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Contents

Abstracts of Poster Presentations

Abstracts of Paper Presentations (in program order)

Symposia (in program order)

1. Mira Ahn, Erin Hopkins, Sung-Jin Lee, Katrin Anacker, Becky L. Yust, Eunju Hwang, and Gina Peek, *Aging in Place: Current Research Findings and Implications in the Field of Housing*
2. Barbara Allen, Pamela Turner, Mary Ellen Welch, David Buys, Claudette Reichel, and Michael Goldschmidt, *Healthy Home: Evolution of Online Resources by the Healthy Homes Partnership*
3. Rusty Smith, *Center for Rural Design*

Perceptions of safety from crime as the significant factor for seniors' aging-in-place decision

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Background and Purpose

Safety from crime in residential environments has been a norm (Jeffery, 1973; Kim, 2006; Newman, 1973). Several studies demonstrated significant correlations between safety from crime and residential satisfaction (Weidemann & Anderson, 1985). However, it is very rare to find empirical evidence that explains how safety from crime could affects elderly residents' aging-in-place intentions. The purpose of this research was to examine the need for crime-free environmental design guidelines for elders. This study thus aimed to identify significant correlations among elder residents' perceived safety from crime, their neighborhood satisfaction, and their intention to age in place.

Research Method

The research hypothesized residents' perceptions of safety from crime would significantly affect their aging-in-place intention. We assumed differences in aging-in-place intentions were also influenced by resident age. Different housing types could also affect their perceptions of residential environments. We thus adapted stratified sampling method for a questionnaire survey, with the strata as age groups. To reduce the effects from different housing types and neighborhood settings, the survey targeted single-family housing residents. The items in the questionnaire are presented in Table 1. It took over three months to collect 331 responses from mid-Michigan areas. After excluding incomplete surveys, 321 responses were used for statistical analyses. Using SPSS, descriptive analyses, mean difference tests, and correlation coefficient matrices were conducted to generate findings.

Findings

Significant relationships among residents' perceived safety from crime, their residential satisfaction, and the aging-in-place intention were examined by categories of residents' age. Considering the age to prepare for retirement, the 321 respondents were divided into three groups: age 30s or younger (29.2%), 40-50s (44.9%), and 60s or older (25.9%).

Residents' perceptions of safety in their neighborhoods: Overall residents' perceived safety was positive, with the mean value of 4.16 out of 5 points. Additionally, their responses to the question, "My home is located in a safe environment for children to play," was positive (Mean=4.08). The perceived safety from crime did not significantly differ among the three groups.

Residents' perceptions of safety and neighborhood satisfaction: Results from Pearson's correlation coefficients support positive relationships between the perceived safety from crime and residents' satisfaction with their neighborhood environments. When they felt safer, their satisfaction was higher ($r = 0.537$, $p < 0.01$).

Residents' perceptions of safety and aging-in-place intention: If residents' felt safer in their neighborhoods, their intention to age in place got stronger. The group of residents with higher perceived safety showed a stronger intention. The mean difference between "intend to age in place (group A)" and "not intend to age in place (group B)" in terms of their perceptions of safety significantly differed (Mean

of group A = 4.44, group B = 3.94). The age group of 60s or older showed a stronger intention to age in place when they felt safer.

Residential satisfaction and aging-in-place intention: The positive correlation between residents' satisfaction with neighborhoods and their aging-in-place intention was also significant. The older residents with higher residential satisfaction expressed strong intentions to age in place. Compared to younger residents, the residents age 60 years and older had a stronger intention to age in place when they felt safer.

Suggestions and Conclusion

Research findings including significant relationships among residents' perceived safety from crime, their residential satisfaction, and their aging-in-place intention. The results also confirmed the need for reinforcing the CPTED guidelines for older residents who experience retirement and plan to age in their current residences.

Although the safety from crime has been regarded as critical in residential environments, detailed CPTED guidelines have hardly been developed further for senior housing since Newman's design guidelines were widely accepted in the 1990s (Newman, 1997). For the elderly who show more concerns about the safety from crime, it would be important to enhance this aspect for supporting their aging-in-place decision. In fact, some other countries have developed and implemented CPTED guidelines for many different types of housing (CPTED Research Information Center, 2018). Considering territoriality, offering natural surveillance, controlling access, and offering appropriate maintenance could be applied in many ways when designing senior housing. Designers and property managers can also provide their input to the guideline development. The guidelines should include both interior and exterior of senior housing units to improve the perceived and actual safety from crime for elderly residents so that they can pursue aging-in-place.

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Hurricane Preparedness and Recovery

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Key Words: Storm Preparedness, Storm Recovery, Flooding, Home Sanitation, Mold, Food & Water Safety, Home Maintenance, Healthy Housing, Consumer Services

Summary: As a result of the educational programs conducted by County Extension Agents stronger partnerships were forged with numerous County agencies before, during and after storm events.

Situation: In 2016 and 2017 the community was struck by five weather related natural disasters: an ice storm, tornado, tropical storm Hermine, hurricanes Matthew and Irma. During these disasters the community experienced storm surge, flooding, inundating wells, flooded homes, debris from trees, wide spread power and water outages, disruption of transportation and supply, and many modes of communication such as internet services were disrupted. Flooding caused issues with contaminated wells and mold in homes. Electrical and water outages made sanitation, safe food storage and preparation a challenge. Ice for cool storage was very difficult to find immediately before, during and especially after the storm events limiting the potential alternatives for safe food storage.

Response: County Extension Agents conducted educational programs to prepare members of the community to survive and recover from weather related disaster events. These programs represent a long-term education before weather events as well as immediate response during the event and throughout the recovery. At risk populations, such as limited resource and elderly were targeted for these programs as well as high risk communities.

Long term, thirty-seven programs were conducted for more than 725 consumers by the Family and Consumer Sciences (FACS) Agent that included the development of an emergency preparedness plan, the creation of a home emergency 3-day preparedness kit, home maintenance, review of insurance policies, important documents needed for post storm recovery, energy conservation during storm and power outages, food safety including preservation and preparation, evacuation plans, when to evacuate, why to evacuate, as well as evacuation resources particularly those with limited mobility or vehicle access, services available post storm – FEMA,HUD, USDA and access to information portals.

During the storm events, in partnership with the County Emergency Management Agency (CEMA) Extension publications were distributed in both English and Spanish through social media, radio and television including media affiliates: CBS, NBC, ABC and FOX. The FACS agent participated in news conferences to inform the public about food safety risks association with the wide spread power outages.

Impact: As a result of the Programs conducted by the Extension office stronger partnerships were forged with numerous County agencies before, during and after the storm events. The FACS agent served as a liaison between the County Health Department, County Inspections and HUD to help residents receive appropriate remediation for repairs and rapid mold growth due to leaks and flooding. Populations with limited mobility and transportation were able to register and access public assistance for mandatory evacuations and returning home after the storms. One community participated in Hurricane Preparedness program after Hurricane Matthew. It helped the community to survive and recover a year later from the effects of Hurricane Irma much faster than for Hurricane Matthew.

Minnesota Manufactured Housing Communities Data Collection and Best Practice Survey

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There are notable gaps in the data collected on manufactured (mobile) home communities (MHCs). Traditional data sources, like national census data, are difficult to interpret as they only track manufactured homes as a housing type, not by where the homes are sited. The lack of specificity of the census survey makes it difficult to study manufactured housing communities apart from the larger stock of affordable housing. At the local state level, oversight of MHCs is often decentralized, making data collection difficult and costly to obtain. This project seeks to   analyze the current MHC data collection and management practices of Minnesota state agencies. In Minnesota, oversight of MHCs is delegated across seventeen different environmental health agencies. Bifurcated agency relationships and decentralization creates problems for all those who rely on reliable data: manufactured homeowners, housing developers, advocates, and public agencies alike. A data repository of MHCs was created using public data requests of park lists maintained by delegated state agencies as well as copies of annual inspection reports. All but two of the seventeen delegated agencies provided data. The information collected on the park lists varied across delegated, three of which did not maintain master lists. Additionally, as there was no general inspection report document distributed by the Minnesota Department of Health, the format and recorded information varied across delegated agencies. Creating an accurate list proved challenging due to key data points such as park ownership, number of pads, and contact information reportedly inconsistently. Results from this project underscore the need for a more centralized approach to data collection and management practices similar to other states such as Oregon.

Home, Health and Well-being: African American Elders

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Minority groups' perspectives are under-represented in research literature including housing research, are often interpreted/misinterpreted by well-informed and well-intentioned scholars, who may lack race consciousness or understanding of institutional racism. To address this gap, a qualitative research study with data from structured interviews with 17 African American adults aged 65 years and older described the interrelations between the physical environment, social environment, and overall well-being. The participants resided in non-institutionalized, community-based housing in the Minneapolis-Twin Cities metropolitan area. Housing types included single-family owner-occupied, multi-family rental units, and subsidized 202 developments.

African American elder participants described their attachments to home and the social environments surrounding their housing. Their housing and tenure status emerged as critically important in their expressions of self-identity which also emerged as an important influencer of well-being. Another important finding confirmed the importance of a residential environment as more than physical shelter and more than a means to build wealth. The African American elders in this study described home as a psycho-social space that supported African American elders a sense of belonging, empowerment, and peace. They often described their current housing as the only space where they truly felt safe, rooted, and renewed. This relationship was most profoundly expressed by residents in a 202 development.

Alternatively, the homeowners valued their tenure status and were committed to maintain it by aging-in-place.

Interactions between the physical and social environments were related to well-being as explained by the Ecological Model of Aging. Socioeconomic status and the security of a safe, decent, and affordable home, in a supportive and amenity-rich community, were powerful influencers of participants' well-being.

The research findings emphasized the critical role of home place in buffering the negative effects of racism among elder African Americans across a variety of residential settings. The study exemplified the importance of race-centered research, suggesting the experience of racism presses on elders. However in this small in-depth study of African American elders aging in their independent home environment the near environment appeared to buffer press due to experiences with racism. Housing providers and policy decision makers can consider research evidence on the specific aspirations, needs, and challenges of African Americans; such evidence may help mediate the negative experience of racism and encourage the development of additional and preservation of positive independent home for aging African Americans.

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Intersections of Well-being and Home Satisfaction in the Designed Environment

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The purpose of this phenomenological qualitative study was to understand how the physical home environment affects psychological well-being for stay-at-home mothers. It is important for interior designers and housing professionals to understand the connection between people, the built environment, and the role their profession plays in improving quality of life. This connection is mediated by psychological and physiological responses. The concept of well-being is difficult to quantify (Becker et al., 2010; Kopec, 2012), but there are factors such as stress and satisfaction that are predictors of well-being (Deiner, 2009; Dilani, 2001; Guerin & Martin, 2010; 2010; Ulrich, 1991).

Satisfaction is a major factor of well-being and a key variable in the housing adjustment theory (Morris and Winter, 1975). This theory has the ultimate goal of achieving well-being in regards to housing. The housing literature is vast when focusing on satisfaction and well-being however, few studies cite satisfaction in relation to interior spatial qualities and characteristics which are of great importance to occupants.

As stay-at-home-mothers spend a significant amount of time in their homes, it is important to address their well-being as caring for infants and children can physically and mentally take a toll in a mother's life. Studies have shown a link between a mother's mental health and developmental delays in children (Manuel, Martinson, Bledsoe-Mansori, & Bellamy, 2012). Due to the influence the physical environment has on people's emotional health, well-being implications support the need to identify any physical environment factors in the home that can reduce stress, increase control, or improve quality of life.

This inquiry explored what well-being means in the home, what physical characteristics or features in the home environment increased and/or decreased stay-at-home mothers' well-being. Face-to-face interviews, observation, and photo elicitation were used to collect data. The sample consisted of 14 stay-at-home mothers who had one or more children from birth to five years of age and lived in a metropolitan area. Kreitzer's (2012) well-being model was used as a

Findings revealed that quantity of space, access to nature, personalization, and privacy/retreat were important for well-being in the mothers' homes; clutter and lack of cleanliness detracted from their well-being. Suggestions for creating well-being in the home were generated from the findings in the study. These suggestions support well-being by reducing stress levels for mothers and their families in the home environment. In addition, outcomes of this study will aid interior designers in home design that support well-being, health practitioners in understanding potential stressors in the physical home environment, and may potentially affect housing policy to impact planning and building practices of homes for those who reside in affordable housing with minimal resources to increase their quality of life.

Interactive Laundry Care Lesson

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Key Words: laundry, laundry care, healthy homes, interactive laundry

Laundry education is an important topic for all ages to know and understand as the cost and care for clothing textiles accounts for about 10.9% of the home budget (U.S. Department of Labor, Bureau of Labor Statistics, 2017) and Americans wash about 300 loads of laundry each year (Energy Star, 2018). In nine-week intervals over the past year, Family and Consumer Sciences (FACS) 6th grade students participated in a course on laundry essentials. The objective of the interactive curriculum is to teach students about green cleaning laundry detergent and laundry care as part of life skills education. Students gain knowledge about how to make laundry detergent and how to determine the lowest prices and best methods for cleaning their clothing. The program follows the State Standards MSFCS6-FD1 for 6'" grade that students learn about factors affecting textile and apparel decisions for individuals and families and how those decisions affect society. Through the lesson, students are learning about laundry room safety, including correctly labeling cleaning products, cleaning up spills, and the importance of disposing of empty detergent containers (American Cleaning Institute, 2018).

Students discuss why we choose the clothes we wear and the places we shop. The group discussion is based on fashion trends, popular brands and peer influences. The participants learn how to make a powder laundry detergent using a simple cost-efficient recipe (Carlos, 2014). While making the laundry detergent, the students learn the science behind laundry detergent (American Cleaning Institute, 2018) and the energy needed for washing clothes. The students participate in making the powder detergent during the program presentation. An interactive sorting game shows students how often one should wash jeans, sheets, bras/underpants, bed sheets, pajamas, bath towels, and t-shirts (Alliance

Communications, Sumaya Shrestha, 2011).

Evaluations at the end of the lesson indicate that 76.1% of the students will try suggestions from the laundry lesson. Over a third of the students. 33.6%, want to begin making their own laundry detergent, and 25.7% of the students said they would be careful with laundry detergent and chemicals to keep them out of reach of younger children and pets. Overall, 90.3% of the students were satisfied with the lesson. The students also commented that the lesson was fun, educational and interactive - they loved the hands on involvement in making the laundry detergent.

The lesson and evaluations were limited due to a small sample size from one rural school. A second limitation was that the students' evaluations were self-reported. This lesson is in the first year of implementation in the classroom. Future plans for the interactive laundry lesson in the classroom include continuing the lesson development and making the program available to FACS teachers and county extension agents for programming. This lesson fits into STEM education because of the science presented about the chemical reactions and the mathematics of measuring ingredients to make the laundry product.

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Concurrent Session Presentations

Public Investment and Rental Housing in Rural Communities[1]

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Key words: Community capitals, rental housing, rural housing

The role of public investments in promoting rental housing is often considered as an urban housing issue. Yet in 2010, across the country 28.4% of occupied housing in rural and small towns was rental units (Housing Assistance Council 2012, p.36). In many rural communities rental housing is a critical community asset in workforce recruitment, senior housing, and housing for low-and moderate-income households. The research findings shared here highlight public investment in rental housing and the impact it has for rural community capital.

The study aimed to examine public investments in rural rental housing using the Community Capitals Framework. The goal of this effort is to incorporate this information into ongoing research that can inform public policy regarding rental housing in rural communities. Because housing is grounded in place, it represents an essential component of communities' local capital and enhancing housing stock is a key aspect of community development (Beltz, 2014). Human and social capital facilitate housing development resulting in communities taking advantage of (or overcoming) the natural capital of their location. Communities leverage local financial capital through using political capital to access outside funding. Resistance or support of housing development is further influenced by citizens' cultural capital influences. Applying the Community Capitals Framework to public investments the study identified the potential bonding (local) and bridging (state and federal) capital resources available to rural communities to meet local housing needs. For the purposes of this study financial capital resources excluded those designed to promote owner-occupied housing and were limited to funding for rental housing development, renovation, and tenant rent assistance.

Utilizing the rural-urban continuum, a random selection of 8 rural counties (those with RU values of 8 & 9) became the basis for examining the influence of public investments in rural rental housing. Using publicly available secondary data in agency reports and community websites as well as government resources for rental housing were identified. Funding allocations were used to match resources to communities within the selected rural counties. Descriptive analyses were conducted.

Preliminary findings indicate that rural communities are, in fact, utilizing their community capital and effectively leveraging local assets to develop and preserve subsidized rental housing. New rental housing development was facilitated through the use of federal Low-Income Housing Tax Credits. Public investment promoted multifamily rental housing rehabilitation through a state sponsored Small-City Block Grant Program. Local Housing Authorities allocated tenant-based rent assistance available through HUD Section 8 and housing choice vouchers. Project based rent assistance was also provided in UDSA funded developments.

Community capital was an essential component in accessing public investments in rural rental housing. New rental housing developments were contingent on public-private partnerships and frequently multiple actors were involved in the planning, construction, and management of multifamily developments. The Community Capitals Framework provided a useful approach to understanding the provision of rental housing in small rural communities. The application of the framework can provide a strategy for local communities in supply sufficient housing. In particular, it can highlight resources that may facilitate or inhibit further development and provide a better understanding of the role that housing plays for future economic and community development.

It is projected that a significant portion of the private sector rental housing in rural communities consists of single family dwellings, including mobile homes, duplexes, and apartments above main street businesses. Further research is necessary to capture this segment of the rental housing market as it requires field studies with community by community data collection. Given the emphasis of this study on public investments information on the private rural rental market was not reported.

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Tiny House Communities for Homeless and Housing Aspirations

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Key Words: tiny houses, homeless, housing aspirations

A recent housing movement, "tiny houses" features small footprints, environmentally friendly mechanicals and finishes, represents a sustainable and affordable approach to housing design. This approach to housing has also been developed as an alternative approach to the on-going challenge of housing the homeless (Keable, 2017). Tiny house communities or villages specifically providing safe housing environments for the homeless are being developed in locations including: Michigan, Oregon, Texas, Washington, and Wisconsin.

The purpose of the qualitative phenomenological study was to describe housing attachment and housing aspirational goals of individuals, who experienced homelessness, currently living in a tiny house cooperative community. Increasing knowledge of the tiny house cooperative experience may provide a deeper understanding of individuals residing in tiny house and communities while answering the research question, how do housing and community attachments influence aspirational housing goals?

The tiny house cooperative included five residential members, four men and one woman. The three research participants self-identified as formerly homeless men in their 50's, 40's, and 30's; all three of the participants referred to themselves as original or founding members of the tiny house cooperative. The sample was not intended to reflect the parent city homeless population, however, the participant characteristics provided insight into tiny house cooperative residents' demographics and past homeless experiences (Creswell & Poth, 2018). The concepts of housing and community attachment provided exploratory themes of the study. The meanings of each theme were left undefined in the pre-analysis conceptual model to allow for participant constructed definitions; this approach provided a voice and descriptions of the participant lived experience through the open-ended interview questions and observations (Miller, Creswell, & Olander, 1998). Interviews were recorded and transcribed by the researcher; transcriptions and field notes were transferred to a question matrix and white board where words were analyzed for emerging categories and theme definitions (Bell & Walsh, n.d.; Miller, Cresswell, & Olander, 1998).

The participants described housing attachment as a space providing privacy, security, safety, and storage as well as increased housing stability. The participants' responses acknowledged an appreciation of safety and security, however, they also discussed bathroom and plumbing design deficits of the physical features. The participants defined community attachment and pride developed through investments of time and participation in community activities (Riger & Lavrakas, 1981). The cooperative participation and volunteer requirements encouraged members to give back to the community and provided a sense of purpose, opportunities for friendship and bonding, and commitment to the cooperative community. All of the members responded they did not have alternative housing aspirations outside of the cooperative and preferred to remain living at the cooperative because of the invested time and their commitment to the cooperative.

Despite housing quality deficits including no plumbing within the tiny house and requirements to participate in the cooperative community, participants described a high level of satisfaction and little propensity to move. By providing a deeper understanding of why people with insecure housing gravitate toward tiny house structures and communities, and how housing attachment influences housing aspirations and long-term housing stability, policy makers and grass-roots organizers may consider alternative approaches to housing and community that support this population. For example, tiny house villages could be designed with plumbing to accommodate long term residency. Alternatively, such communities could be designed as transitional housing programs with policy and programs that provide supports and incentives to encourage individuals to continue their housing stability as they move into more normative housing.

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Exploring Housing Issues in Mississippi by Race, Income, and Gender

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Key Words: Housing Quality, Housing Status, Race, Income, Gender

The Lower Mississippi Delta (LMD) spans portions of Missouri, Illinois, Kentucky, Tennessee, Arkansas, Mississippi, and Louisiana and includes some of the highest concentrations of poverty in the U.S. LMD housing issues such as quality, housing tenure, and housing cost burden (HCB) were explored by the Housing Assistance Council (HAC). They found that over 10,000 occupied housing units have inadequate plumbing and/or incomplete kitchen facilities; many of these occupants are African American. The homeownership rate is 67.9%, and it is even higher for rural areas (70.9%) compared to urban areas (51.4%); approximately half of African American households are homeowners regardless of location. Home values and incomes are generally low, but still result in 23% of homeowners and 51% of renters paying more than 30% of their income on housing (HAC, 2013). Some of the poorest counties in the LMD are found in [State]. Housing related research for the state and its LMD counties is limited.

The purpose of this research is to further explore the housing issues of quality, housing tenure, and HCB by race, gender, and income in the state of Mississippi. These housing issues will also be assessed by county (delta and non-delta).

Methods

Sample and Data Collection

The sample includes Mississippi residents age 18 and older, living on their own (not with a parent/guardian), and from only one household. Using the convenience or snowball sampling method, students in an online Sociology of Housing class conducted face-to-face and phone interviews with 155 residents. A repeated cross section design was used over the fall 2015, 2016, and 2017 semesters.

Student Training and Instrument

Using webcasts, students attended instructor led trainings on the basics of research and interviewing. Students were IRB certified and used an instructor monitored discussion thread in Canvas to ask questions and problem solve while collecting data. The instructor created the interview schedule which included closed and open-ended questions. Qualitative data for the first wave was presented at the HERA 2016 conference Green-Pimentel, 2016).

Variables, Research Questions, and Analysis

Dependent variables include quality (measured using the Poor Quality Index (PQI); U.S. Department of Housing and Urban Development, 2013), housing tenure (renter, owner), and housing cost burden (30% or less, 31% or greater). Independent variables include: race (Caucasian, African American), gender, income (ordinal), and county (delta, non-delta).

T-tests were used to examine PQI score by race, gender, and county. ANOVA was used to examine PQI score by income as well as HCB by race, gender, and county. Chi-Square was used to examine housing tenure by race, gender, income, and county.

Results

Detailed results will be given in the presentation. Select results include the following. The mean PQI score was significantly higher (meaning poorer quality) for residents of delta counties and also differed significantly by income. The variables having a significant relationship with housing tenure were race, income, and county. The strength of these relationships were moderate for race and county, and strong for income. Implications of the findings will be discussed in the presentation.

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Strategies for Teaching Housing Finance to Students Struggling with Calculations

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Post-secondary housing educators may encounter students who have difficulty performing on course assignments that involve math, especially in financial planning courses. The goals of this presentation are to describe reasons for students' difficulty with calculations and to share effective strategies to assist students with overcoming this difficulty, with a focus on housing-related content (e.g., amortization, mortgage refinancing). A cause of students' difficulty may be disengagement, or a more complex cause may be math anxiety or dyscalculia. Students with math anxiety are usually skilled students who fear they will not perform well (The Understood Group, n.d.). Often, their problems stem from a previous negative experience in a math class ("Math Anxiety," n.d.). Conversely, students with dyscalculia have deficits in math skills, such as an inability to recall facts. According to the National Center for Learning Disabilities (2007), students with dyscalculia can find it "hard to visualize patterns, different parts of a math problem or identify critical information needed to solve equations and more complex problems" (para. 7). For example, the ability to identify the information needed to solve a mortgage refinancing homework problem is essential in many financial planning courses.

Previous work has noted the unique challenges students with dyscalculia, anxiety, and ADHD have in the post-secondary financial counseling and planning classroom (Betz-Hamilton & Frank, 2017); however, this proposed session will expand upon this work by specifically focusing on strategies for teaching housing-related content that involves math (e.g., amortization, mortgage refinancing) in financial planning courses, particularly for students who have math anxiety or dyscalculia. These strategies will include, but are not limited to, demonstrating how to break down complex calculations into manageable steps, designing early course assignments so more weight is given to demonstrating the process rather than determining the right answer, and providing multiple opportunities for self-assessment during class time.

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Maplewood Mansion Learning Lab:

Mutually Beneficial Opportunities through Community Partnerships

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Key Words: housing education, immersive learning, community partnerships

Introduction: Maplewood Mansion is one of the original Ball Family homes, located in the Minnetrista Boulevard Historic District of Muncie, Indiana, less than two miles from the Ball State University campus. Through a partnership established in 2017 between Ball State University, Ball Brothers Foundation, and Indiana University School of Medicine, Maplewood Mansion Learning Lab was established with these goals in mind:

- To provide short-term housing for medical students completing their educational requirements at Ball Memorial Hospital;
- To provide these medical students with an exceptional Muncie experience that encourages them to return to the area after graduation to live and work;
- To provide immersive learning experiences for Ball State University students.

Purpose of Presentation: In this interactive session, presenters will share more detail about learning opportunities created through Maplewood Mansion Learning Lab, as well as the challenges involved. It is our desire to inspire faculty at other universities to create similar learning opportunities in their housing-related classes.

Project Accomplishments: To provide faculty with resources related to this project, an online site was created as a repository of information. Information included the history of Maplewood Mansion, links to educational resources, and space for faculty to share their involvement in teaching, research, and service activities through Maplewood Mansion Learning Lab.

Specific accomplishments of advanced Residential Property Management classes included identification, research, development, and/or implementation of these activities:

- Mission/Vision/Values statement
- Social media sites
- Logo
- Career apparel for student staff
- Resident handbook
- Forms and procedures
- Updates to common spaces
- Welcome gifts for residents
- Inventory of furnishings
- Bike share program
- Rotating student leadership roles
- Responding to fictitious "on call" situations

In addition to the work accomplished by the advanced RPM students, other Ball State University students have been involved in Maplewood Mansion Learning Lab. Introductory RPM students use the site for job shadowing experiences, students in the RPM maintenance class use the site for property-related field experiences, and a capstone class in the Management Department used the site for a SWOT analysis. Both RPM students and Hospitality/Food Management students use Maplewood Mansion Learning Lab as an internship site, and students in the HFM Catering class assist with special events held at Maplewood Mansion.

Project Challenges: Although a great deal has been accomplished in a very short time through Maplewood Mansion Learning Lab, a variety of challenges exist. Teaching that incorporates this "applied" methodology rather than traditional lecture and assessment is time-consuming and requires faculty to be more responsive to the educational needs of the students and the day-to-day needs of the site; some faculty have been reluctant to shift to this mode of teaching. The distance from campus, resulting in the need for both students and faculty to often drive to Maplewood Mansion Learning Lab, has been a scheduling challenge and a transportation challenge. Another challenge has been the need to provide learning opportunities for students without interrupting the daily activities of Maplewood residents. And an ongoing challenge of Maplewood Mansion Learning Lab is the cost of operations and upkeep, especially for a historic building.

Hitchhiking Home: Bedbug's in Your Backpack

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Key word(s): Bedbugs, Schools, Kids, Children, Integrated Pest Management

Introduction

For decades, parents would whisper, "sleep tight, don't let the bed bugs bite," as they tucked their young children into bed at night. Not understanding the significance of such a phrase, children giggled as they rested their heads and counted sheep until they fell fast asleep. Now that bed bugs have made a reappearance, the phrase is not such an endearing one for those trying to rest their weary noggins. In July 2018, professionals were educated about bedbugs at the annual School Nurses Survival Training Conference hosted by Barnes Jewish/Christian (BJC) Hospital. As part of that education, school nurses were also surveyed about the prevalence of bedbugs and other pest issues in their school, what strategies they use to manage pests, how they communicate with families about pests, and additional resources that they might need moving forward. The goal of the research is to 1) assess the needs and concerns of school nurses about bedbugs/pest issues, 2) develop an action plan to address these issues, and 3) provide them with educational materials and resources to utilize as they continue to manage pest issues in their school environments.

Literature Review

Bed bugs have an extensive and grueling history, referenced as a nuisance in Egyptian literature, discovered fossilized, and believed to be around 3,500 years old (Hogenboom, 2015). Although a common problem in England during the 17th and 18th centuries, due to the availability of modern pesticides people received relief during the 20th century (Potter, 2011). Because of several factors, including the adoption of safer pest management practices and the mobility of modern life, bed bugs have made a resurgence in recent decades. According to national treatment data provided by Orkin, St. Louis ranks at number 37 out of 50 cities with the most treatments for bed bugs. This is based on treatment data between December 1, 2015 and November 30, 2016 (Fox News, 2017). Terminix, another popular pest control company, ranks St. Louis at number 16 out of 20 cities with the most bed bug infestations. This data is based on service requests within the first half of 2017 (Business Wire, 2017).

Although expensive and difficult to eradicate, bed bugs are not known to transmit serious diseases to humans (Center for Disease Control, 2018). However, significant stigmas are associated with the presence of bed bugs such as uncleanliness or low-socioeconomic status (Shindelar and Kells, 2012). As it relates to school environments, these stigmas can be particularly humiliating to children who may endure embarrassment from other classmates. The presence of bed bugs becomes "emotional and generates anxiety in parents, students, and school staff (Environmental Protection Agency, 2012)." In reality, bed bugs can affect anyone, anywhere. Even though a few bed bugs may "catch a ride" in a student's backpack or other possessions from an infested home, infestations inside the school are not common (Shindelar and Kells, 2012). However, every school must decide how to deal with the potential issue of students and staff bringing bed bugs into a school environment (Merchant, 2018).

Methodology

The study employed a quantitative/qualitative research approach and utilized a survey as the primary source for data gathering. The survey was purposefully kept brief as the amount of time available with participants was limited. They were asked to respond to six questions based on a 5-point likert type scale with open-ended follow-up questions attached to each quantitative survey question in order to gather richer, more specific data about their individual strategies and experiences. The survey was administered based on convenience sampling to fifty-five school nurses who attended the bedbug presentation at the

School Nurse's Survival Training Conference. The survey assisted in determining how problematic bedbugs and other pest issues are in their particular school settings, what strategies they use to manage pest issues, how they communicate with families about pest issues, and additional resources needed to manage pest issues in their school moving forward.

Results

Below, in table 1, are a summary of the survey results from the BJC School Nurses Survival Training. Some significant findings from the survey indicate that many schools seem to be utilizing pesticide sprays and applications as one of their primary methods for pest management. Integrated Pest Management (IPM) is series of techniques which utilize a variety of methods to effectively control pests while reducing the risk and impact to humans, animals, and the environment. Under IPM training, pesticide use is always considered the last line of defense against pests (IPM Institute of North America, 2018). Therefore, this is one area of significance, where training and education to school nurses, maintenance workers, and administration can be highly effective in reducing the health and environmental risk created by pesticide use in and around the school environment. Only about half of the survey participants indicated that they currently had an IPM plan in place for their school. More than a third of survey participants didn't feel as if their school would be very likely to integrate IPM strategies into their currently pest management plan. Fortunately, for the surveyed group, bedbug issues did not see to be a significant problem in their schools. Other pest issues, only seemed to be a moderate problem.

Based on the survey results, education and communication about pest management, pest prevention, and treatment options are also areas where significant improvements can be made. More than half of participants indicated that they either never or rarely ever communicated with families about pest issues. However, it should also be acknowledged that more than half of survey participants also indicated that they did not feel as if pests were a problem of major significance in their school environments. Interestingly, survey respondents also did not feel as if families were very responsive to education about pest issues. There were many reasons for this including denial, social stigmas, cultural myths, fear, embarrassment, lack of financial resources, and access to treatment options. Education is a very powerful tool, however there are many barriers that exist and will need to be overcome in order for education methods to be effective.

Table 1	
Responses were scored on a 1 to 5 scale (1 being lowest and 5 being highest)	
Quantitative Questions and Responses	**Qualitative Questions and Responses**
How problematic are bed bugs in your school?	**What strategies have you used to manage bed bug issues in your school?**
N/A: 29% 1: 47% 2: 17% 3: 7% 4: 0% 5: 0%	• Spraying for insects • Hiring a pest control company • Family communication • Homecare instructions
How problematic are other pest issues in your school?	**What strategies have you used to manage other pest issues in your school?**
N/A: 17% 1: 40% 2: 17% 3: 22% 4: 4% 5: 0%	• Chemical pest sprays • Examining and treating lice • Sticky traps • Education • Communication • Cleaning

How well does your school communicate with families about pest issues?	What strategies has your school used to communicate with families about pest issues?
N/A: 24% 1: 28% 2: 13% 3: 13% 4: 13% 5: 13%	• Telephone call • Text message • Email • Written letters to families • School website • School newsletters
How responsive are families to education from the school about how to manage pest issues?	**What barriers exist in educating families about how to manage pest issues?**
N/A: 25% 1: 23% 2: 9% 3: 26% 4: 9% 5: 8%	• Lack of financial resources • Denial • Lack of time • Social stigma (dirty, unclean) • Language barriers • Communication barriers • Education level of families • Access to treatment and services • Cultural myths • Blame • Fear • Embarrassment.
Does your school currently have an Integrated Pest Management plan?	**What types of Integrate Pest Management techniques does your school use?**
No: 47% Yes: 53%	• Spray grounds/inside of building • Clean lockers, Chromebooks, etc. • Education, resources, student rechecks, call parents • Sticky traps • Minimize food in classrooms • One on one contact between nurse and families • Clean clothes/backpacks, seal clothes from home in nurses office
• **If no, how likely would your school be to develop an Integrated Pest Management plan?**	
• 1: 38% • 2: 6% • 3: 44% • 4: 6% • 5: 6%	
• **If yes, how effective do you feel the Integrated Pest Management plan currently is?**	**What additional resources do you need to manage bed bugs or other pest issues in your school?**
• N/A: 4% • 1: 4% • 2: 8% • 3: 40% • 4: 40% • 5: 4%	• Reading materials • More information • Education • Posters/pamphlets/flyers • Prevention education before problem occurs • Education about transfer prevention • Online resources

Limitations

One limitation to the study existed because only school nurses were surveyed as part of this study. In order to get an accurate assessment of pest problems and strategies utilized to manage them, maintenance staff and administration personnel from the schools should be surveyed. If pest issues exist with a student, their teacher and school nurse are probably going to be the first front line workers to access and manage the issue. Education and communication about these issues also probably lies in the hands of school nurses. However, school maintenance workers are behind the scenes handling day-to-day operations such as trash disposal, cleaning, and other pest management issues.

Although the presentation and education were important for school nurses to understand IPM, the survey was handed out for them to fill out during/after the presentation. This created a limitation because some participants answered the questions based on what they would do in the future based on what they learned in the presentation about bedbugs and IPM strategies. However, it was a goal of the survey to find out about their current issues and what sort of education and resources were needed to further assist them.

Conclusion

School nurses who attended the bedbug presentation at the BJC School Nurse's Survival Training were extremely engaged and interested to learn more, about not only bedbugs, but how they could manage other pest issues in the school environment and in their own home environments. They were also very receptive to engaging in further educational opportunities which could be provided to them. Work has begun in conjunction with the Integrated Pest Management Institute of North America to start working with these schools to provide them with additional education and resources about bedbugs and IPM strategies that they can utilize in their schools. The results of this survey are of further guidance as it provides a more in depth view of some of the needs, issues, and barriers that school staff might be facing.

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Older Adults' Interest in Housing Information

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Abstract

As the population of adults age 65+ increases, the market of mature consumers will also increase placing expectations and demands on industries including healthcare, housing, and service sectors. Decision makers in these increasingly competitive arenas need to position their missions and goals to align with these changing needs. The goal of this study was to identify characteristics of adults aged 45+ who are interested in community-based housing options. Data (N=1,052) were collected through a nationwide telephone survey to identify the current and future information and service needs of adults aged 45+.

Using classification and regression tree (CART) analysis with the chi-squared automatic interaction detector (CHAID) algorithm to overcome issues of multi-collinearity within the data, findings indicated that perception of health interference in daily living, age, gender, and living arrangement were significant indicators for interest in obtaining housing information. We analyzed the participants' interest in receiving information on home repair/modification programs, reverse mortgage options, retirement communities, and assisted living facilities.

Overall, the characteristics identified though Andersen's behavioral model align with the progression of potential housing needs. Although predisposing (i.e., age and gender) and enabling factors (i.e., living arrangements) influenced some housing needs, the need factor (i.e., perception of health interfering with what one wants to do) held an underlying influence in determining housing information need. Specifically, women living alone and reporting their health interfering with their daily living have the highest interest in receiving information on home repair/modification programs. Participating in home repair/modification programs can potentially lengthen the time they can remain in the home before more supportive housing is needed. For individuals interested in information on retirement communities, where independent living options are available, age was the only key indicator. The subgroup of adults age 75-84 was different from other age groups. Persons interested in receiving information on assisted living facilities also perceived that their health interfered with what they wanted to do. Age was not an indicator even though it may be easy to assume poor health comes with age. No key indicators emerge among participants seeking information on reverse mortgages.

Economic and Environment Assessment of Photovoltaics for Low-income Households

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Access to clean and affordable energy is a challenge in most parts of the world, and the US is no exception. A substantial number of low-income households spend more than 50% of their income on energy [1], [2]. Rooftop photovoltaics (PV) systems are potential candidates to serve the energy needs of these households while maintaining environmental safety and economic stability. Consequently, there is a need for a holistic approach for analyzing the extent of the overall benefits of PV systems, which are economically affordable for low-income households while having an environmental benefit. This study examined the economic and environmental impacts of using photovoltaics for addressing the energy needs of low-income households in Detroit, Phoenix, and Portland. These locations were chosen because while they all have local economic incentives for renewables and low-income housing communities, they also have different levels of solar insolation.

First, the term "low-income housing" was defined by the average income based on the state's LIHEAP qualifications. Various characteristics of the housing units were gathered for modeling purposes, such as the insulation and water heating requirements, based on state's energy and building code recommendations and prototype residential building designs[3]. The base size was modeled off Detroit's 'Tiny Homes' houses, and the other locations were determined using ratios of single-family home sizes as mentioned in Residential Energy consumption survey (RECS) from Energy Information Administration [4]. The economic and environmental feasibility of PVs were analyzed for single-family residential areas.

The residential electricity demand for the households was modeled using BEopt software, which used the typical low-income housing characteristics such as the building size, building envelope efficiency, and equipment options.. The rooftop PV system was designed for the modeled electricity demand by optimizing for net present cost using HomerPro software. The environmental impacts were analyzed using Life Cycle Assessment (LCA) with SimaPro software. Based on these models, we proposed the most cost-efficient and environmentally beneficial PV systems for each low-income community.

The overall systems were designed to include battery storage as well to provide an efficient and reliable source of electricity. The expenses of installing and maintaining such systems were incorporated into the economic and environmental analyses. We also looked at the various policy mechanisms that could make PVs more affordable for low-income households and how these policies affect the accessibility of PV systems. Energy policies were analyzed to evaluate the potential implementation of PV systems in single-family homes. Battery storage policies were also important when considering the system design to ensure that sufficient energy was available when solar energy was not produced. Altogether, these models and policies led to proposals for PV system designs that would optimize production, storage, environmental benefits and affordability for low-income housing and communities. Designing energy systems specifically for low income households could pave the way to affordable, green energy for low-income households and potentially reduce energy costs.

Preliminary Results

	Detroit, MI	Phoenix, AZ	Portland, OR
Global Horizontal Irradiation	3.84 kW/m²/day [5]	5.78 kW/m²/day [6]	3.53 kW/m²/day [7]
Average annual temperature (Winter minimum-summer maximum	50.3 (21.4-81.4) [8]	75.1 (46.3-104.8) [8]	54.5 (35.8-78.5) [8]
Climate zone	5 [9]	2 [9]	4 Marine [9]
Size of low-income housing unit (assumed)	300 ft² [4][10]	277 ft²[11]	293 ft²[12]
Maximum income level (LIHEAP specification for four-person housing)	$37,650 [13]	$40,364 [14]	$43,511 [15]
Annual electricity usage per low-income housing unit	14,344 kWh/year	9,174 kWh/year	10,519 kWh/year
Annual cost for the low-income housing unit with electricity use from electricity grid only	$1,997	$1,146	$1,135
Annual cost for the low-income housing unit with rooftop PV	$1,503	$765	$813

Discount Rate	%	6.9 [19]
Inflation Rate	%	2.5
PV lifetime		30 years
Inverter lifetime		10years
PV cost		$660/kW
Inverter cost		$130/kW
Inverter efficiency		98%
Derating factor		90.5%

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Green Leases: A Framework for On-Campus Housing

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Key word(s): sustainability, green lease, higher education institutions, on-campus housing

A fundamental goal of higher education institutions (HEI) is student exposure to innovative ideas. By using the university as a living laboratory, students can apply these novel ideas to relevant worldwide issues. Sustainable development, one such worldwide issue, has surged in response to environmental, economic, and social concerns. The HEI has an opportunity to flourish as a thought leader in integrating exemplary approaches to sustainable development throughout the campus. One fulfillment approach is by greening campus operations.

Campus operations, a vital segment of the HEI, provides a tremendous living laboratory opportunity for sustainable development concepts since students interface with the campus on a regular basis. When considering the portion of students who live on-campus, the residence hall can be an ideal living laboratory to introduce innovative sustainable development ideas because students are in this environment on a daily basis. Green leases, an agreement between the building owner and resident, incorporate sustainable clauses which dictate how the building space will be occupied and managed in a more environmentally friendly manner. Gaining traction in the commercial sector of real estate, green leases foster resource conservation and subsequently lower building operating costs. Therefore, green leases complement objectives such as efficiency and profit while taking into account the environment.

In this manuscript, the evolution of green leases as well as the current prevalence of this phenomenon will be reviewed both domestically and internationally. Strengths and impediments of green leases will also be examined from a commercial real estate perspective as well as unique barriers and assets from the HEI perspective. Next, a framework will be developed for adapting green leases from the commercial sector to the residential sector, specifically on-campus housing. This framework will focus on the accountability of the student and HEI to act in more environmentally sensitive ways. Using the innovative idea of green leases at HEIs can create sustainable living environments for on-campus students which in turn can help these students develop environmentally friendly habits. These sustainability-focused habits can be transitioned upon graduation into the live, work, play ethos of the former student translating into a more sustainable future.

The Kitchen as Fetish

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Key words: kitchen, fetish, history

Introduction

The kitchen exists as a central component of the home across cultures. It has many forms that reflect its situation within the political, cultural, and economic constraints of the family. It has been both communal and private, closed and open, gendered and not, and has served as a primary meeting place within the home. The Western kitchen is a product of the recent past. At a basic level, as defined by the Census, a housing unit has complete kitchen facilities when the following three items are present: (a) cooking facilities (b) refrigerator; and (c) a sink with piped water (Census, n.d.). The kitchen has been elevated in status from that of service to an object of desire. The finishes and design are not indistinguishable from other more formal aspects of the home design.

Goal of the Presentation

The goal of this presentation is to examine how the U.S. kitchen has become elevated in status in both new construction and renovation. This presentation will explain the historical developments that illustrate the evolution of the residential kitchen (Banham, 1969). The goal is to better understand the current context of decisions that dominate an ever-expanding area of the modern American house. Specifically, we will focus on the following three entities. First, we will document and examine increased square footage and rising costs devoted to kitchen. Second, we will explore the sophistication of equipment, that is, the increase in technology. And third, we will investigate the change from service space to service and social space.

Why This is an Issue in the Field

1. Kitchens are increasingly expensive. With the elevation of space planning, appliance, and finish to luxury status, the cost of the modern kitchen has substantially increased in a way that decreases funds for other parts of the home (cite)
2. Consumers care about kitchens (evidence: media attention, pop culture) Peek cite
3. Connection between theory and consumer behavior. Is there an intersection between Morris and Winter and changes in today's kitchen? Which norm supports the change (ex: housing satisfaction).

The kitchen is no longer a machine of efficiency, but a fetish. It has spawned its own industry of design and accreditation. As housing educators, the kitchen is a significant component of what we study and teach. The changes to the kitchen over recent decades significantly affect the cost and availability of housing. A contextual understanding of kitchen design will enable housing educators to help in the delivery of formal and informal education.

Methods

This literature review will establish the kitchen as a both a room and a concept. The advancement of technology within the home environment allowed for the invention of the modern kitchen. When complete kitchen facilities became the norm, consumers moved away from kitchens that satisfied basic needs to more advanced and labor-saving spaces. The literature review will document the transition from service space to service and social space. The theoretical basis is Morris and Winter's (1975) Theory of Family Housing Adjustment, focusing on quality norms.

Results and Implications

Kitchens are ubiquitous. Both formal and informal education about kitchens dominates education about the home environment. With a better understanding of the foundations of current kitchen trends, the housing educator can be more discerning in how they deliver their ideas to a prospective client, within a classroom environment, or to the consumer.

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Green Cleaning Programming Ideas for New and Emerging Audiences

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Key Words: Household cleaning, green cleaning programming, outreach education

All of us face a variety of risks to our health as we go about our day-to-day lives. Some risks are simply unavoidable while others we may choose to accept. Additionally, there are certain risks we may choose to   avoid if we had the opportunity to make informed and educated decisions. One risk that educators have the opportunity to inform consumers on is indoor air pollution from household cleaners.

People spend an average of 90% of their time indoors. Studies conducted by the Environmental Protection Agency (EPA) show levels of several common organic pollutants to be 2 to 5 times higher inside homes than outside. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors. In addition, people who may be exposed to indoor air pollutants for long periods of time are often those most susceptible to the effects of indoor air pollution. Such groups include the young, the elderly, and the chronically ill.

Household cleaners are one source of indoor air pollution. During cleaning and/or sanitizing, consumers commonly use more than one product. Complex mixtures of volatile organic compounds (VOCs) may be created when multiple consumer products are used – Also, consumers commonly use products with complex formulations — such as combination products that are both cleaners and sanitizers — or multiple ingredients. VOCs can be released both when the product is being used and stored. Educating consumers about pollutants in the home environment is one way to reduce indoor exposure and improve the health of one's home and its occupants.

The Green Cleaning Make and Take project focuses on creating healthier and safer home environments by reducing indoor pollutants and safety risks. In hands-on interactive workshops participants learned: (1) about the connection between health and housing; (2) the science of cleaning product ingredients; (3) how to select and make green cleaning products; and (4) safe storage of all household cleaning products. Workshops included hands-on activities such as making green cleaning recipes and a BINGO-like game called GREENO.

Since 2017, workshops were held in eight counties, reaching 513 people, including 147 youth and 80 educators. Educators who participated in the workshops have shared the information with their students and have incorporated the use of green cleaning products in their classrooms.

Workshops were evaluated using a retrospective evaluation to assess knowledge gained and intent to change behavior. The majority (72%) of participants indicated that they learned a lot about the impact of VOCs on indoor air quality. Over 60% indicated that after attending the workshop they would regularly make and use green cleaning products. Forty-seven per cent of the participants indicated that after the workshop they intend to regularly store products safely.

The objective of this presentation is to discuss the findings of this on-going project, along with limitations and challenges, and the potential for expansion.

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Integrating Healthy Homes Principles into Middle School Science Curriculum

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The U.S. Department of Education (n.d.) writes that, "All young people should be prepared to think deeply and to think well so that they have the chance to become the innovators, educators, researchers, and leaders who can solve the most pressing challenges facing our nation and our world, both today and tomorrow" (para. 3). As a discipline, science teaches students the skills and creativity necessary to solve these pressing challenges. Unfortunately, the scientific concepts taught in the classroom focus more on facts than on application (National Science Teachers Association, 2016). In sharing the Next Generation of Science Standards, the National Science Teachers Association (NSTA) suggests that curriculum should address the interrelated character of science as it is used in daily life; the transformation of facts into the application of science; and the integration of science with engineering to solve practical problems (NSTA, 2016).

The Middle School Healthy Homes (MSHH) curriculum help bridge the gap between science theory and science practice. Rather than rote memorization of vague scientific phenomena, students in the MSHH curriculum learn about matters that they interact with on a daily basis, while teaching them to take control of their environment and play a role in maintaining a healthy home. This population was chosen because healthy homes principles align well with middle school common core science standards. In addressing these principles in science classrooms, educators can merge scientific principles with hands on practical application.

The MSHH curriculum consists of seven interactive modules that align with Common Core Science Literacy Standards. The modules address Healthy Homes Principles, Drinking Water Quality, Asthma, Radon, Lead, Carbon Monoxide, and Home Safety. While meeting common core standards, the activities also ask youth to inspect their homes for potential healthy homes hazards. This investigation and discussion increases the potential for improving the healthfulness of their homes.

 The curriculum was first implemented during the fall and spring of the 2017-18 academic calendar. Students in this initial implementation consisted of 6-8 graders enrolled in a public school who were enrolled in either an 8th grade science class or a multi-grade elective course entitled, "If You Build It". The science classes addressed topics such as hydrosphere, chemistry, and diseases. The elective class focused on principles of building and engineering and required students to apply basic principles of building science to the construction of buildings and floor plans. Both classes were excellent venues for introducing healthy homes principles and actions that reduce housing environmental hazards and improve overall occupant health. Each module provides basic information about a healthy home topic and has students put their healthy homes knowledge into action by identifying and implementing ways that they impact individual health, the health conditions of their home, and the health conditions of their neighborhood/community.

This presentation shares results of student healthy homes assessments that measure current knowledge and behaviors related to the topic and highlights student activities and projects. Data demonstrates student knowledge growth and behavioral change and skill development at the individual, home, and community level.

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Issues and Policy: Housing Satisfaction as Aging in Place Indicator
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Key words: Housing Satisfaction, aging in place, policy

Increasing numbers of older adults will further impact the U.S. housing market and policies. Currently, individuals who are 65 years and over total 48 million, which accounts for 15% of the total population; and will reach 98 million (24% of the total population) by 2060 (U.S. Census Bureau, 2017; Population Reference Bureau, 2016). Such demographic shifts have been discussed with aging in place (AIP), which is defined as the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level (Centers for Disease Control and Prevention, 2013).

Often, the AIP concept is considered from a cost-saving perspective. According to the U.S. Department of Housing and Urban Development (2013), AIP can yield cost savings for families, governments, and health systems when compared to long-term care (e.g., nursing home) costs wherein the government pays, i.e., Medicaid (47%) and Medicare (23%) and families pay out of pocket (23%) (Pennsylvania Health Care Association, n.d.). In 2009, the median monthly payment for a nursing home was $5,243 while non-institutional long-term care (e.g., AIP with in-home care service) was $928. Therefore, senior housing costs implies that AIP can yield substantial savings for aging families and for the government. Then, a question is raised in terms of how to support AIP for older adults. In order to respond to this question, we should reconsider that AIP is likely to occur if the older adults are satisfied with their current living places (Kwon et al., 2015), implying more attention should be given to factors relating to housing satisfaction for older adults and how to apply such factors to services or policies for older adults aging in place.

HERG's (Housing Environment Research Group) research outcomes on older adults' housing satisfaction that include individual home and neighborhood satisfaction can provide an exemplary guideline in terms of factors and policy/service approaches. For example, when assisting baby boomers' AIP through policies or services, more attention should be given to baby boomers who are younger (age factor) or never married (marital status); in 'fair' health (health condition) or unemployed (employment status); have lower incomes (family income); live in multifamily housing units (structure type) or in small home (structure size); or are renters (tenure status) (Kwon et al., 2015). For older single-persons in urban and rural areas (Lee et al., 2016; Ahn & Lee, 2016), their age, health condition, unit location, gender, age

of house, housing quality, and structure types are important considerations when supporting single older persons' AIP through policies or services. However, education, government income assistance, housing affordability, structure size and tenure status are only considerations for urban older single-person adults, not those in rural areas.

The increasing and diverse older populations creates a demand for public policy and services on society, which will allow more individuals to live safely and independently long after their retirement. Therefore, it is important to examine housing satisfaction as an AIP indicator and relevant factors, leading to meaningful policies and services for older adults.

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Aging-in-Place: The Role of Informal Support Systems

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Aging-in-place strategies of low-income, aging renters were investigated through semi-structured, face-to-face, in-depth interviews *(N=25)* in a southeastern United States urban area. This abstract focuses on informal support systems used by respondents.

Sample Description

Annual income was less than $25,000 for 24 of 25 respondents. The sample was predominately female (*n* = 17) and African-American (*n* = 23). Age of respondents ranged from 61 to 86 (*M* = 71.4). Marital status varied: never married = 4; married = 5; and previously married = 16. All respondents relied on government income support, including Social Security (21), Medicare (22), Medicaid (7), and SNAP (15). No respondent reported paid employment. Eight interviewees had relatives living with them. Half the respondents (12) lived in subsidized or age-restricted senior housing. Twenty-four respondents reported 63 different health issues, including bone or disk problems (20), breathing or lung issues (17), high blood pressure (13), and diabetes (12).

Informal Support Systems

Informal support systems can facilitate daily living and add to quality of life (Greenfield, 2016; Iecovich, 2014). It is important to recognize the role of informal support systems in the design and management of housing in order to assist aging in place. Six types of informal support systems were identified by respondents[1]:

- **Children (11)**. Children lived with the respondent, were a source of income (respondent as caretaker), provided emotional support, or were a link to the respondent's extended family. A child-safe home can be important for many elders aging in place.
- **Church (11).** Being involved in church activities was important to multiple respondents and related to positive outlooks. Senior and affordable housing in neighborhoods near churches and church activities on-site are important. Additionally, churches can be partners for volunteer activities.
- **Neighborhood Walkability (9).** Safe and pleasant places to walk were noted as positive features of housing locations while lack of safe walking was a limitation. The opportunity to walk safely to activities and shopping was seen as a positive benefit.
- **Extended Family (5).** The opportunity for extended family to visit, perhaps stay overnight, was important for a sense of security, companionship, and to facilitate meeting care needs.
- **Volunteer Opportunities (4).** Some respondents found the ability to volunteer in their neighborhood or community as important. "Giving back" can keep an aging person outwardly focused. Volunteer activities may require access to transportation or space for on-site activities as well as communication and knowledge about activities.

Pets (2). Pets may be limited in rental housing, but the choice to have a dog (and easy access to outside space) was important to some respondents. Pets provide companionship and foster responsibility, and possibly a sense of security/safety.

Effective informal support systems identified by respondents contributed to positive attitudes and satisfaction with their living environment. This research suggests the importance of integrating these support systems into the planning and design of housing for elders, or assisting people with later life housing choices that provide these support systems. Examples include playgrounds for children, child-safe interior design in residential units, (which could benefit elderly residents as well), guest spaces in apartments or within the residential development for visiting family members, and affordable rental housing that could be occupied by elders in neighborhoods planned for easy and safe walking with locations or destinations (such as churches and shopping) of interest. Features such as these have the potential to lead to more effective aging in place.

[1]The research presentation will be supported by qualitative comments from study participants.

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How Sustainable are Health Improvements from Home Environmental Interventions?

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Key word(s): health and housing, environmental health, healthy homes, asthma

Research has documented that housing conditions can negatively impact the health of residents, particularly vulnerable populations (Northridge, 2010). Asthma has many known indoor environmental triggers including dust, pests, smoke and pets, as evidenced by approximately 7.1 million children (U.S. EPA, 2013) and 18 million adults (CDC, 2014) of the U.S. population who have asthma. We evaluated the hypothesis that the improved health outcomes and environmental conditions resulting from multi-trigger, multifaceted healthy homes interventions will decline over time for older adults with asthma. We will describe the health and home environmental status of older adults with asthma at the end our initial home intervention study and evaluate the change in health outcomes and environmental conditions that resulted over a 2 to 3-year period after the completion of the initial study.

Methodology and Procedures

A comprehensive health and environmental assessment and subsequent intervention were completed in 90 households in the first study involving 93 older adults living in public and privately managed multifamily rental housing in Lowell, the fourth largest cities in Massachusetts. The two largest populations among the sample of older adults included Hispanics (45%) and Asians (19%). We reenrolled these participants in a second study 2 to 3-years later to compare their current health status and environmental conditions to their status at the completion of the first study to evaluate the change. Health and environmental assessments conducted in English, Khmer and Spanish included survey questionnaires and visual observations. Environmental assessment included evaluation of asthma trigger activities (ATAs) and exposures or triggers (questionnaire and home survey). Health assessment included collecting data on respiratory health outcomes (on symptoms, quality of life, medication use, doctor/ER/hospital visits, and exhaled nitric oxide (eNO) a measure of lung inflammation).

Results

Preliminary assessments with older asthmatic adults show health outcome decline from the end of the first study to baseline assessment in the follow-up study in following areas: doctor visits due to asthma, symptoms and impact quality of life indicators and ACT score, a measure of asthma control adequacy. Change is home asthma triggers for older adults was inconclusive. The comparison of baseline to follow-up change in ACT, PSS-4 and SQRQ score, wheeze, asthma attack, healthcare utilization and environmental data was done using a paired sample t-test. All statistical analysis was done using SAS (Version 9.2) or Stata (Version 11) statistical software.

Conclusions and Implications

The findings suggest that improved health outcome change and reduction in home asthma triggers from culturally/linguistically appropriate, multifaceted home interventions are not sustainable without additional follow-up interventions. The study suggests that additional "booster interventions" are necessary to sustain the health outcome improvements and home asthma triggers reductions resulting from a low cost comprehensive home environmental intervention with our study population of older adults. Consequently, policymakers should provide more funding to support additional studies or pilot projects that include "booster interventions" and to sustain changes in housing conditions to further evaluate health outcome changes to older adults with asthma**.**

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Sustainability in Housing: Is Water the New Energy?

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Key Words: water, sustainable housing, teaching

The theme of the 2018 National Capitol Region Symposium of the American Water Resources Association was Resilient Solutions for Water Management in Urban Environments. The introduction to this theme challenged participants to consider their "Goals and Expectations for Quality of Life Criteria in Urban Environments" (Younos, 2018). The comparison was made between 20th and 21st century criteria. With respect to residential environments, Younos suggested that in the 20th century, our focus was "affordable housing and buildings" while in the current century, the goal/expectation was "waste/energy efficient housing and buildings".

Was this an "a-ha" moment? Or does this suggest that housing educators are on the leading edge of preparing students to play a key role in the future?

Water and a Class in Sustainable Housing

In winter 2015/2016, lead in the water in Flint, Michigan was prominent in the media (Sanburn, 2016), and on the Virginia Tech campus (Adams & Tuel, 2016). The immediacy and controversy of Flint, Michigan's water crisis offered opportunities to rethink the relevance and importance of water issues and their applicability to housing sustainability. As a result, the curriculum emphasis in a housing course on environmental issues needed to shift. A cross-disciplinary course, *Housing: Energy and the Environment*, had always included lead and water as core content. Previously, however, energy was a major focus. The focus for water was primarily safety and quality standards plus water treatment systems found in single and multifamily housing. In 2008, as a benchmark, only one 75 minute class (out of 30) was devoted exclusively to water issues.

In the spring 2017 semester, specific water-related content encompassed six classes in the 30 class semester. One class was devoted specifically to a review and analysis of the Flint, Michigan, water crisis. Content and learning activities were issue driven, including international water issues. Topics included: water quality, conservation, rights, and privatization; gray water; storm water management; and watersheds. In the spring 2018 semester, specific learning activities related to the Cape Town, South Africa water crisis were added.

In the 2018-2019 academic year, the course will be in the University's new general education core as a social science course. Water issues content will be further integrated into the overall course, as reflected in the new course title*: Environmental and Sustainability Issues in Housing.* Students will learn social science theory relevant to the study of housing, such as Housing Adjustment Theory, Diffusion of Innovation, Theory of Human Motivation, and Family Systems Theory, and apply one or more of these theoretical perspectives in the study of water-related sustainability issues. For example, a household with contaminated well water, possibly from nearby fracking activity, could be evaluated. Class teams might analyze different responses by the household as predicted by applying different theories, and present their analyses to the class. These theoretical results could then be compared to an actual case study.

The presentation will highlight teaching and learning activities for water-related content of the current and newly revised course.

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Exploring the Unsustainable Consequences of Downsizing to a Tiny Home

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New homes in America generally have the largest average floor space compared to any other country in the world, with the average size of a home being about 2,400 square feet (Mitchell, 2014; US Census Bureau, 2017; Vail, 2016). There are many detrimental environmental impacts of larger homes, including loss of land (both farmland and environmentally fragile lands), greater air pollution and energy consumption, and ecosystem fragmentation which leads to reduced diversity of species and other negative impacts (Johnson, 2001; Parrott, 1997). This current building practice can have major negative implications for the environment.

To offset the environmental impacts of conventional homes, many have downsized to tiny homes to seek a more sustainable lifestyle. A tiny home is a small, efficient space, typically under 400 square feet that enables homeowners to live a more sustainable, less expensive, and minimalist lifestyle (Small House Society, 2014; Vail, 2016; Williams, 2014). These homes can be mobile or on a fixed foundation. There is currently very little academic attention on tiny homes, and very few studies exist that have critically examined them as an effective housing solution for those who wish to downsize. However, existing literature in the tiny home field, including literature analyses and personal narratives, suggests that individuals who downsize will experience a significantly decreased environmental impact (Anson, 2014; Bozorg & Miller, 2014; Vail, 2016). A review of this literature resulted in a hypothesis that while one's overall environmental impact is lower, there are sometimes unintended, unsustainable consequences of downsizing to a tiny home such as eating out more often, driving longer distances, and relying on others for storage (Anson, 2014; Murphy, 2014; Williams, 2014). Identifying unsustainable consequences of downsizing to a tiny home will enable individuals who are considering downsizing to a tiny home to be aware of potentially preventable unsustainable elements of small living and be able to account for those when making decisions regarding their downsizing and tiny home designs.

To discover some of these unintended consequences, we interviewed a dozen individuals who have lived in a tiny home for a year or more. These individuals were recruited at both a tiny home conference held in Charlotte, North Carolina, and online through various tiny house groups. Individuals were given no compensation to participate in this research and participated voluntarily. Individuals were asked to take an online survey about their day-to-day sustainable behaviors and were invited to be interviewed by phone as a follow-up to their online responses. In these interviews, the researcher inquired about any potential unsustainable consequences of downsizing to a tiny home. Among the interview responses, there were a variety of responses, including, "My travel has increased because of living tiny; I

have to live outside of city limits to be legal, and therefore I'm driving more often. So, I am spending more time in the car," and "I just don't have the room to recycle now. I don't have the room for containers to hold everything until I can go take it to the recycling facility".

From these interviews, we created an inventory of unintended, unsustainable consequences that were mentioned throughout the interviews. Three of the most common consequences included longer commuting distances due to living in more rural settings, buying more things in small packages that take up less room but use more packaging than bulk items, and recycling less due to lack of storage and curbside recycling services. Our preliminary review shows that while one's overall environmental impact will likely be lower after downsizing to a tiny home, there are often tradeoffs such as increased travel or improper waste disposal. Downsizing to a tiny home will likely decrease one's environmental impact in terms of housing, but not necessarily every component of one's environmental impact. Revealing these unsustainable, unintended consequences could be vital to those who wish to downsize while comprehensively reducing their environmental impact. Identifying and designing ways to mitigate these consequences could help with the longevity of tiny homes as a sustainable housing solution and help advocates of the tiny house movement to understand the measured impacts of downsizing on one's environmental impact.

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Making Homeownership Possible

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Key Words: homebuyer education, home ownership center, mixed methods, program evaluation

The purpose of this project was to describe the outcome of a statewide network of homebuyer education and counseling programs facilitated and supported by a Home Ownership Center. Using holistic, mixed-methods, we interviewed providers and participants; a participant survey was based on the interview findings. This report summarizes interview and survey data to understand how the providers and participants experience the homebuyer education process and describe their suggestions for refining the program.

Analysis of interview and survey data suggested that most participants found homebuyer education workshops that fit within their schedules and time frames. Despite providers' concern that participants drove distances, none of the participants described difficulty finding a class. Participants mentioned learning about the program from family and friends; after participation they described recommending the program to others. Overall, participants' comments suggested they valued meeting and learning from local experts in the home-buying process. Participants shared positive comments about the course, the extensive binder of reference material, and advice from housing counselors.

One of the most consistent theme that emerged concerned the eight-hour course. Some complained that a few "needy" participants dominated class time. They often felt that complicated and/or personal financial questions could be better addressed through one-on-one counseling. Other participants with purchase orders in hand, complained that to qualify for a designated mortgage product or to receive down payment assistance they had to listen to discussions about early stages of the homebuying process.

Another theme was participants' need to commit to a long-term process of repairing credit histories and reducing debt. Providers described searching for materials and activities to motivate participants. Because many participants need months or years to prepare to qualify for a mortgage, providers wanted suggestions on providing long-term support and motivations. Although participants acknowledged positive outcomes from new financial management behaviors, several were frustrated. After working for a period of time to improve their financial position, funding could run out or an increasingly competitive market resulted in an unsuccessful search for affordable housing. For example, a few rural participants described situations with very few units on the market or mortgage products that would not finance a "fixer upper." Urban participants described situations of feeling rushed to make purchase decisions and experiences of "losing-out" because they felt they were competing with multiple offers.

Because participants consistently mentioned positive learnings from the course and how they valued the binder as a reference, we suggest the homeownership center develop marketing materials acknowledging the center's role in organizing and providing resources for the network of providers. Branding the center may build grassroots support for continued funding of homebuyer services. Local providers also described the need for more resources to market their education and counseling services. Many providers and participants identified financial (ill)literacy as a barrier to sustainable homeownership. Many educators and counselors had years of experience, some with years of experience in banking. However, they wanted and needed more financial counseling resources. They were concerned about privacy issues when working on personal financial issues. And they needed more advice and practice to become comfortable advising participants on building workable financial plans. Counselors needed advice on how to support participants as they developed and implemented long-term plans to prepare for homeownership. Specifically, they asked for updates on student loans. Overall, providers relied on center-produced resources, and appreciated that the center maintained professional standards. However, they did not refer participants to the center website nor brand materials as produced by the c3eter.

We recommend that the center consider breaking the homebuyer education workshops into two versions based on participant objectives. One version would address the needs of householders, ready to purchase, who are required to attend education to earn a certificate for a first-time homebuyer mortgage and/or down payment assistance. Another version would focus on financial literacy for householders preparing for future homeownership.

Measuring Neighborhood Satisfaction through Participation in Community Organizations

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Neighborhood satisfaction is a subjective concept that has varying perspectives and attributes that depend on an individual's needs or expectations. Some underlying factors contributing to it includes individual and neighborhood resources, exposure to problems, social interaction, and community expectations. Early housing scholars have equated neighborhood norms as being essential to the overall housing experience (Morris & Winter, 1975). There is even recognition that neighborhood groups and associations help households achieve the belonging and love objectives associated with Maslow's hierarchy of needs (Community Association Institute, 2005; Maslow, 1943). The concept is deemed essential because a previous finding shows residents satisfied with their neighborhoods to have reported better mental health and life satisfaction, perceive less crime, and are less likely to move to other places (Grogan-Kaylor et al.,2006). On the other hand, community participation is the involvement of people in groups that promote interpersonal networks, which tend to increase mutual understanding and trust among participants, forming the basis of social capital (Putnam, 2001). Community participation is operationalized as the involvement of people in neighborhood groups and civic organizations.

This quantitative study utilized the 2013 metropolitan sample of the American Housing Survey (AHS), and the sample was chosen because of its unique module associated with neighborhood involvement. The question of interest is to identify whether the involvement of people in neighborhood groups and civic organization ultimately results in increased neighborhood satisfaction. The data used relate directly to households that answered questions on the rating of neighborhoods, civic organizations and neighborhood groups. For this study, we identified neighborhood participation in two fashions. First, we isolated whether a respondent belonged to what the AHS referred to as a "neighborhood group," which it defined as a block group, tenant association, community council, or neighborhood watch group. We also examined a closely related variable which the AHS defined as a "civic organization." This separate variable can include such things as a social/fraternal organization, a local community organization or the PTA. The expectation lies in the premise that residents who participate in civic organizations and neighborhood groups had higher satisfaction than those who do not, ceteris paribus. Therefore, the goal of this study is to demonstrate the relationship between neighborhood satisfaction and community participation especially among the medium-low-income households, which is what sets it apart from other similar studies. Results indicate that of the 27,881 households, only 3% (n = 2888) belonged in neighborhood groups. Within the data set, 5% (n = 4,347) were members of civic organizations, and 1,049 belonged to both civic and neighborhood groups. The chi-square tests show significant evidence of an association between participation in community groups and neighborhood satisfaction. But, further analyzes would be performed and reported as the study progresses. Although, the present indication means that participation in community groups can likely increase the level of satisfaction of a person towards the places they live.

The importance of this study is to establish the importance of community participation which could contribute to the overall quality of lives and well-being of citizens through stronger social capital building efforts.

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Symposia Proposals

Aging in Place: Current Research Findings and Implications in the Field of Housing

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SESSION SUMMARY

The theme of this symposium is aging in place (AIP) research and its implications. AIP is commonly defined as "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level" (Center for Disease Control and Prevention, 2013). The concept of AIP has been considered a phenomenon, goal, or process, and accordingly, diverse research inquiries with different research focuses have been developed. Recent efforts in AIP research indicate that the idea of AIP is evolving by allowing diverse interpretations of its value, which is considered desirable (Ahn, 2017). Therefore, sharing diverse perspectives on the AIP concept and discussing its research implications might be timely and meaningful for housing researchers.

The purpose of this symposium is to discuss and exchange ideas on current AIP research findings and the interpretations of different study results in the field of housing to determine practical implications with integrated views from diverse research focuses. The symposium is composed of five presentations. The research focus and scope vary from urban older renters to suburban homeowners, from American rural seniors to Korean rural seniors, and from a local sample whose data were collected

through face-to-face interviews versus national secondary data. The expectation is that this research discussion will help identify where current AIP housing research is and the implications for appropriate stakeholders. It could also provide potential collaboration opportunities for research and extramural funding for AIP researchers in the field of housing.

The first presentation will share the challenges and strategies of urban low-income older renters (62+) in staying in their current homes and communities. Research findings on the AIP challenges encountered by this population (*N*=25) will be presented based on in-depth interviews and home environmental analyses [1]. The second presentation uses 2009–2013 American Community Survey data to provide an analysis of the demographic, socioeconomic, and housing characteristics of homeowners (65+) who moved to their current house before 1979. This study focuses on the differentiations of these factors among older homeowners living in central cities, mature suburbs, and developing suburbs [2]. The third presentation will discuss community-level strategies to support older residents (65+) in remaining in their neighborhood in a large midwestern city. The collaboration experience with a non-profit organization in collecting data will also be shared [3]. The fourth presentation will highlight the findings on Korean seniors' perceptions of the eight domains identified by the World Health Organization Global Network for Age-friendly Cities and Communities for urban and rural older residents [4]. The last presentation will discuss the opportunities and challenges involved in creating and sustaining livable rural communities for older residents (65+) with multi-state research collaboration. The following two research questions were developed: (1) How do we maintain, remodel, or design highquality sustainable housing for AIP in rural communities, and (2) what policies and programs provide the best practices to promote the creation and implementation of a successful AIP design and initiatives? [5].

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PANEL PRESENTATIONS

[1]**Aging in Place Challenges for Urban Low-Income Older Renters**
Sung-Jin Lee*, Suk-Kyung Kim, Kathleen R. Parrott, Daejin Kim, Valerie L. Giddings, and Sheryl Renee Robinson

[2]**Aging in Place: Analyzing Homeowner Characteristics, Mortgage Status, and Property Values in Mature and Developing Suburbs**
Katrin B. Anacker*

[3]**Developing Community-Based Strategies for Healthy Aging**
Becky L. Yust*, Michael Urness, and Nima Meghdari
Acknowledgement:This research was funded in part by the USDA National Institute of Food and Agriculture, Minnesota Agricultural Experiment Station Project #53-017.

[4]**Korean Seniors' Perception on WHO's Age-Friendly Domains**
Eunju Hwang*, Seo-yeon Lee, Seung-Hahn Koh, Nancy Brossoie, and Julia Beamish

[5]**Aging in Place: Home and Community in Rural America**
Gina Peek*

Evolution of Online Resources by the Healthy Homes Partnership

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Background

The Healthy Homes Partnership (HHP) was created and launched in March 1999 to deliver via a U.S. Department of Housing and Urban Development (HUD) – U.S. Department of Agriculture, National Institute of Food and Agriculture (USDA-NIFA) partnership, public outreach education that addresses housing deficiencies and risks associated with childhood diseases and injuries. The Healthy Homes Initiative supports research, education, and Extension programs that increase home health and safety, improve family health, and build stronger communities.

Objective

The goal is to describe the evolution of several online resources developed by the Healthy Homes Partnership (HHP) – faculty from land grant universities who provide research-based education and resources to consumers, educators and professionals.

Methods

The HHP has designed a variety of online educational resources: a website, a social media presence, the Healthy Homes Social Media Toolkit, the *Healthy Homes Highlights* Newsletter, the Healthy Homes Program Impact Survey, webinars, and a youth app through funding from HUD and USDA-NIFA.

Results and Implications

The National HHP Website: Montana State University Extension worked on updating the website. It is segregated into two sections: Educator and Consumer. The website provides access to consumer friendly healthy homes resources for consumers along with healthy homes training lessons for educators, such as Extension professionals. Continuous updates to the website include: quarterly newsletters, webinars, lessons and resources, state contacts and partners. The HHP website has had 8,962 page views.

Social Media Platforms: The HHP uses Facebook, Twitter, and Pinterest to generate online interest in healthy homes. The sites connect the user to the HHP website. The Universities of Georgia (UGA) and Connecticut (UConn) provide the majority of posts and pins in English, with some in Spanish and American Sign Language. Data for Facebook and Twitter is collected using the tools on the sites,

along with analytical software called Sprout Social. Pinterest demographics consist of pins, boards and followers.

The objective of the social media outreach is to develop, launch, and maintain social media that integrates content from the Healthy Homes Solutions Toolkit and other research based resources. UConn Extension and UGA Extension work together to provide consistent healthy homes messaging for the general public.

- *Facebook* (@HealthyHomesPartnership): Social media highlights include 83,706 Facebook post impressions, a 72.2% increase from the previous twelve months. This includes 2,046 engagements calculated within posts and 528 link clicks based on 430 total Facebook posts. Demographic composition consists of 78% female and 22% males. The majority of the fan base is comprised of women 35-44 years of age.
  - In December of 2017,a Facebook post reached at an all-time high of 5,596 when University of Connecticut student, Hailee Parenteau, posted a video with subtitles and a voiceover about the 'Eight Principles of a Healthy Home' in American Sign Language. This post received 337 reactions (the highest post reaction to date), as well as 44 comments through entirely organic shares without the use of any paid promotions.

- *Twitter* (HealthyHome4): Tweets have received 602 post engagements, a 79.2% increase in the past twelve months. This includes 37,511 organic impressions, a 3.7% increase. We received 124 link clicks through our total 100 followers, a 44.9% increase. The Healthy Homes Partnership sent out 408 direct messages and received 125 in return.
  - Demographic composition consists of 55% female and 45% male. The majority of the followers are women and adults, 65 and older. The most popular tweet sent out was "Helpful Tips for Making sure your Home is Safe, Especially for seniors", posted on January 22, 2018. This reached 660 people, gaining 4 responses and 3 retweets.

- *Pinterest* (HealthyHomes4): As of August 9, 2018, there were 69 followers on the nine boards containing 704 pins.

Healthy Homes Social Media Toolkit – Mississippi State University Extension Service's Healthy Homes Initiative developed a social media toolkit with messages and reinforcing images from each lesson. Messages include both a version branded with the HHP logo and an editable one that can include each university's logo. The toolkit is available on the HHS webpage and directly from Dr. David Buys. To date, the HHP Facebook page, managed by the University of Georgia, has used the toolkit, posting at least 20 of the messages. MSU Extension agents as well as Extension professionals from other states also use the toolkit, though documenting the full extent of their use is not possible. The original developers continue to monitor content and will adapt images as needed to reflect the most accurate and up to date information.

Website - Revised graphics and messages will be posted on the Healthy Homes Partnership webpage with the curriculum. The HHP website has 8,962 page views.

Healthy Homes Highlights **Newsletter**: The newsletter is a resource for educators, not an outreach method to consumers. The e-newsletter services provides metrics of how many subscribers open it. The *Healthy Homes Highlights* newsletter directly reached 327 Extension educators and collaborators nationwide. Issues are also posted on the HHP website and may be accessed there as well. The newsletter is enabled by the HHP funding to serve the national program participants.

Healthy Homes Program Impact Survey: The survey was developed and conducted in Louisiana using the Survey Monkey app to determine adoption levels of general and specific practices, based largely

upon the Healthy Homes Solutions curriculum. 2016 and 2017 results revealed high adoption rates, providing valuable indicators for accountability and formative evaluation.

- According to the Healthy Homes Program Impact Survey:

  o 75% adopted practices as a result of what they learned (i.e. they assessed their home or workplace for health risks, took action or made changes to address those risks, and utilized the educational tools and resources provided by the HHP program).
  o 86% shared what they learned with an average of 59 others, achieving a cumulative reach of approximately 4460 people.
  o There was a high frequency level of adoption of recommended practices (average score >3.5 on a 5-point Likert scale, ranging from a score of 1 [never] to 5 [always]) for all Healthy Homes Solutions lesson topics except radon and water quality.

The electronic impact survey is derived from the objectives and key practices of each lesson of the Healthy Home Solutions curriculum, thus providing indicators of its effectiveness. The impact survey, now that it is developed, can be administered at little or no additional cost, so it will continue to be utilized in Louisiana to evaluate its ongoing healthy homes program.

Healthy Homes Webinars: Webinars are offered based on the Healthy Homes Solutions Toolkit. These are available on the University of Tennessee Extension website and the Healthy Homes Partnership website. Short video clips were created for social media. Webinars produced in 2017 were, "Remodeling for Health" and "Strategies for National Lead Poisoning Prevention Week." In 2017 and 2018, webinars were promoted in concert with HUD's "June is National Healthy Homes Prevention Month." Educators from several universities presented webinars primarily in late May and throughout June on multiple healthy homes topics.

Eleven hundred ninety-eight people have been reached through webinars. The average attendance was 120 per webinar session, with the highest webinar participation being 492 people. Each webinar was an hour and a half. These sessions targeted stakeholders which included community health workers, state health agencies, HUD grantees and Extension agents. Some of the popular webinar topics in 2018 were, "Bridging the Cultural Divide-The Role of Community Health Representatives/Workers in Environmental Public Health," "How are we going to pay for this? Healthy Homes for Residents with Limited Financial Resources," and "Hoarding." These webinar topics were selected through a poll of stakeholders through HUD.

Youth Oriented: A Safe and Healthy Home App: The app serves as an informational tool to reduce housing deficiencies and risks associated with childhood diseases and injuries. The purpose of the app is to add value to the Healthy Homes Solutions Toolkit. The app is in final development and no evaluation information exists at this time.

Federal, state, and community partnerships are key components of the Healthy Homes Partnership mission and throughout national extension programming. Over 387 partnerships have been formed by the ten sub-grant recipients throughout their individual states through this program.

Funding for Social Media for the Healthy Homes Partnership is primarily sustained by a multi-year, interagency grant from the U.S. Department of Housing and Urban Development (HUD) Office of Lead Hazard Control and Healthy Homes, and the U.S. Department of Agriculture – National Institute of Food and Agriculture. Currently, the program is on the first year of a four-year renewable grant. Supplemental funding for states is also provided by grants from state and federal agencies.

Acknowledgement

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