

Sustainable Resilient Flooring Choices for Hospitals

Perceptions and Experiences of Users, Specifiers and Installers

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Hospital stakeholders are increasingly recognizing the importance of sustainability and its implications for their building practices. One way that hospitals can green their buildings is by using more sustainable materials in their facilities. There has recently been a great deal of interest in finding sustainable resilient flooring solutions. Hospital flooring is a very important and visible part of the healthcare environment that can contribute to a positive experience when done well or can result in problems and negative impressions when done poorly. So, while hospitals want to use more sustainable flooring products, they are reluctant to use a product that does not have a long track record.

The objective of this study was to examine the recent experiences that architects, installers, facility managers and users have had with alternative, green resilient flooring materials in hospital settings. This research effort focused on specific resilient flooring materials, including rubber, polyolefin¹ and linoleum. Sharing the user experiences is expected to demystify these lesser-known products, identify key issues, and potentially lead to increased adoption.

The research project was led by the Georgia Institute of Technology with collaboration from *Green Guide for Health Care*TM, Healthy Building Network and Practice Greenhealth. It was contracted for by The Health Care Research Collaborative of Health Care Without Harm.

The study builds on the Health Care Research Collaborative paper, “Resilient Flooring & Chemical Hazards: A Comparative Analysis

of Vinyl and Other Alternatives for Health Care,”² researched and authored in 2009 by the Healthy Building Network (HBN), which inventoried the chemicals involved in four flooring material types (vinyl, linoleum, rubber and polyolefin) and characterized those chemicals using a chemical hazard-based framework. In the present study, we sought to hear directly from users about their perceptions and experiences. As such, the study used two methods for getting user feedback: an online survey of and a series of interviews with architects, flooring installers and facility managers.

1 Polyolefin polymer flooring is often made from mixtures of polyethylene and polypropylene. Examples include Stratica by Amtico, Lifeline by Upofloor, WELS by Ceres and FreiFloor by Allstate.

2 “Resilient Flooring & Chemical Hazards: A Comparative Analysis of Vinyl and Other Alternatives for Health Care” is available at www.noharm.org/us_canada/reports/researchcollaborative.php

RUBBER

We love this [rubber] flooring! It is very comfortable to work on, we have had red food coloring on it for over an hour and it didn't stain."

Staff, Dartmouth Hitchcock Medical Center

The online survey was distributed to over 30,000 people through the *Green Guide for Health Care*™ and Practice Greenhealth networks in March, 2010, and 689 people responded. Only 13% of the respondents were installers, and the rest were split between architects and hospital representatives. In addition to the survey, we interviewed many flooring stakeholders to develop six case studies of hospitals that have used rubber, polyolefin and linoleum flooring.

Over half of the survey respondents reported having specified, used or installed two of the more sustainable product offerings, rubber (56.7%) and linoleum (51.8%). We found that there was much less familiarity with polyolefin (20.7%). Across all survey respondents we saw the most use of the two vinyl (less sustainable) products; sheet vinyl is the most commonly used product (72.5%) followed by vinyl composition tile (VCT) (63.6%).

From our research we learned that four priority issues that went into flooring decisions for all of the stakeholder types were: cleanability, aesthetics, durability and initial cost. By looking at the data divided up by respondent types we can see that stakeholders are concerned with different issues. This, in turn may drive these players to arrive at different decisions when presented with the same facts about flooring products. The figures list the percentage of people in that group who selected a specific attribute as one of the top 3 attributes for any of the

Figure 1: Resilient Flooring Adoption Rates

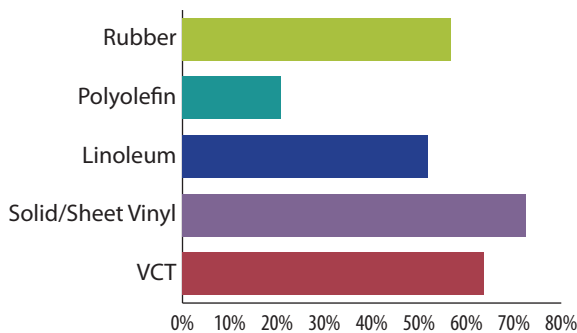
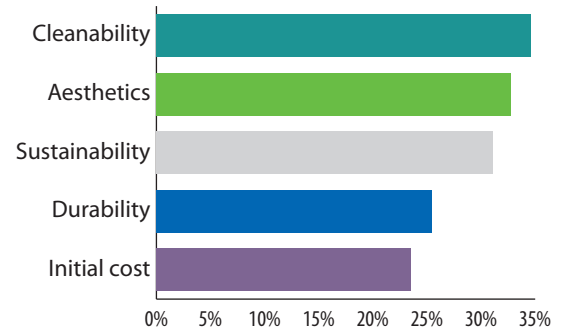


Figure 2: Specifiers' Most Commonly Selected Positive Attributes



materials they had used. For example, in Figure 2 we see that over 30% of specifiers selected 'cleanability' as a positive attribute for one of the flooring materials. In each figure we provide the 5 most common responses for that stakeholder group. The purpose of these figures is not to identify their impressions of specific materials, but to demonstrate that specifiers, installers and users are concerned about different issues. More than the other groups, architects and specifiers were also interested in aesthetics and sustainability. Facility managers and users were overwhelmingly focused on the cleanability of flooring products, whereas installers were more likely to be concerned with initial and lifecycle cost as well as durability.

Newer flooring materials are often accused of being difficult to install and prone to installation problems. To learn whether this was true and to determine the nature of the problems we asked our respondents to specify, for each material, whether they'd had specific installation problems. We learned that installation related problems occur with all the different resilient flooring types. Figure 5 shows the percentage of respondents that reported specific problems for each

POLYOLEFIN

"I wish we had this [rubber] flooring in all our rooms"

Clinician, Northern Michigan Regional Hospital

Figure 3: Installers' Most Commonly Selected Positive Attributes

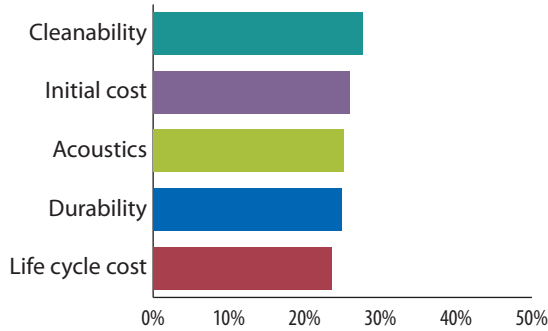
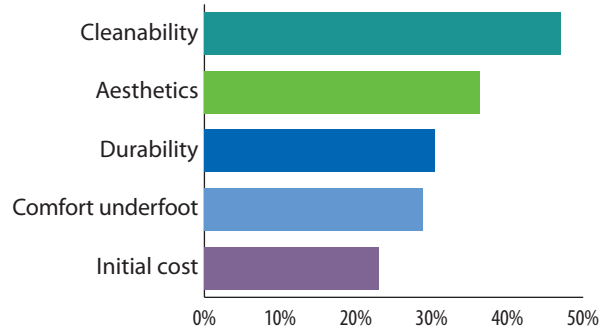


Figure 4: Users' Most Commonly Selected Positive Attributes



material. Bubbling was indicated as a problem for all sheet goods, showing up more strongly for solid/sheet vinyl (48%) than for rubber (45%) or linoleum (40%). Adhesion was the second most common problem, and again it was reported at higher rates for sheet vinyl (39%) than for rubber (36%), polyolefin (33%) or linoleum (23%). Cracking, discoloration and rips and tears were also among the top chosen installation problems across material types.

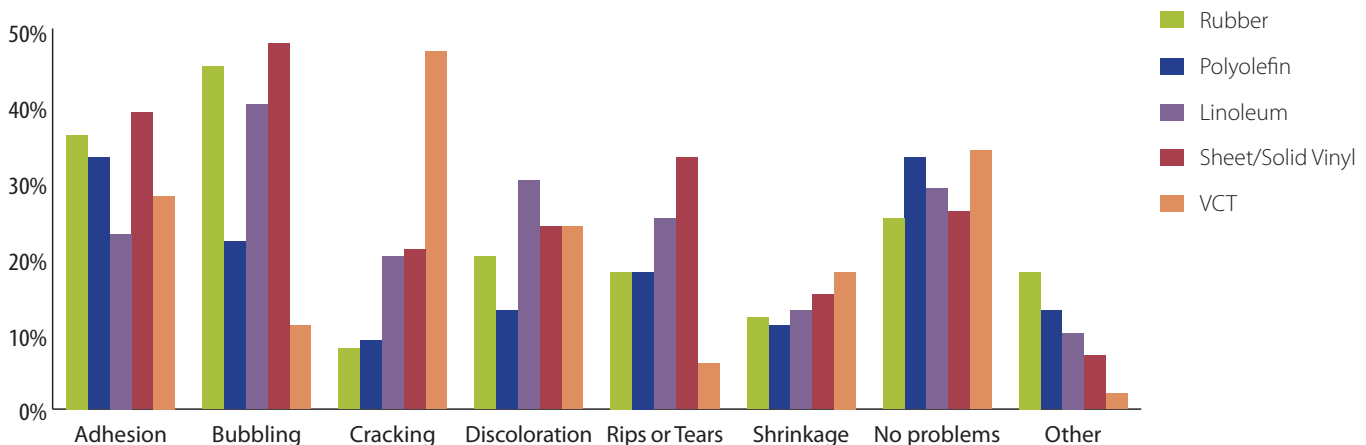
Although problems with installation may be attributed to specific flooring types, adhesives or the installer, the overall trend is that all materials, including the vinyl ones, are experiencing installation problems. From the case study interviews we learned that the incidence of flooring failures is generally not due to properties of the materials but result from a combination of factors which have converged at the same time that these materials have become more common place in the market: fast track construc-

tion; changes in concrete formulations; and low-VOC adhesives. A consistent message we heard during all the case study interviews was that flooring should be approached as a system which includes the subfloor. All the components of this system have to work together for a successful installation.

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LINOLEUM
The higher upfront cost of linoleum is offset by the savings from maintenance and a longer replacement cycle.
 Rumford Hospital Case Study

Figure 5: All Resilient Floors Experience Installation Problems



The overall message from the survey and case studies is that while vinyl flooring products are still being used by a majority of facilities, many hospital facility professionals view these products as less sustainable and are using alternative materials in many new projects and parts of the hospital. The success of a flooring installation depends on many factors, not just the material itself. Most importantly, the floor needs to be approached as a system, with all components of the system handled properly. This means selecting the right product for the right application, properly preparing the floor before installation, hiring skilled installers, and using recommended maintenance protocols to keep the floor looking its best. When all parts of the system are done correctly, rubber, linoleum and polyolefin

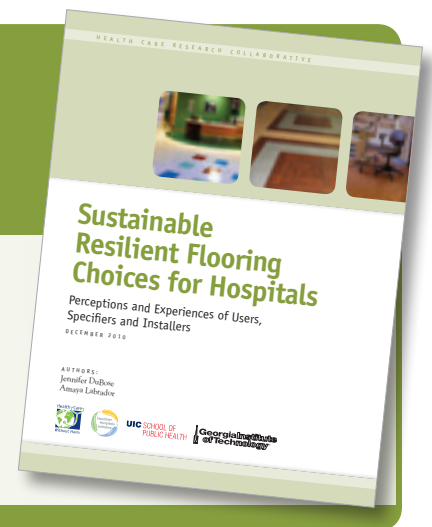
flooring materials perform well and make excellent resilient flooring choices for hospitals.

Additionally, this research turned up a good deal of anecdotal evidence indicating that some of the more sustainable flooring materials also offered benefits for worker and patient health and safety, including increased comfort while standing and walking, reduced fatigue, reduced noise levels, reduced risk of falls, and lessened negative health impacts from the use of harsh cleaners due to the lessened need for such products on rubber and other more sustainable types of flooring. Given the potential significance of these impacts, follow-up research should be conducted to work with hospitals to measure them in a more systematic and quantitative manner.

For the full version of *Sustainable Resilient Flooring Choices for Hospitals: Perceptions and Experiences of Users, Specifiers and Installers* go to http://www.noharm.org/us_canada/reports/researchcollaborative.php.

Health Care Without Harm has initiated a research collaborative coordinated by faculty of the University of Illinois at Chicago School of Public Health, with support from the Pioneer Portfolio of the Robert Wood Johnson Foundation, aimed at stimulating collaborative research around health and safety improvements in health care. The Research Collaborative is designed to increase the evidence base concerning the impacts of sustainable design, construction, organization, operations, and materials and chemicals choices in the health care sector on patient, worker and environmental safety.

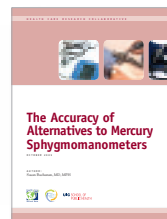
This paper is the seventh in a series of papers in which the Collaborative provides research and analysis of factors influencing patient, worker and environmental safety and sustainability in the healthcare sector.



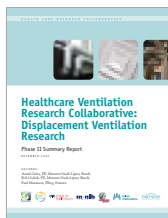
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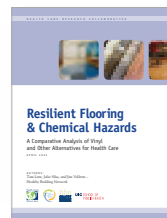
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 February 2010. 28 pages.



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 Authors: Arash Guity, PE, Bob Gulick, PE, Paul Marmion, PEng
 December 2009. 30 pages.



Resilient Flooring and Chemical Hazards: A Comparative Analysis of Vinyl and Other Alternatives for Health Care
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