

The Public Health Impact of Greening Affordable Housing

Presented by
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National Center for Healthy Housing

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Healthy Homes Training Center

Project Partners

Viking Terrace Apartments

Worthington, Minnesota



- Southwest Minnesota Housing Partnership
- Minnesota Green Communities
- Greater Minnesota Housing Fund
- Center for Sustainable Building Research
- Enterprise Community Partners
- National Center for Healthy Housing



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Evaluation Elements

- Visual Assessment
- Resident Health and Quality of Life Questionnaire
- Resident Training
- Radon Testing
- Performance Testing



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Green Rehab Elements

- Ventilation: ASHRAE 62.2
- Low-VOC adhesives, paints & coatings
- Radon testing pre- and post-rehabilitation
- Pest management: Contracted with pest control firm specializing in IPM
- Non-smoking common areas
- No carpet in wet areas
- Energy Star labeled fans exhausted to the exterior equipped with a humidistat
- Surface water management



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Before Renovation



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Resident Involvement



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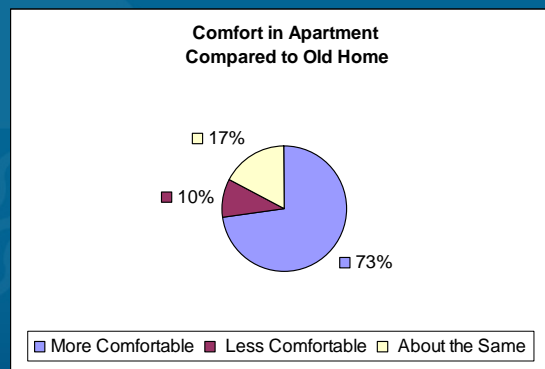
Data Collection and Training

- Health Questionnaire
- Visual Assessment
- Resident Training



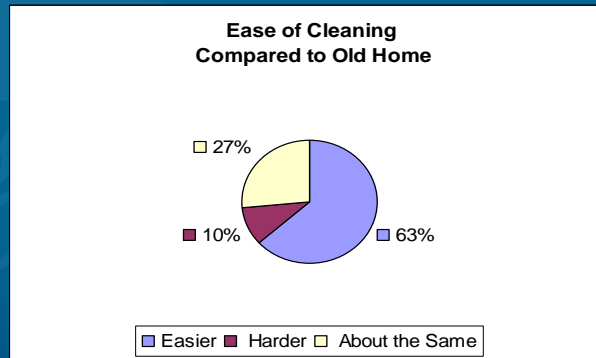
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Baseline Questionnaire Results



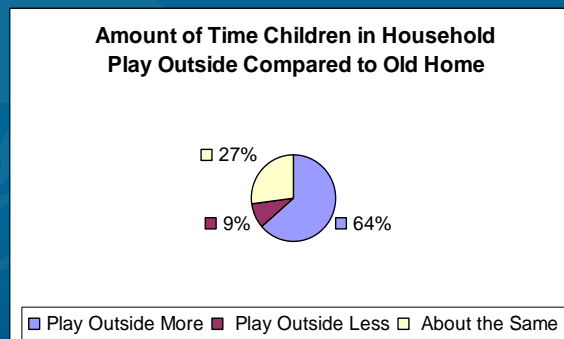
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Baseline Questionnaire Results



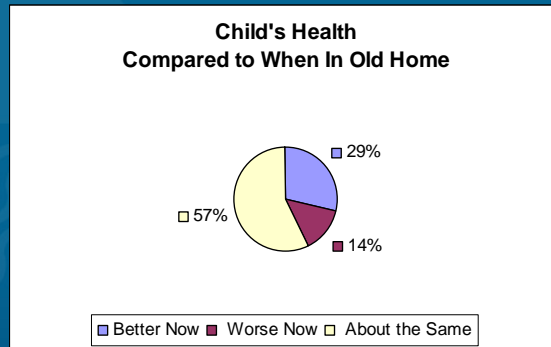
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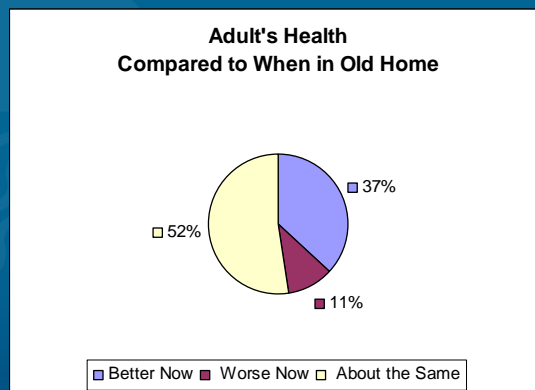
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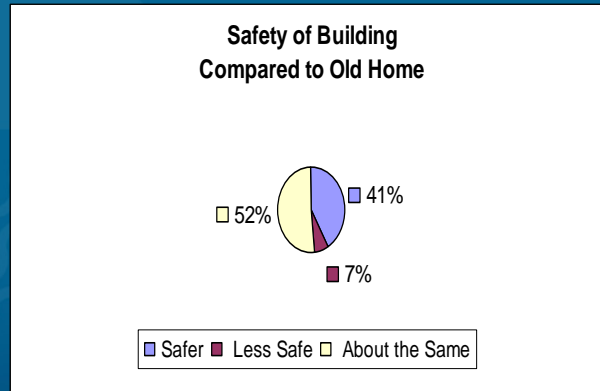
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Baseline Questionnaire Results



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Baseline Questionnaire Results



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Environmental Testing

- Carbon Dioxide Measurements
 - Adequate Fresh Air
- Radon
 - 90 Day Alpha Track to Test the Need for Mitigation
- Volatile Organic Compounds (VOCs)



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Radon Testing Results

- 2 Rounds of Pre-Renovation 3-Day Tests (1/06 & 3/06):
 - Round 1: 29 kits, Range 1.0-6.8 pCi/L, 9 Results at or above 4 pCi/L
 - Round 2: 8 kits, Range 2.3-4.0 pCi/L, 1 Result at 4 pCi/L
- Post-Renovation 90-Day Tests in 2 Buildings (1/07-4/07):
 - 22 test kits placed, 17 recovered (9 units, 8 common areas).
 - Range 0.6 to 4.5 pCi/L
 - 2 results at or above 4 pCi/L



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Ventilation Testing

The ventilation testing showed that:

- Fresh air was delivered at a rate of about 70% of the ASHRAE standard,
- Kitchen and bathroom exhaust air flows were slightly below and above the specified rates, respectively, and
- The ductwork required more sealing to reduce leakage.



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Summary of Results

- Noticeable improvements in child and adult health, comfort, safety and ease of cleaning
- Radon testing shows the need for mitigation
 - now underway
- Ventilation measurements show fresh air supply, duct sealing and need for improved exhaust ventilation in kitchens and bathrooms
 - now underway



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Conclusions

- Low-income housing can be renovated using Green and Healthy Homes principles that promote energy conservation, sustainability and public health and safety.
- Ventilation and environmental testing can help to ensure that building renovation design performs as intended.
- Collaboration of housing, health and environmental professionals is essential.



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