Kobet, AIA, LEED Faculty, has worked with clients on five continents for more than 35 years to create innovative places to live, work and learn. He is an educator, speaker, former chair of LEED for Schools, primary author of LEED for General Contractors and Construction Managers, and president and CEO of The Kobet Collaborative.
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