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# Resilient Flooring Research & Experience at Kaiser Permanente

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# Kaiser Permanente's Facility Portfolio

## Space Portfolio

- 65 million sq ft of facilities
- 14 million sq ft of parking
- 1,020 medical and administrative buildings including:
  - 500 ambulatory care facilities
  - 35 acute care hospitals

## Capital Plan

- \$24 Billion in facility investments over 10 years
- 130 ambulatory care projects
- 26 hospital projects
- 6,000 net new beds
- 4 radiology centers



# The PVC Alternative: Resilient Flooring

## Research Process for PVC Alternatives

- 2 ½ year process
- Internal committee of experts
- External specialists hired
- Pilot installations – measured/monitored
- Interviews, references
- Maintenance study
- Indoor air-quality testing – internal, external
- Stain testing
- Business case

# Resilient Flooring Evaluation:

Sheet Vinyl/VCT Flooring Risks		Potential Benefits of Nora Rubber or Amtico Stratica Flooring		Potential Financial Implications of Risk Reductions
Health effects from exposure to caustic stripping fumes	➔	Elimination of stripping/refinishing	➔	Decreased illness or injury resulting in lost worktime
Slip/trip/fall accidents	➔	Reduced risk of falls (greater Static Coefficient Of Friction) & reduced fall injuries (softer surface)	➔	Reduced liability risks
Back/lower extremity pain & plantar fasciitis from standing on hard surfaces	➔	Reduced chronic injuries due to softer surface	➔	Decreased injuries resulting in lost worktime
Reverberating noise distracts, tires medical staff, delays patient recoveries	➔	Noise dampened by rubber, eco-polymeric surfaces	➔	Improved physician and staff efficiency due to reduction in distractions & potential increased speed of recovery for patients
Flooring composed of toxic/carcinogenic materials (DEHP, PVC)	➔	DEHP, PVC eliminated	➔	No direct financial implications—could be longer term positive health implications such as the elimination of asthma triggers
Operations disruptions by waxing/stripping	➔	Elimination of waxing/stripping	➔	No quantifiable financial implications-- time savings for staff

# The Alternative: Resilient Flooring Research

## Results & Conclusions:

- Long-term savings
- Improved traction, reduced slip/fall rates
- Better acoustic properties
- Mold resistant
- Stain resistant
- Health benefits
- More comfort underfoot
- Installation & maintenance challenges



# Installation Challenges

- Bubbling and lifting
- Forensic investigation of dozens of installations: Not related to product
- Conclusions: Poor floor prep, moisture in slab, improper adhesive application, inadequate curing time

# Installation Lessons Learned:

- Follow manufacturer recommendations
- Involve manufacturer early in project
- Select proper flooring type and color for application
- Determine need for moisture abatement (and use proper method)
- Properly prepare substrate
- Allow adhesive to cure

# Maintenance Issues

## Northern Cal OR Case Study:

- Maintenance training conducted prior to and post installation
- Complaints about Betadine stains in new ORs
  - Can't clean stains
  - Cost to clean
- Resolution
  - Incorrect cleaning chemicals used

# Maintenance Issues Lessons Learned:

- Don't install rubber in a sea of vinyl
- Color and pattern are key
- Follow manufacturer's cleaning protocol
- Train EVS staff
- Battle of shiny floor vs. dull floor
- Don't wax

# Continuing Research: Safety

## No Studies Exist of Injuries by Flooring Type

### Anecdotal feedback:

- Walnut Creek ED & Nursing – plantar fasciitis
- Acoustics

### German Nursing Home Study:

- Only broken bones on non-rubber surfaces
- Significantly lower fall rate

# Current Research: Safety Benefits

## 2005 – 2006 Slip, Trip, and Fall Study

### Closed Claims:

Folsom & Elk Grove: 3 injuries related to flooring

Antioch & Livermore:

0 injuries related  
to flooring

- Further research needed

