



White Paper:

RUBBER FLOORING SUPPORTS REIMBURSEMENT DRIVERS OF AFFORDABLE CARE ACT

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Affordable Care Act Affects Business Models of Healthcare Providers

The Affordable Care Act (ACA) is a transition from volume-based to value-based, patient-centered care. The drivers and domains of the ACA focus on patient-centered care, patient satisfaction and the ability to improve quality and reduce the cost of care in the healing environment.¹ As a result, healthcare systems face a shift in cultural, operational and organizational outcomes and efficiencies that profoundly affect their business models.

Integral to ACA, Pay for Performance (P4P) or Value-based Purchasing (VBP) is a financial reimbursement model that rewards health systems on the basis of quality and efficiency. The fundamental drivers for reimbursement include patient experience, clinical outcomes, operational efficiency, clinical process of care and safety. Because flooring encompasses every square inch of the built environment—in essence, it is a structural componentⁱⁱ—its selection and specification can significantly impact these drivers and ultimately, the amount of reimbursement awarded to health systems under ACA.

All rubber flooring is not created equal. Materials and production variables result in floors that can and do differ significantly in terms of safety, durability, surface density, stain resistance, maintenance and reparability. These variables can, in turn, alter the performance characteristics for reducing noise, increasing cleanliness, controlling infection, eliminating exposure to cleaning chemicals, reducing maintenance time and expense, improving safety and enhancing both the caregiver and patient experience. nora systems, Inc., understands the reimbursement drivers of healthcare reform and how they directly relate to the performance characteristics of their premium rubber flooring products.

Value-based purchasing is a measure of transparency, to evaluate, report and reward excellence in healthcare delivery. VBP outcomes



adjust and withhold a portion of Medicare reimbursements that can be earned back by performing well on a set of four quality metrics: Process of Care, Patient Experience, Patient Outcomes and Hospital Efficiency. As it pertains to safety and flooring, the performance attributes of rubber flooring for operational and reimbursement drivers directly relate to creating safer spaces.

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey is a component of VBP that reports results pertaining to a patient's experience of care, enabling a comparison of acute care hospitals locally, regionally and nationally. The eight domains or measures of hospital quality and patient satisfaction include:

1. Communication with nurses
2. Communication with doctors
3. Responsiveness of hospital staff
4. Pain management
5. Cleanliness and quietness of hospital environment
6. Communication about medicines
7. Discharge information
8. Overall rating of hospital

Flooring attributes have an actionable impact on communication (as it relates to noise), cleanliness and quietness of the hospital environment.

Connecting performance characteristics and evidence-based design

“Evidence-based design is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes.”

– The Center for Health Design



Flooring affects all aspects of health, safety and well-being in the healthcare setting. The floor is the most visible component of the space and provides the surface for all activity. In 2012, The Center for Health Design (CHD) created a report and checklist: “Achieving Evidence-based Design Goals through Flooring Selection and Design.”ⁱⁱⁱ Flooring surfaces were examined using

an Evidence-Based Design (EBD) approach to define how flooring can contribute to the following performance-improvement goals:

1. Reduce slips, trips and falls
2. Reduce patient and staff injuries associated with falls
3. Reduce noise levels
4. Reduce staff fatigue
5. Reduce surface contamination and potential risk of healthcare-associated infections (HAIs)
6. Improve indoor air quality (IAQ)
7. Improve patient and family satisfaction
8. Represent the best return on investment^{iv}

Healthcare environments designed on the basis of solid research and evidence improve patient safety, reduce stress, increase care delivery effectiveness and enhance quality of care—objectives that contribute to the overarching goals of improved patient, staff and organizational outcomes.^v nora[®] rubber flooring impacts each of the performance-improvement goals shared above, directly relating to the reimbursement drivers of VBP, including enhanced operational optimization, clinical efficiency, safety and patient experience scores.

As an example, if a patient room needs to be turned over rapidly between patients, there may only be time to mop the floor, which is not sufficient disinfection protocol for terminal cleaning. nora rubber allows for flooring in the patient room to be steam cleaned and dry in less than 15 minutes. In addition to disinfecting, this process eliminates noise, odor and chemicals, impacting both clinical efficiency and patient perception as it relates to HCAHPS.

Surface density also impacts slip/trip/falls, the movement of equipment over the surface and ergonomics as it relates to the comfort and safety of caregivers and patients and fosters a positive perception for the patient of the healing environment. The inherent properties of nora rubber floors provide for an extremely dense, closed surface that repels dirt as the result of a special production process that ensures optimum material cross-

linking. The dimensional stability and resilience of rubber does not trap dirt or bacteria in specific rubber products. Instead, rubber's structure enables it to resist bacteria and fungi without requiring the use of chemicals or additives.

When it comes to safety, as noted in the CHD Evidence-Based Design study, "Rather than using a generalized flooring category, evaluate flooring products based on their performance against each EBD goal before deciding on the right flooring material and design for a particular area. Consider the trade-offs for each product."^{vi} Flooring selection and de-selection can impact operational optimization, clinical efficiency, indoor air quality and patient satisfaction.

Noise impacts healing environment

As the foundation of the built environment, flooring plays a primary role in transferring the noise generated by hospital alarms, printers, chair casters, cleaning equipment (steam cleaning of rubber floors is much quieter), rolling equipment and footsteps created by hard-soled shoes. All contribute significantly to sound levels in the healing environment that have long been a source of complaints.

Evidence-based research studies show noise also has a direct, measurable and negative impact on healing. Noise can cause sleep disruption, which affects wound healing and increases the need for medication and the length of stay. Noise also has been associated with undue stressors that negatively impact caregivers and can be an error-provoking condition. It can annoy nurses, increase fatigue, emotional exhaustion and burnout, and contribute to communication difficulties, which can lead to medication errors.

HCAHPS survey question #9 asks patients, "During this hospital stay, how often was the area around your room quiet at night?" This question consistently receives the lowest patient scores, which is why it is important to consider the impact interior finish selections,

especially flooring, have on patient well-being, satisfaction, HCAHPS scores, caregiver safety and retention.

Evidence-based research by Davenny (2010) suggests that among common healthcare flooring surfaces, rubber generally produces the least impact noise, and vinyl composition tile placed directly on concrete and terrazzo produces more impact noise.^{vii} nora rubber flooring has an actionable impact on noise level reduction. The ripple effect on the caregiver and patient can affect length of stay and the need for medication, improve communications, lower stress levels and contribute to comfort underfoot.



Evaluating acoustic testing

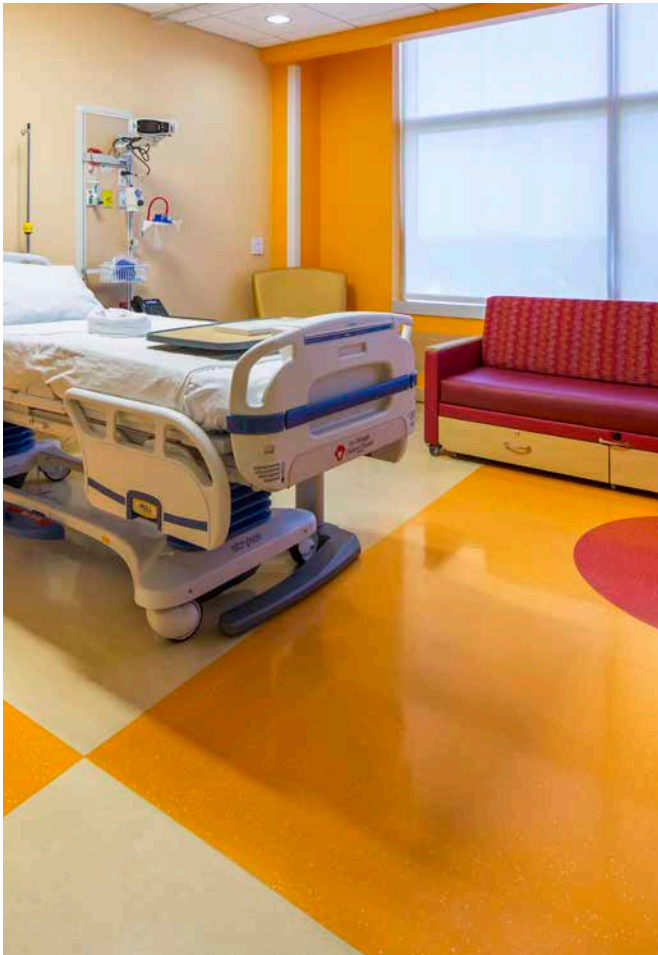
Footfall sound can be reduced with absorbent acoustic rubber flooring. To best understand how flooring affects decibel levels in the healing environment, you must be able to properly compare Impact Insulation Class (IIC) and Δ IIC value among various flooring manufacturers. Testing and measuring a material's acoustic performance is complex, so it is helpful to look at the meaning of various test results for flooring's actual performance in the built environment.

First, the ASTM E2179 Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission through Concrete Floors is the test

that specifiers should reference and the one used by resilient floor manufacturers when marketing their products' acoustic performance. Results of this test include both impact insulation classification (IIC) and delta IIC (Δ IIC). (An explanation of these values follows.)

ASTM E2179 results are relevant if noise is a concern from either the room above or below. The entire ceiling and subfloor assembly on its own will typically reduce the sound transmission above or below the room. Ask for the Δ IIC Test Report to make a meaningful comparison.

ASTM E492 Standard Test Method for Laboratory Measurement of Sound Transmission Through Subfloor-Ceiling Assemblies Using the Tapping Machine does not allow for Δ IIC. It is important that the specifier and client partner are informed as to the differences between IIC and Δ IIC.



Understanding IIC and Δ IIC

It is important to test both with and without the flooring installed so a facility's ceiling and subfloor assembly can be calculated.

The resulting value is for flooring only. That value is stated as a Δ IIC (the delta is the difference when the ceiling and subfloor assembly is removed from the equation).

Higher values represent better sound absorbency. For example, at first glance, flooring with a Δ IIC value of 14 does not compare well with another flooring system that has an overall IIC value of 34. However, the 34 value is for the complete flooring system—not just the flooring material—and includes the ceiling and subfloor assembly (in this case, a concrete subfloor).

The ASTM E2179 baseline reference for concrete floors is an IIC of 28. If this is netted out, the true Δ IIC for the flooring alone can be calculated and turns out to actually be 6 (34-28), which is much lower than the Δ IIC value of 14 for the higher-performing alternative.

To make informed decisions, verify that values from the manufacturer(s) are stated in Δ IIC for comparative analysis.

Creating safer spaces

"Safety" is a holistic term that encompasses ergonomics and fatigue, infection control, slips/trips/falls, health and wellness, acoustics, chemicals and maintenance in the healing environment. The inherent safety attributes and performance characteristics of rubber flooring address these issues and can positively impact the business decisions healthcare facilities face within the "new normal."

Centers for Medicare and Medicaid Services (CMS) identify falls as preventable events that should never occur. Nevertheless, falls are one of the most common adverse events reported in hospitals. Reviews of observational studies in acute care hospitals show that fall rates range from 1.3 to 8.9 falls per 1,000 patient days. Between 30 to 35 percent of patients who fall sustain an injury. Each of these injuries, on average, adds 6.3 days to the hospital

stay, and the cost for a fall with injury is about \$14,056. (Joint Commission Prevent Falls Project). Also worth noting, a single nurse fall is estimated to cost a hospital approximately \$33,000.

In addition to their far-reaching negative impacts on patients' recoveries and quality of life, falls impact the bottom line of the hospital, in part because costs associated with the treatment of a fall are not reimbursable under ACA.

CMS has identified 14 categories for Hospital Acquired Conditions (HAC). Included on the list is "falls and trauma," a category directly attributed to flooring.

Three flooring-related issues impact fall protection: slip resistance, glare and light reflectance value. As it relates to patient and caregiver safety, the flooring material, finish, type of maintenance and the coefficient of friction should be carefully considered when evaluating flooring products to create safer spaces. Other factors should also be taken into account, including the aging eye, change in height due to floor transitions and floor pattern (color value, light reflectance value, glare and the texture of the surface).

These factors also help prevent caregiver fatigue (which has been shown to contribute to slips, trips and falls) and make it easier to

move heavy equipment safely and efficiently. It's equally important to remember that shiny no longer equals clean. Visual acuity is impacted; a slippery, waxed floor can have an adverse effect on patient and caregiver safety. Although rubber flooring cannot provide a measurable effect, it can have an actionable impact on the incidence of slip/trip/fall.

Infection control and cleanability is critical

When it comes to creating safer spaces, healthcare settings demand flooring that can be efficiently cleaned and disinfected. A Centers for Disease Control and Prevention (CDC) survey, based on a large sample of U.S. acute-care hospitals, found that one in 25 hospital patients had at least one HAI. There were an estimated 722,000 HAIs in the United States in 2011. About 75,000 hospital patients with HAIs died during their hospitalizations. A separate CDC study of medical costs estimates that the overall annual direct medical costs of HAIs to U.S. hospitals ranges from \$35.7 billion to \$45 billion.^{viii} So, it's important to note that because nora rubber flooring is not a media to microorganisms, it does not encourage or produce bacteria, in turn, supporting the drivers of infection control in the built environment.

Maintenance is a key area where specification of nora rubber flooring improves safety, clinical and operational optimization. An automatic scrubber can clean and buff rubber floors rapidly by applying water to the floor via a scrubbing pad and then squeegeeing the water off the floor, leaving a clean, dry floor in about the same amount of time it takes to mop. This process improves indoor air quality and eliminates the need for chemicals in cleaning. As noted earlier, the introduction of a steam cleaning system gives facilities and environmental service teams the ability to clean the floor while an area is occupied, increasing flexibility, reducing disruption to clinical work, improving patient perception and directly impacting HCAHPS scores.



Making informed decisions

In healthcare organizations, flooring represents a significant investment over the life cycle of the facility, literally underpinning all healthcare delivery activities. To make informed decisions, a comprehensive analysis of both first-time and life-cycle costs is necessary.

An analysis of VCT, vinyl, carpet, rubber and linoleum flooring conducted by the Florida Hospital, Office of Design studied the life-cycle costs of those materials over a 15-year period. The study found that while VCT is typically the least expensive “first-cost” material, the maintenance costs can be 9 to 15 times the installed cost, because of finish requirements and the associated man-hours to maintain the product.

The same study found that rubber flooring had the lowest cost per square foot over the 15 years.^{ix} nora rubber flooring products do not have a factory-applied finish, so they do not require maintenance time for waxing and stripping. A cost benefits analysis can carefully evaluate the intrinsic value and support safety and outcomes. When capital dollars are limited, product selection must focus on the investment made for the life of the facility, in support of patients and caregivers’ safety, as defined by the performance attributes of rubber.

To assist with the business decision owners face when selecting and maintaining a floor, nora offers a life-cycle cost analysis (LCCA) “tool” that enables the accurate comparison of manufacturers’ products under International Sanitary Supply Association (ISSA) standards. ISSA is the highest quality, industry-specific, accepted resource for knowledge and cleaning practice standards. The tool is so specific, it calculates cost of product(s), installation, product maintenance protocol, necessary man-hours and cleaning supplies needed for a given space and square footage.

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Rubber flooring meets demands of caregiver and patient safety

Interior finish products selected for the built environment support caregiver and patient safety, delivery of care and operational outcomes. As the trend toward evidence-based design grows, more healthcare facilities are basing decisions about the built environment on credible research, with the goal to achieve the best possible outcomes for patients and caregivers. Meanwhile, increased scrutiny of healthcare investments, costs and consequent patient outcomes, coupled with the enactment of the 2010 Patient Protection and Affordable Care Act, demand a more complete understanding about how all interior finishes in the healthcare environment—including flooring—contribute to patient, caregiver and resource outcomes.

This “new normal” has transformed what key stakeholders demand from flooring products. The inherent product attributes of nora rubber flooring meet these demands by providing a sound focus on operational optimization, clinical efficiency and patient and caregiver outcomes by offering slip and stain resistance, improved indoor air quality, sound attenuation, and resistance to the growth of bacteria and fungi. At the same time, it provides reduced life-cycle costs while meeting sustainability and health and wellness goals.

End Notes

- i 2013 The Advisory Board Company, Source: Advisory Board Research and Analysis, www.advisory.com
- ii https://www.healthdesign.org/sites/default/files/chd_achieving_ebd_goals_through_flooring__design_final.pdf
- iii Nanda, U., Malone, E., and Joseph, A. (2012) wrote Achieving EBD Goals through Flooring Selection & Design. Concord, CA: The Center for Health Design.
- iv https://www.healthdesign.org/sites/default/files/chd_achieving_ebd_goals_through_flooring__design_final.pdf
- v (Hamilton K. The four levels of evidence-based practice. Healthcare Design, November 2003:18-26) [Ulrich R. Evidence-based design to enhance patient safety. In The environment for care: An NHS estates symposium. London: The Stationary Office, 2004] [Ulrich R, Zimring C, Joseph A, Quan X, Choudhary R. The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. Center for Health Design. Concord CA, 2004].
- vi Nanda, U., Malone, E., and Joseph, A. (2012) wrote Achieving EBD Goals through Flooring Selection & Design. Concord, CA: The Center for Health Design.
- vii https://www.healthdesign.org/sites/default/files/chd_achieving_ebd_goals_through_flooring__design_final.pdf
- viii <http://www.cdc.gov/HAI/surveillance/>, http://www.cdc.gov/HAI/pdfs/hai/Scott_CostPaper.pdf
- ix <http://www.spflooring.com/SiteResources/data/files/Suzanne%20Barnes%20Study.pdf>