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Examining Environmental Hazards in Rental Homes and Habitability Laws in Clark County, Nevada

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EXAMINING ENVIRONMENTAL HAZARDS IN RENTAL HOMES AND HABITABILITY
LAWS IN CLARK COUNTY, NEVADA

By

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A thesis submitted in partial fulfillment
of the requirements for the

Master of Public Health

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Abstract

It is well established that home conditions are linked to the health outcomes of occupants. There are over 880,000 housing units in Clark County, Nevada; nearly half of those are renter-occupied units (ROUs). Currently, there is limited research on the characteristics of environmental hazards found in Clark County ROUs and the strength of habitability statutes created to protect tenants from substandard housing. Understanding how renters in Clark County are affected by environmental hazards in ROUs and the processes by which landlords and tenants resolve grievances related to those hazards would benefit public health. It would enhance the ability to quickly identify which ROUs are at most risk for hazards and allow public health professionals to better plan and implement strategies intended to mitigate or prevent negative health outcomes created by those hazards. This study examined data from the Clark County Landlord and Tenant Hotline Study to answer the following questions: (1) Is there a relationship between the age of ROUs and the types of environmental hazards found in them? (2) Is there is a statistically significant difference in the proportions of hazards remediated by tenants who received a site inspection from the SNHD or sought legal advice in addition to sending a complaint letter to their landlord? (3) Do the age of an ROU, the number of complaints made by each tenant, or complaint category influence the likelihood of remediation? An ANOVA revealed that the average age of ROU's was statistically significantly different between hazard categories, $F(4, 445) = 5.11, p = 0.002$. A Bonferroni post hoc analysis revealed mean differences were statistically significant between essential services ($\bar{x} = 35.27, SD = 16.59$) and mold ($\bar{x} = 27.64, SD = 12.77; p < 0.05$) and essential services and other ($\bar{x} = 23.25, SD = 11.62; p < 0.05$). A chi-square test of homogeneity suggested that there was no statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention, $X^2 =$

1.11, $p = 0.292$. A binary logistic regression revealed that for each 1-year increase in ROU age, the likelihood of remediation was decreased by 2.5%. For tenants with one complaint, the odds of remediation were 1.75 times (95% CI = 1.06 - 2.89) that of tenants with multiple complaints. For complaints categorized as essential, the odds of remediation were 4.15 times (95% CI = 1.36 - 12.7) that of complaints categorized as non-essential. The results suggest that the mean age of ROU's with essential service complaints is higher than ROU's with complaints categorized as mold or other. Furthermore, a tenant's probability of getting hazards remediated was not significantly increased if they received a site inspection or sought legal advice in addition to sending their landlord a letter. The study suggests that tenants were less likely to get their hazard remediated by their landlords if they had multiple complaints, lived in an older home, or had a non-essential complaint. The results of this study can be used to enhance our abilities to quickly identify which ROUs in Clark County are most at risk for hazards and identify the factors that influence the likelihood of remediation.

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Table of Contents

Abstract	iii
Chapter 1: Introduction	1
Chapter 2: Background	4
The Relationship Between Housing and Health	4
Disease Vectors and Pests.....	4
Indoor Air Pollutants.....	6
Toxic Substances	8
Housing Structure and Protection from Environmental Elements.....	10
Plumbing and Waste Management	11
Electrical	12
Heating, Cooling, and Ventilation	13
Landlord and Tenant Habitability Law.....	14
Implied Warranty of Habitability.....	15
Uniform Residential Landlord and Tenant Act	16
Nevada Habitability Law	19
Clark County Landlord and Tenant Hotline Study	21
Basic Services Procedures	22
Research Activities Procedures.....	23
Chapter 3: Methods.....	26

Study Design	26
Inclusion Criteria	26
Hypotheses and Methods	27
IRB and Data Management.....	29
Chapter 4: Results	30
Descriptive Statistics.....	30
Hypotheses Analysis	30
Chapter 5: Discussion, Conclusions, and Recommendations	34
Discussion	34
Limitations	36
Conclusions and Recommendations	37
Appendix A: Sample Essential Complaint Letter Template.....	43
Appendix B: Example Non-Essential Complaint Letter Template.....	45
Appendix C: CCLTHS Follow-Up Survey.....	47
Appendix D: IRB Approval	52
References	53
Curriculum Vitae	62

Chapter 1: Introduction

Clark County, located in Southern Nevada, is the 14th largest county in the United States (Clark County, n.d.), encompasses over 7,800 square miles and has an estimated population of over 2 million people (U.S. Census Bureau, 2017). Of the over 880,000 housing units in Clark County, Nevada; nearly half are renter-occupied units (ROUs) (U.S. Census Bureau, 2017). Currently, there is limited research on the characteristics of environmental hazards found in these ROUs and the process by which landlords and tenants resolve grievances related to those hazards.

Understanding how renters in Clark County are affected by environmental hazards in ROUs and the laws created to ensure habitability of those ROUs would benefit public health because research has linked the condition of housing to the health of the occupants. Many environmental hazards in the home can lead to various injuries, diseases, and death (CDC & HUD, 2006; Coyle et al., 2016). The purpose of this study is to fill gaps in knowledge that may hinder the ability to quickly identify which ROUs are at highest risk for hazards and allow public health professionals to better plan and implement strategies intended to mitigate or prevent negative health outcomes created by those hazards. This is significant because the more efficient we are at identifying these ROUs, the earlier the intervention can be applied. It is important to population health and those most vulnerable, as they are the most likely to live in homes that contain environmental hazards.

Laws ensuring habitability of ROUs in Nevada are outlined in Chapter 118A of the Nevada Revised Statutes. These statutes adopted elements found in the Uniformed Residential Landlord and Tenant Act of 1972 (URLTA) in 1977 and the Revised Uniformed Landlord and Tenant Act (RURLTA) (NRS 118A.; Wills II et al., 2017). Although almost identical to these

model statutes, there is little research on the effectiveness the statutes have on ensuring habitability. Renters can inadvertently find themselves in a precarious situation when seeking remediation of an environmental hazard in their homes because some landlords are either unaware of their responsibilities outlined in the statutes or take advantage of their renter's ignorance of the law or their difficulty in seeking its enforcement. This study can help better understand the variables that influence the effectiveness of the laws created to protect tenants from substandard housing and what steps a tenant can make to increase the likelihood of getting a hazard remediated by their landlord.

The goals of this study were to (1) examine if the age of ROUs can be used to identify hazards and (2) identify the factors that influence the likelihood of remediation. More specifically, this study sought to answer the following research questions:

- (1) Is there a relationship between the age of ROUs and the types of environmental hazards found in them?
- (2) Is there is a statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention (i.e., receiving a site inspection from the SNHD vs. seeking legal advice after sending a complaint letter to the landlord)?
- (3) Does the age of a home, the number of complaints made by each tenant, or complaint category influence the likelihood of remediation?

This study utilized data from the Clark County Landlord Tenant Hotline Study (CCLTHS) to answer these questions. The CCLTHS is a UNLV and Southern Nevada Health District (SNHD) collaboration that collects information regarding the conditions of ROUs in

Clark County and assists landlords and tenants with grievances regarding hazards found in ROUs.

Chapter 2: Background

The Relationship Between Housing and Health

Shelter is regarded as one of our basic needs. It should be a place of refuge and safety, but inherent dangers found in our homes can pose serious threats to the physical and psychological well-being of an individual (CDC & HUD, 2006). An abundance of research has shown a link between elements in the home and the health of its occupants (Coyle et al., 2016; Gielen et al., 2012; Jacobs, 2011; Krieger & Higgins, 2002; Weitzman et al., 2013; Wu, Jacobs, Mitchell, Miller, & Karol, 2007). This should be no surprise, considering that we spend close to 90% of our time indoors (CDC & HUD, 2006).

The CDC's Healthy Housing Reference Manual (2006) identifies the following subjects as important in identifying and addressing hazards in the home: (1) disease vectors and pests, (2) indoor air pollutants and toxic materials, (3) housing structure, (4) environmental barriers, (5) water supply and quality, (6) plumbing, (7) waste management, (8) electricity, and (9) heating, ventilation, and air conditioning (HVAC). Although each of these categories are individually important, it is equally important to look at them collectively as an interdependent system. Deficiencies in one area can exacerbate dangers in other areas. Examples of the dangers associated with housing hazards include injuries, cardiovascular and neurological disorders, and death (CDC & HUD, 2006). The common solution to preventing hazards is to be proactive and continually assess, upkeep, and maintain all components in the focus areas identified by the CDC and HUD (CDC & HUD, 2006).

Disease Vectors and Pests

An abundance of research has linked negative health outcomes with the presence of pests, such as cockroaches or rodents (Ahluwalia & Matsui, 2018; Grant et al., 2017; Nasirian, 2017;

Olmedo et al., 2011; Phipatanakul et al., 2017). Household pests contain allergens that are known to induce asthma and act as vectors for disease (Portnoy et al., 2013). Implementing a pest management plan and proper upkeep of the home can significantly reduce or eliminate exposure to pests (Nasirian, 2017; Rabito, Carlson, He, Werthmann, & Schal, 2017).

Cockroaches and rodents, the most pervasive of household pests, have intrinsic characteristics that allow them to infest and proliferate in homes regardless of the age or condition of the home and the socioeconomic status of its occupants (Portnoy et al., 2013). Cockroaches are omnivorous foragers that can withstand long periods without food and prefer tight, dark places that allow them to thrive undetected (Portnoy et al., 2013). Cockroach allergens, which are known causative agents of asthma, can be found in nearly 90% of inner-city homes (Do, Zhao, & Gao, 2016), and, compared to exposure to other common household allergens from dust mites and pets, they have a larger influence on the severity and morbidity of asthma (Pomés, Mueller, Randall, Chapman, & Arruda, 2017). Asthma is a serious problem, particularly among children. Sullivan et al., (2017) state that over 7 million children are diagnosed with asthma each year. Furthermore, the direct cost of childhood asthma to Americans reach an annual total of \$1 billion (Sullivan et al., 2017). Rodents have allergens that can exacerbate asthmatic symptoms and are notorious carriers of disease (CDC & HUD, 2006; Kass et al., 2009). Additionally, rodents can cause structural damage to homes which can further exacerbate risks and negative health outcomes (CDC & HUD, 2006, Kass et al., 2009). Rodents are known to chew through building materials to gain access to various parts of the home and increase the risk of electrical fires by chewing through wires (CDC & HUD, 2006).

The most effective approach to combat pests is implementing an integrated pest management program (IPM) (Portnoy et al., 2013; Weitzman et al., 2013). IPM utilizes

proactive measures that identify and eliminate ingress points, eliminate sources of food and water, utilize traps, and use pesticides with low toxicity, if necessary (Weitzman et al., 2013). According to Weitzman et al. (2013), many studies have shown that implementing IPM strategies are effective in reducing cockroach allergens and could reduce allergens from other pests also.

Indoor Air Pollutants

Repeated exposure to indoor air pollutants have been associated with various cardiovascular diseases and other chronic conditions such as asthma (CDC & HUD, 2006; Mitchell et al., 2007). Pollutants that influence indoor air quality can be categorized as either biological agents or chemical agents (CDC & HUD, 2006; Mitchell et al., 2007). Examples of biological pollutants include pet dander, dust mites, bacteria, and molds (CDC & HUD, 2006; Mitchell et al., 2007). Examples of chemical pollutants include volatile organic compounds (VOCs), environmental tobacco smoke (ETS), and pesticides (CDC & HUD, 2006).

Dogs and cats are ubiquitous household pets that can be found in about half of all households and are the source of allergies to 12% of the general population and between 25%-65% of children with chronic asthma (Ahluwalia & Matsui, 2018). Another biological agent that is found in almost every home and is known to exacerbate asthma is the household dust mite (CDC & HUD, 2006). These microscopic creatures can be found by the hundreds of thousands in nearly 85% of beds in US homes, where they thrive on the dead skin flakes of humans (Álvarez-Chávez et al., 2016; Arbes et al., 2003; CDC & USDHUD, 2006; Salo et al., 2008). A study by Alvarez-Chavez et al. (2016), found that households that were visually assessed to have household dust had a statistically significant association with child occupants who were sensitive

to dust mites; therefore relating the cleanliness of the home as the most significant factor associated with sensitized children.

Certain fungal species are known to induce allergic reactions in some individuals (Borchers et al., 2017; Singh, 2005; CDC & HUD, 2006). These reactions include rhinitis, asthma, and eye and throat irritation (Singh, 2005). Fungi found in households are more commonly referred by colloquial, non-technical terms such as mold, toxic mold, black mold, mildew, etc. These general terms describe a diverse kingdom with over 1 million species (Borchers et al., 2017; Singh, 2005). In spite of the many negative misconceptions of molds, only a few species are known to be pathogenic or toxic (Singh, 2005).

There are numerous chemical agents that affect indoor air quality as well. Products such as air fresheners, paints, cleansers, pesticides, and waxes that release organic chemicals that vaporize into gasses are known as VOCs (CDC & HUD, 2006). VOCs can lead to negative health effects such as eye and nose irritation, central nervous system damage, liver damage, and are suspected to be carcinogenic (Mitchell et al., 2007). Although exposure to VOCs is not exclusive to inside the household, concentrations of these compounds can be higher in the indoor microenvironment (CDC & HUD, 2006).

The National Institutes of Health's (NIH) Cancer Institute defines ETS as smoke that is emitted from a tobacco product or exhaled by a smoker (NIH, n.d.). The CDC states that ETS contains over 7,000 chemicals, 70 of which are known carcinogens (CDC, 2017). Furthermore, repeated exposures to ETS can decrease the efficiency of the lungs, which can exacerbate and increase the number of asthmatic episodes (Jacobs, Kelly, & Sobolewski, 2007; Makadia, Roper, Andrews, & Tingen, 2017). Additionally, a less talked about consequence of ETS, third-hand smoke, can have lingering effects in homes of non-smokers (Weitzman et al., 2013). Third-hand

smoke refers to residual chemicals from secondhand smoke that have deposited on surfaces it has come in contact with (Jacob et al., 2017; Weitzman et al., 2013). These chemicals have the ability to embed and persist in multiple household surfaces, later reacting to atmospheric gasses, and producing and releasing byproducts that are detrimental to the health of those in the household (Jacob et al., 2017; Weitzman et al., 2013).

Toxic Substances

Toxic substances can be found in the building material of household components such as paint, insulation, plumbing, and siding (CDC & HUD, 2006). Lead and asbestos are examples of toxic materials that were commonly found in households but have since been banned (CDC & HUD, 2006). These materials were originally chosen because of their favorable intrinsic qualities but years of research have determined direct links to negative and sometimes irreversible health outcomes such as brain damage and lung cancers. Consequently, regulations have been created to prohibit the use of these products in new homes and outline appropriate means of remediation or abatement (CDC & HUD, 20016; Jacobs, Kelly, & Sobolewski, 2007). This is a significant public health issue, as populations that are overburdened by negative and environmental health conditions are more likely to live in older homes and be exposed to lead (Jones et al., 2009).

Lead is an element that was popular in paints because of its durability (CDC & HUD, 2006). Although its use in consumer paint has been banned since 1978, leaded paint can still be found today in many homes built pre-1978. According the American Community Survey (ACS) over half of the US housing stock was built before 1980 (U.S. CensusBureau, 2016). In Nevada, approximately a quarter of the housing stock was built before 1980 (US Census Bureau, 2016).

The most common routes of exposure are through the ingestion of lead paint chips or inhalation of lead dust (Jacobs et al., 2007; Roberts, Allen, Ligon, & Reigart, 2013). Lead can cause permanent neurological and gastrointestinal damage and bioaccumulate in bones and teeth (Jacobs et al., 2007; Roberts et al., 2013). Children are most susceptible because of their likelihood of eating paint chips. Once lead has been ingested or inhaled by a child, its ability to pass through the blood brain barrier and children's gastrointestinal tracts makes them absorb lead more readily compared to adults (Jacobs et al., 2007; Sanders, Liu, Buchner, & Tchounwou, 2009). Once lead has passed the blood-barrier, it induces damage to multiple parts of the brain including the cerebellum, prefrontal cortex, and hippocampus (Sanders et al., 2009). Consequently, children can suffer from behavior problems, reduced IQ, neuropathy, liver damage, and nausea (Sanders et al., 2009).

Exposure to asbestos is also known for its lifelong, irreversible effects. It is a mineral fiber that was incorporated in many household components since the 1800's because of its durable and heat resistant qualities (Lemen & Landrigan, 2017). These characteristics made it a preferred substance in thermal insulation, flooring, and roofing (Lemen & Landrigan, 2017). As early as the 1920's, researchers were witnessing temporal and causal relationships between asbestos exposure and lung diseases (Kratzke & Kratzke, 2018).

Asbestos, a proven carcinogen, accounts for approximately 12,000 – 15,000 deaths each year in the U.S. (Lemen & Landrigan, 2017). Lung cancers, mesothelioma, and debilitating non-malignant lung diseases such as asbestosis, are caused by the inhalation of asbestos fibers (CDC & HUD, 2006). In the case of asbestosis, inhaled asbestos fibers lodge into the cavities of the lungs and permanently scar them, which leads to a decrease in lung capacity and a high association with mesothelioma and lung cancers (Kratzke & Kratzke, 2018). Mesothelioma is a

pervasive cancer of the visceral and parietal surfaces of the chest or peritoneal surface of the abdomen (Kratzke & Kratzke, 2018; Sekido, 2013). According to Lemen & Landrigan (2017), the only route to decrease the amount of disease and deaths related to asbestos is to prohibit all uses of asbestos because there is no safe level exposure. Through the Toxic Substances Control Act, Clean Air Act, and Consumer Product Safety Act, many asbestos uses and product manufacturing, importation, processing, and distribution in commerce were banned in the U.S. (EPA, n.d.)

Housing Structure and Protection from Environmental Elements

Nothing exemplifies the importance of the interdependent relationship of the many systems within a house than its structural elements. They provide protection from the external environment, regulate the internal environment of the house, and provide structural support to other housing systems such as plumbing and electricity. These elements include a home's foundation, vapor barriers, framing components, exterior and interior walls, and roofing components (CDC & HUD, 2006). The roofing components provide protection from outside elements and facilitate the exchange of indoor and outdoor air. Vapor barriers provide another level of protection by preventing the ingress of moisture and harmful gasses into the home. The framing components and interior and exterior walls house the plumbing, electrical, and HVAC systems.

Due to the interdependent relationship that the structural components have with other elements of the home, a fault in one area can pose a systematic threat to the entire home. The threat of moisture entering the home because of compromised, missing, or badly constructed structural elements demonstrates this. One of the purposes of a home's structural components is to prevent the ingress of moisture into the home or to prevent the accumulation of it by providing

a path for it to escape (CDC & HUD, 2006). When either of these criteria are not met, this can create damp conditions that are conducive for pathogen growth and poor air quality, provide favorable conditions for pests, and threaten the structural integrity of the home by causing the deterioration of framing and wall components (CDC & HUD, 2006; Weitzman et al., 2013).

Plumbing and Waste Management

A home's plumbing system is imperative to provide a clean, reliable supply of potable water and means of wastewater removal. When the plumbing system is poorly constructed, and/or not maintained, problems can cause components of the system to break down and interrupt water or sewage service (CDC & HUD, 2006). Consequently, this can increase the likelihood of water contamination, cause structural damage, foster the growth or spread of pathogens, cause personal injury, and limit access to drinking water according to the World Health Organization (WHO) and the World Plumbing Council (WPC) (WHO & WPC, 2006).

Inconsistent or interrupted potable and waste water services can potentially lead to health risks such as increasing exposure to untreated wastewater, eliminating the ability to wash your hands, and limiting access to drinking water (WHO & WPC, 2006). Interrupted or inconsistent sewage service can increase exposure to waste water which contains many harmful pathogens such as E. coli and Giardia (CDC & WHO, 2006; WHO & WPC, 2006). Further complicating the issue is the inability to wash and sanitize your hands (WHO & WPC, 2006). This eliminates the first and most impactful step towards preventing the spread of infectious agents, according to the CDC (2015). Inconsistent or interrupted water service could reduce access to drinking water that is an essential element for the proper function of multiple body systems. Furthermore, finding alternative sources of water could place an additional financial burden to poorer families.

Broken plumbing components can lead to injuries, structural damage, and the growth of pathogens (CDC & HUD, 2006; J. O. Falkinham, Hilborn, Arduino, Pruden, & Edwards, 2015; J. Falkinham, Pruden, & Edwards, 2015; WHO & WPC, 2006). A major contributor to both personal injuries and the spread of pathogens is improper water temperature (J. O. Falkinham et al., 2015; J. Falkinham et al., 2015; WHO & WPC, 2006). This is the result of water heaters that are either not set to a recommended temperature or unable to hold consistent temperatures. Consequently, low water temperatures can create favorable conditions for opportunistic premise plumbing pathogens such as *Legionella pneumophila*, *Mycobacterium avium*, and *Pseudomonas aeruginosa* (J. O. Falkinham et al., 2015; J. Falkinham et al., 2015; WHO & WPC, 2006). Conversely, high water temperatures can scald the skin, especially in children and the elderly (Jacobs et al., 2007; WHO & WPC, 2006).

Broken plumbing components can also lead to leaks of both potable and wastewater. An accumulation of moisture in various structural components of the house can foster an environment for fungi growth and is a water source for pests (CDC & HUD, 2006; Jacobs, 2011). Additionally, leaking pipes can cause structural damage by cracking paint and causing wood and sheathing to rot. Broken wastewater pipes further complicate the problem by increasing the potential of being exposed to harmful pathogens (CDC & HUD, 2006; WHO & WPC, 2006).

Electrical

Potential hazards that are capable of property damage, injury, and death lie behind the outlets that power our connected world. Nationally, there was an average of over 45,000 fires per year between 2010 and 2014 that were related to electrical failures or malfunctions (Campell,

2017). These fires accounted for over 400 deaths and nearly \$1.5 billion in property damage (Campell, 2017).

The majority of local electrical codes are modeled from some version of the National Electrical Code (NEC), which is developed by the National Fire Protection Association (NFPA) (CDC & HUD, 2006; NFPA, 2018). Currently, 19 states have implemented the 2017 NEC, 28 states have implemented earlier versions of the NEC, and 3 states have implemented their own version of the NEC (NFPA, 2018). According to the NFPA (2018), Nevada has adopted the 2011 NEC and it is not in the process of adopting an updated version.

Although the purpose of electrical codes is to establish a standard for safety, a house that was initially NEC compliant during its construction, could be out of date and noncompliant according to most recent codes (Brenner, 2015; CDC & HUD, 2006). Further complicating the issue is the decisions in some states not to adopt the newest NEC even though these updates reflect advancements in technologies, guidelines on how to bring non-compliant homes into compliance, and new safety strategies (Brenner, 2015).

Heating, Cooling, and Ventilation

Having a properly working heating, ventilation, and air conditioning system (HVAC) is imperative in a region such as Southern Nevada where temperatures soar over 100°F during the summer and linger towards freezing during the winter. According to the latest data provided by the National Weather Service (NWS), 2016 marked the 4th consecutive year that Nevada led the nation in heat related deaths (NWS, 2017). Of 50 heat-related deaths in 2016, 24 occurred in permanent, non-mobile homes (NWS, 2017). The most vulnerable to heat related deaths are those aged 60 and older, who accounted for half of all deaths in 2016 (NWS, 2017). Furthermore, a functional HVAC system also effects indoor air quality by regulating moisture

and the flow of air into and out of the home (CDC & HUD, 2006). This has an integral role in removing indoor air pollutants and preventing moisture build-up, which can lead to mold and structural damage.

Landlord and Tenant Habitability Law

Policymakers have created standards to address where and how to build homes to protect the health and safety of the public. These regulations include housing codes that prevent developers from building potentially dangerous substandard housing and zoning codes that ensure that a community is designed in the best interest of the health of the community (Galvan, 2006). The Tenement Act of 1840 (CDC & HUD, 2006) and the New Tenement Act of 1901 (Heathcott, 2012) in New York were pioneering in being the first laws to recognize the relationship between housing and health by addressing the importance of proper sanitation, indoor air, and having housing components in good repair.

States started to include habitability sections in their statutory laws to define the responsibilities that landlords and tenants have to keep a residence in a habitable condition (Bachelder et al., 2016; Horwitz-willis et al., 2017; Super, 2011; Wills II et al., 2017). The regulatory and enforcement authorities for housing codes varies between and within states (Horwitz-willis et al., 2017). Most state habitability laws are regulated by either a building, safety, or economic and community affairs agency and are enforced at the municipal level. Although state and local laws regarding habitability vary from state to state, they are mostly modeled after the Uniform Residential Landlord and Tenant Act (URLTA) of 1972 (Bachelder et al., 2016; Horwitz-willis et al., 2017; Super, 2011; Wills II et al., 2017).

Nevada's landlord and tenant habitability laws are outlined in Chapter 118A of the Nevada Revised Statutes (NRS). These statutes define the obligations of both the landlord and

tenant and the process for resolving disputes. According to Wills, et al. (2017), Nevada was an early adopter of the habitability elements found in the URLTA and suggest that recent revisions to the statute is an example of the state's eagerness to keep the regulations relevant an up to date.

Implied Warranty of Habitability

URLTA and other state and local housing codes were not the first legal mechanisms to regulate ROU habitability. The foundation of current landlord and tenant habitability law is the concept of implied warranty of habitability (Brennan, 1999; Franzese, Gorin, & Guzik, 2016; Gilbert, 2011; Horwitz-willis et al., 2017; Super, 2011; Wills II et al., 2017). In general, implied warranty of habitability is a landlord's promise to the tenant that the rental property will be in a habitable condition throughout the leasing term (Brennan, 1999; Franzese et al., 2016; Gilbert, 2011; Super, 2011). The implied warranty of habitability can be created and defined by state and local statutes, building codes, and case law (Super, 2011). It attaches to the rental agreement between landlord and tenant. Brennan (1999) states that the implied warranty of habitability in leases gave potential tenants bargaining power and protection against landlords.

The implied warranty of habitability is comparatively tenant-friendly. Before the inclusion of the implied warranty of habitability principle in leasing contracts, tenants had fewer rights, protections, and assurances from their landlord (Brennan, 1999; Franzese et al., 2016; Gilbert, 2011; Mostafa, 2007). Specifically, landlords employed the caveat emptor, or "tenant beware" practice, which limited the scope of what a landlord was responsible for, putting the responsibility of securing specific warranties on the tenant, and often resulting in tenants losing court cases against their landlords when housing conditions were not fit for habitation (Brennan, 1999; Franzese et al., 2016; Gilbert, 2011; Mostafa, 2007). For the most vulnerable populations

that are overburdened by social, economic, and health disparities, this was especially troublesome (Wakefield & Baxter, 2010).

Although the implied warranty of habitability was a significant step in improving the rights and protections of tenants, the process of handling landlord and tenant grievances and the degree of enforcement differs across state and local jurisdictions (Bachelder et al., 2016; Gilbert, 2011; Horwitz-willis et al., 2017; Wills II et al., 2017). Currently, most states include some form of implied warranty of habitability in their statutes, but the District of Columbia and four states are void of any explicit statutory laws that create an implied warranty of habitability and are limitedly covered by common law (Wills II et al., 2017). Arkansas is the only state without a landlord's warranty of habitability (Bachelder et al., 2016; Wills II et al., 2017).

Uniform Residential Landlord and Tenant Act

Seeking uniformity and modernization of landlord and tenant habitability laws in the US, the Uniformed Law Commission (ULC) drafted the URLTA of 1972 (ULC, 1972). The ULC is a non-partisan, non-government organization that assists states by drafting model statutory laws (UCL, n.d.). It is up to the individual states if they want to adopt all, some, or none of the elements in the model legislation provided by the ULC. The articles of the URLTA provide a framework for implementing landlord and tenant laws that clearly define the responsibilities of both the landlord and tenant to keep a home in a habitable condition and the guidelines to remedy disputes between them. In 2015, a revised, more comprehensive version of URLTA (RURLTA) was created. It is important to note that the sections of RURLTA that outline the responsibilities of landlord and tenants to maintain a home in a habitable condition reference every element outlined in the CDC's Healthy Housing Reference Manual. RURLTA outlines the

following landlord and tenant responsibilities to keep the home habitable and maintained as well as remedies for non-compliance:

Landlord Responsibilities to Maintain Premises (ULC, 2015)

1. The home must be compliant with all applicable housing, building, and health codes.
2. The home must provide effective waterproofing and protection from outdoor elements.
This covers the roof, exterior walls, windows, and doors.
3. The home must have a working and maintained plumbing system, which includes a system for wastewater removal.
4. The home must have access to a working water supply that is able to produce hot and cold water.
5. The home must have a working and maintained HVAC system.
6. The home must have a working electrical system
7. The home must be free of pests, such as rodents, bedbugs, or other vermin and should be free of hazardous substances such as mold, radon, and asbestos.
8. If the home has a common area(s), they should be safe, clean, and sanitary.
9. There needs to have an appropriate number of trash receptacles.
10. Structural elements such as the flooring, walls, ceiling, and stairs need to be in good repair.
11. Any appliances or facilities that are necessary or provided by the landlord must be in working condition.
12. All locks on exterior doors and windows must be in working condition.
13. Any safety equipment required by law must be supplied.

Tenant's Responsibilities to Maintain Premises (ULC, 2015)

1. The tenant must comply with all responsibilities required by them to abide building, housing, and health codes.
2. The home must be kept safe and sanitary.
3. All trash must be removed in a sanitary manner.
4. Components of the plumbing system found in the home or utilized by the tenant must be kept clean.
5. The plumbing, HVAC, and electrical systems and other facilities and appliances must be used in a reasonable manner.
6. The tenant is responsible for making sure that no one in the home destroys, defaces, impairs, or removes any component of the home.
7. The tenant must not disturb the use or enjoyment of other tenants in the home or on the premises of the home.
8. The tenant must report any needed repairs or remediation in a timely manner.
9. Except for normal wear and tear, the home must be returned in the same condition as it was during the start of the lease.
10. Unless specified in the lease, the home must be used primarily as a dwelling unit.

Selected responsibilities imposed on the landlord can be assigned to the tenant in a separate agreement, provided that the agreement is not bound to the rent owed to the landlord and the tenant's inability to complete the task(s) does not exclude the landlord's responsibilities (ULC, 2015).

Remedies for Non-Compliance (ULC, 2015)

1. The party responsible for non-compliance must be given an official notice of the violation.

2. The violating party must remedy or make significant progress remedying the problem with 5 days for complaints categorized as essential or 14 days for complaints categorized as non-essential. Essential complaints include access to adequate water, sanitation, heating, electricity, and anything that endangers the immediate safety and health of the tenant(s).
3. If the issue is not remedied, the tenant(s) have the following options depending on their case:
 - a. terminate the lease
 - b. continue the lease and withhold rent to recover damages related to the non-compliance, obtain injunctive relief, remedy the problem themselves and deducting the cost of the repairs from the rent, or secure the essential service.

Nevada Habitability Law

Nevada started to incorporate elements of the URLTA in its habitability statutes in 1977 (Wills II et al., 2017) and has since revised them three times, most recently in 2007. Nevada's current habitability statutes regarding responsibilities, rights, and remedies mirror RURLTA (NRS118A.290 -NRS118A.380, ULC, 2015) and in a recent study by Wills II et al. (2017), are considered one of the strongest in the nation. The main difference between RURLTA and Nevada's statutes is found in the remedies section. In Nevada, a landlord is given 48 hours, not including weekend or holidays, to remedy or make a reasonable effort to remedy a habitability violation categorized as an essential service (NRS118A.380). Essential services include a working HVAC system, running water, hot water, electricity, gas, and functioning door locks (NRS118A.380). The recommendation from the RURLTA is five days, not including holidays or weekends.

Under Nevada state statute, if a landlord fails to maintain the home in a habitable condition by violating responsibilities outlined in NRS 118A.290, a tenant has the right to seek remedies. According to NRS 118A.290, a home is not habitable when it fails to comply with health and housing codes regarding its health, safety, fitness for habitation, or is deficient in any of the following criteria:

- (1) Effective waterproofing and protection from the external environment
- (2) Plumbing system in good repair
- (3) Supply of hot and cold water with fixtures in good repair that are connected to a working sewage system
- (4) HVAC system in good repair
- (5) Electrical system components in good repair
- (6) Adequate means for the disposal of garbage and
- (7) Home and surrounding grounds are clean and sanitary at the start of the tenancy
- (8) Structural elements such as the floors, walls, stairs, etc. are in good repair
- (9) All supplied appliances and facilities are in good repair

However, tenants can seek remedies only if they first notify the landlord of the violation in writing and request remediation within 48 hours for essential services and within 14 days for non-essential services. Written notice is not required, though, if either the landlord admits to a violation in court or the landlord receives written notice of the violation from an agency that enforces building, housing, or health codes (NRS 118A.355 and 118A.380).

Tenants can seek these remedies only if, the violation was not related to any intentional or negligent action of the tenant (NRS 118A.355 and 118A.380). Furthermore, to seek remedies for non-essential services violations, tenants must also provide the landlord sufficient access to

the home (NRS 118A.355), while to seek remedies for an essential services violation, tenants must be current in rent payments (NRS 118A.380). If remediation or a reasonable attempt towards remediation is not achieved in the prescribed time frame, the tenant may seek the following:

1. **Self-help:** For a repair that would cost no more than one month's rent to fix, a tenant may choose to remedy the violation and deduct the cost of remediation from their rent if the landlord is given an invoice of the charges (NRS 118A.360). For an essential service violation, the tenant may also acquire the remediation service and deduct its reasonable cost from rent or procure replacement housing for the noncompliant period and deduct its cost from rent (NRS 118A.355)
2. **Withhold rent:** Sections 118A.355 and 118A.380 state that a tenant may withhold rent until the violation is remedied so long as the rent owed to the landlord is deposited in a court-maintained escrow account.
3. **Terminate the lease:** Section 118A.355 states the tenant may terminate the lease and recover any deposits and/or prepaid rent for a non-essential violation.
4. **Seek remediation through civil court,** either "actual damages" for essential or non-essential services violations (NRS 118A.355 and 118A.380) or "such relief as the court deems proper" for non-essential services violations (NRS 118A.355).

Clark County Landlord and Tenant Hotline Study

The CCLTHS was created to ascertain how efficient and cost-beneficial a landlord and tenant hotline would be at addressing hazards that have the potential to cause negative health outcomes in ROUs in Clark County, NV. This UNLV and SNHD collaborative project collects

information that can help fill a knowledge gap regarding the conditions of ROUs because there is limited research on home-based hazards in Clark County, NV. The CCLTHS is managed by UNLV and consist of two components, basic hotline services and research activities. Basic hotline services provide guidance to callers on how to address grievances regarding hazards found in ROUs according to NRS 118A. The research component of the study, which requires verbal consent, allows the hotline operator to do the following: (1) obtain additional information regarding household demographics and details of the complaint(s), (2) schedule a site inspection performed by the SNHD, and (3) conduct a follow-up survey (Appendix C).

Basic Services Procedures

The basic services component of the CCLTHS is provided to anyone who calls the hotline regardless whether they consent to the research component. It includes the following steps:

1. The hotline operator determines if the caller is either a landlord, tenant, or calling on the behalf of someone. Additionally, the hotline operator determines if the property is categorized as a public accommodation or public housing. If the caller is calling on behalf of someone on the lease, they are informed that the person on the lease will eventually have to become involved. Individuals calling on the behalf of someone else and who are not on the lease are informed that legal action is only pursuable by tenants party to the lease. Callers who live in homes categorized as public accommodations or public housing are not handled by the hotline and are referred to an appropriate agency that can handle their complaint(s), such as the Southern Nevada Regional Public Housing Authority or Nevada Division of Public and Behavioral Health. Public accommodations include places that are kept, used, maintained, or held out to the public to be a place

where non-permanent rooming accommodations are furnished (e.g. hotels, motels, bed & breakfast facilities, etc.).

2. After the hotline operator collects the caller's contact information and details about the complaint(s), the operator determines if the complaints are categorized as essential or non-essential services as defined by NRS 118A or is considered a health and safety hazard as described in the Seven Principles to a Healthy Home. The Seven Principles to a Healthy Home were created by the National Center for Healthy Housing and are: (1) keep it clean, (2) keep it dry, (3) keep it pest free, (4) keep it safe, (5) keep it contaminant free, (6) keep it ventilated, and (7) keep it maintained. Complaints that do not fit any of those criteria are referred to an appropriate agency that can handle their complaint(s).
3. Callers are informed about complaints under NRS 118A. They are instructed to inform their landlord of the issue(s) in a signed and dated letter and request that the issue(s) gets resolved. Based on the category of the complaint(s), the landlord is required to resolve the problem or make reasonable progress towards a resolution within a specified time. Essential complaints must be responded to within two days, not including weekends or holidays. Non-essential complaints must be responded to with 14 calendar days. Callers are given the option of using letter templates provided by the hotline (see Appendices A & B).
4. Callers are provided with Nevada Legal Services' contact information as an additional resource and then are briefed on the research component of the CCLTHS.

Research Activities Procedures

1. The caller is informed of the study's purpose and is asked to verbally consent if they are interested. Once consented, the caller is assigned a case number.

2. The hotline operator collects additional information on household demographics and complaint details. The specific questions are outline in the follow-up (Appendix C) survey.
3. The caller is instructed to contact the hotline and provide details when a resolution has been reached in the mandated time. If the problem is not resolved in the mandated time, callers have the option to schedule a site visit by the SNHD. During a site visit, an environmental health specialist inspects the home and provides the caller with a report detailing the inspection and attempts to talk to the landlord. Although SNHD does not have jurisdiction over matters between landlord and tenants, the report given to the caller can be used in civil court if legal action is pursued.
4. The hotline operator performs a follow-up call.

Any information collected during both the basic and research components of the study are entered into a master database managed by UNLV.

Conclusion

In summary, since the late 19th century, research has linked relationships between environmental elements in the home with the health of occupants. Understanding the significance to public health, policy makers have created regulations aimed at reducing the incidence of negative health outcomes related to housing. As our understanding of this relationship has grown, pertinent regulations have expanded and now include protections against landlords who violate the warranty of habitability.

In Southern Nevada, a lack of research on both the characteristics of environmental hazards present in ROUs and the effectiveness of landlord and tenant habitability statutes presents a knowledge gap in public health. This knowledge gap can potentially hinder our ability

to accurately assess the degree to which environmental hazards in homes are negatively affecting the health of people in Southern Nevada and the strength of the statutes created to protect tenants from substandard housing. Understanding the relationship between the age of ROUs and environmental hazards and how successful tenants are at resolving habitability grievances, could help reduce this gap and improve population health.

Chapter 3: Methods

Study Design

The study utilized quantitative data obtained from the CCLTHS database. The database contained 3,326 logged calls to the Hotline between March of 2014 and September of 2016. A final dataset of 520 consented cases who answered the CCLTHS follow-up survey (Appendix C) was utilized to answer the research questions. The follow-up survey consisted of information that detail self-reported household demographics, descriptions of the complaint(s), and if the hazards were remediated.

Inclusion Criteria

A final dataset of verbally consented cases that met the following inclusion criteria were used to answer the research questions:

- Must be a tenant or landlord of a private ROU in Clark County, NV
- Must have a qualified complaint that is outlined in NRS 118A regarding the habitability of the ROU or is considered a health and safety hazard as described in the Seven Principles of a Healthy Home.

The final dataset did not include callers who met any of the following exclusion criteria:

- The caller is an occupant of and owner-occupied home
- The caller's home is categorized as public housing
- The caller's home is categorized as public accommodations.
- The caller does not reside in Clark County, NV
- The complaint is not covered in NRS 118 or the Seven Principles of a Healthy Home
- The caller does not provide verbal consent

Hypotheses and Methods

The final data set comprising 521 consented cases was utilized to test the following hypotheses. All analyses utilized SPSS software (v. 24; IBM, Armonk, NJ).

Question 1: Is there a relationship between the age of the ROU and the type of environmental hazard(s) reported?

H₀₁: There is no relationship between the age of a ROU and the environmental hazard(s) reported.

H_{a1}: There is a relationship between the age of a ROU and the environmental hazard(s) reported.

To test this hypothesis, answers to question 2.1 of the housing demographics section and question 1 of the hotline complaint section of the CCLTHS follow-up (Appendix C) survey were analyzed using SPSS Version 24. The categories of reported hazards included the following: (1) mold, (2) general maintenance, (3) bedbugs, (4) cockroaches, (5) other insect, (6) HVAC outage, (7) odor, (8) water outage, (9) electric or gas outage, (10) rodents, (11) domestic animals, (12) pigeons, (13) hoarder, (14) ETS, and (15) other. These hazard categories were consolidated into 5 larger groups and an analysis of variance (ANOVA) was utilized to determine if the average age of ROUs differed as a function of the type of environmental hazard reported. The groups needed to be consolidated because some hazard categories had sample sizes too small to be included in an ANOVA. The final five categories include the following:

- Pests/animals: bedbugs, cockroaches, other insects, rodents, domestic animals, and pigeons.
- Essential services: HVAC outage, water outage, electric/gas outage
- Mold
- General maintenance

- Other: odor, hoarder, environmental tobacco smoke, and other

Post hoc comparisons were conducted using Bonferroni's method to protect Type I error.

Question 2: Is there is a statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention (i.e., receiving a site inspection from the SNHD vs. seeking legal advice after sending a complaint letter to the landlord)?

H₀₂: Tenants who pursued different levels of intervention are equally likely to get their reported hazard remediated.

H_{a2}: Tenants who pursued different levels of intervention are not equally likely to get their reported hazard remediated.

To test this hypothesis, answers to questions 2, 2.1.1.2, and 4 of the hotline complaint section of the CCLTHS follow-up survey (Appendix C) were analyzed. A chi-square test of homogeneity was conducted to determine if there is a statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention.

Question3: Does the age of a home, the number of complaints made by each tenant, or complaint category influence the likelihood of remediation?

H₀₃: There is no relationship between age of a home, the number of complaints made by each tenant, or complaint category and the likelihood of remediation.

H_{a3}: There is a relationship between age of a home, the number of complaints made by each tenant, or complaint category and the likelihood of remediation.

To test this hypothesis, question 2.1 of the household demographic section and questions 1 and 1.1 of the hotline complaint sections was analyzed. A binary logistic regression was utilized to examine if there was a statistically significant relationship between the remediation of a reported hazard and the age of a home, the number of complaints made by a tenant, or complaint category.

IRB and Data Management

The Institutional Review Board (IRB) of the UNLV granted an exempt status for this study (Appendix D). Any data, documents, or records analyzed in the thesis project were utilized in such a way that the identities of the study participants cannot be revealed. This was ensured by the following procedures:

- Completing the Collaborative Institutional Training Initiative (CITI) course on “The Protection of Human Subjects”.
- Data files were stored in private, locked offices and on password-protected computers.
- Unique case numbers assigned to study participants were used in lieu of personal information for reporting and publishing the thesis.

Once the thesis is complete, all hard copies of data will be shredded and electronic data files placed in a secure, password encrypted server managed by the UNLV Department of Environmental and Occupational Health.

Chapter 4: Results

Descriptive Statistics

Of the 520 consented cases in the final data set, the number of complaints made by each tenant ranged from one to five, with 355 (68.1%) tenants registering one complaint, 125 (24.0%) registering two complaints, 30 (5.8%) registering three complaints, 9 (1.7%) registering four complaints, and 1 (0.2%) registering five complaints. When asked if their grievance was resolved, 332 (63.7%) of tenants reported that no resolution was found. The number of tenants who took their grievances civil court was 42 (8.1%). The age of ROUs was normally distributed with a skewness of 0.782 ($SE = 0.115$) and kurtosis of 0.949 ($SE = 0.229$). The mean age of ROUs was 29.8 years ($n = 451$), 95% CI [28.5, 31.1].

Hypotheses Analysis

Question 1 – Is there a relationship between the age of ROUs and the types of environmental hazards found in them?

The hazard groupings used in the ANOVA were pests/animals ($n = 111$), essential services ($n = 62$), mold ($n = 180$), general maintenance ($n = 81$), and other ($n = 16$) (Figure 1). The data met the following assumptions: (1) the dependent variable, age of the home, was measured in a continuous scale, (2) the independent variables, hazard groupings, were categorical, (3) there was independence of observations, (4) there were no significant outliers, (5) the dependent variable was normally distributed, and (6) there was homogeneity of variances. The mean age of ROU's (Figure 2) was statistically significantly different between hazard categories, $F(4, 445) = 5.11, p < 0.05$. A Bonferroni post hoc analysis revealed mean differences were statistically significant between essential services ($\bar{x} = 35.27, SD = 16.59$) and mold ($\bar{x} =$

27.64, SD = 12.77; $p < 0.05$) and essential services and other ($\bar{x} = 23.25$, SD = 11.62; $p < 0.05$).

Therefore, the null hypothesis was rejected.

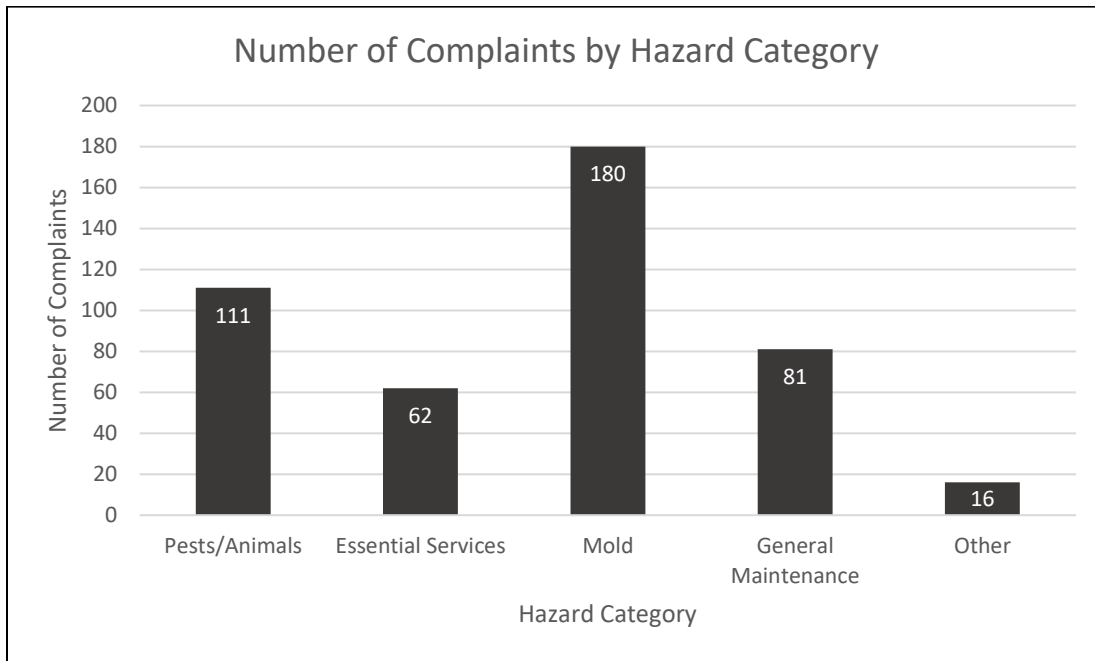


Figure 1. The Number of Complaints by Hazard Category

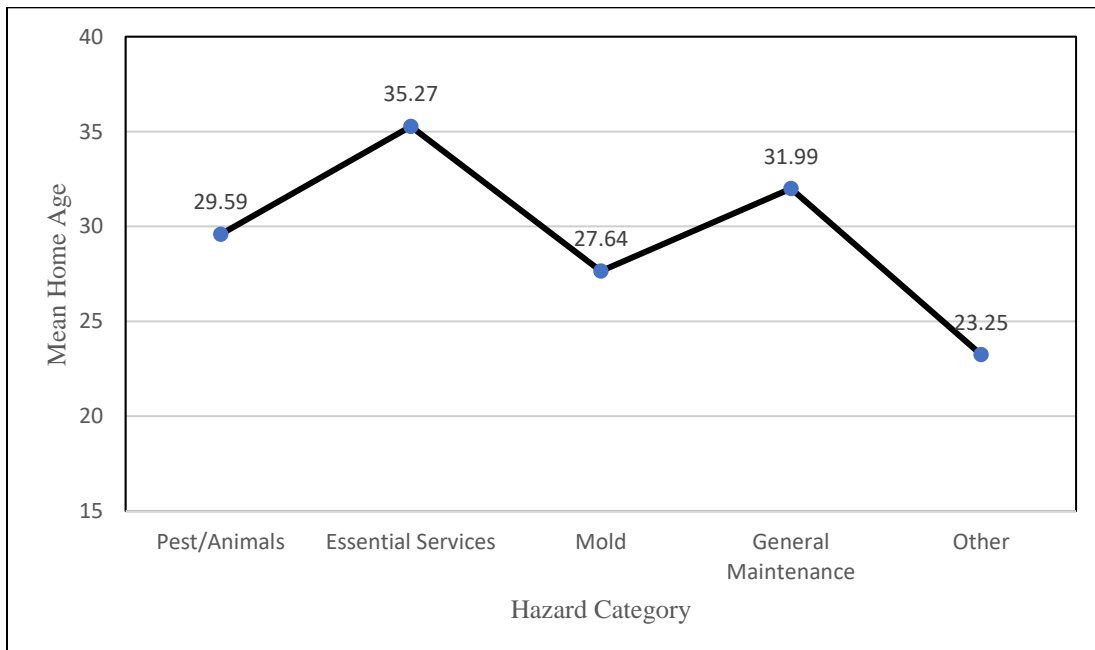


Figure 2. The Mean Home Age in years by Hazard Category

Question 2 – Is there is a statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention?

The data met the following assumptions: (1) the dependent variable, remediation, was dichotomous, (2) the independent variable, intervention level, was polytomous (3) there was independence of observations, and (5) the sample size was adequate. The data shows that 16.7% of tenants who only sent a letter to their landlord were able to get their hazard remediated compared to 35% of tenants who sent a letter and received a site inspection by the SNHD, and 36.8% of tenants who sent a letter, received a site inspection, and sought legal advice. A chi-square test of homogeneity suggested that there was no statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention, $X^2 = 1.11$, $p = 0.292$. Therefore, the null hypothesis was not rejected.

Question 3 – Does the age of a home, the number of complaints made by each tenant, or complaint category influence the likelihood of remediation?

A binary logistic regression was performed to determine if the age of a home, the number of complaints made by each tenant, or whether a complaint was categorized as essential or non-essential had an influence on the likelihood of remediation. A Hosmer and Lemeshow goodness-of-fit test indicated that the model was a good fit to the data, $X^2(8) = 2.69$, $p = 0.952$.

Additionally, the data fit the following assumptions: (1) the dependent variable, remediation, was dichotomous, (2) the independent variables, age of home, number of tenant complaints, and complaint category, were measured on a continuous scale, (3) there was independence of

observations and both dependent and independent variables were exhaustive and mutually exclusive, and (4) the sample sizes of each independent variable were adequate.

For each increase in home age of 1 year, the likelihood of remediation was decreased by 2.5%. For tenants with one complaint, the odds of remediation were 1.75, (95% CI = 1.06 - 2.89], times that of tenants with multiple complaints. For complaints categorized as essential, the odds of remediation were 4.15, (95% CI = 1.36 - 12.7) times that of complaints categorized as non-essential. Therefore, the null hypothesis was rejected.

Chapter 5: Discussion, Conclusions, and Recommendations

Discussion

The data showed that the oldest homes were associated with essential services complaints ($\bar{x} = 35.27$ years), followed by general maintenance ($\bar{x} = 31.99$ years), pests/animals ($\bar{x} = 29.59$ years), mold ($\bar{x} = 27.64$ years), and other ($\bar{x} = 23.25$ years). Essential services pose the most immediate risk to the health and well-being of tenants and those who live in older homes are most vulnerable. Understanding the mean age of the homes and most common hazards may be useful for public health practitioners to implement primary prevention measures. For example, the age of the home may be a useful metric to help target certain homes for inspections and evaluations of meeting habitability requirements prior to any failures or imminent risks to health and safety. Additionally, this information may be useful for local policy makers, as well as landlords, in anticipating needs and securing adequate funding necessary to mitigate such hazards.

Although statistically significant, the mean age difference between essential services and hazards categorized as other provided little insight considering it was an aggregate of four smaller groups with an overall small sample size compared to the other categories. Conversely, it is interesting that compared to the other groups, mold was associated with newer homes. This coincides with research that suggest that the introduction of gypsum drywall into the structural elements of homes increased the chances of mold growth compared to plaster and lathe (Vesper, Wymer, Cox, & Dewalt, 2016). This is due to the binders and additives that are found in the gypsum drywall, which fosters an ideal environment for fungal growth (Vesper et al., 2016).

Although the data did not suggest a statistically significant difference in the proportions of hazards remediated by tenants who pursued different levels of intervention, the proportion of

tenants who got their hazard remediated did increase with each additional intervention. The proportion of tenants that were able to get their hazards remediated was more than two times higher in those who sought more than one level of intervention. The sample size for each intervention group was relatively small and could be an explanation for the statistical insignificance. Each level of intervention, a site inspection or legal advice, places the tenant with an expert in either the environmental hazard or law profession. This could have led to tenants making more informed decisions; ultimately providing them leverage against their landlord.

Qualitative data from tenants who pursued civil litigation suggests that those who made less informed decisions also inadvertently placed themselves in precarious situations, showing some support for this claim. Out of the 41 tenants who took their landlord to civil court, 11 were ultimately evicted because they failed to pay rent while they were contesting the damages with their landlord. None of the 11 evicted tenants sought legal advice. Had they understood the basic tenets of Nevada's landlord and tenant habitability statutes, they would have known that contesting grievances with their landlord does not excuse them from paying rent.

The data from the third research question suggested that to be in the best position to get a hazard remediated, a tenant should reside in a newer home and have one complaint categorized as an essential service. This is of concern because the mean age of ROUs in each hazard category ranged from 23.25 to 35.27 years and older ROUs will inherently observe more housing related hazards than newer ones. For people who are most likely to live in older homes such as lower-income families and the elderly, this can further complicate their living situation. With less available resources, they might not have the means to remediate these problems.

It should be no surprise that the odds of remediation of essential service complaints were 4.15 times that of non-essential complaints. The absence of essential services, such as a working

HVAC system during the summer in Clark County, can lead to immediate negative health outcomes. The nature of the complaint and the short time allotted by the NRS to remedy it could give the tenant more leverage when seeking remediation from their landlord. The issue here is the number of potential non-essential complaints that are not remediated. Non-essential complaints, such as general maintenance issues, might not pose the degree of immediate risks relative to essential services, but often are associated with subsequent failures in essential service complaints. Greater attention to these issues could reduce the incidence and severity of future complaints in ROUs.

Finally, the odds of remediation were significantly higher if the tenant had a single complaint. This is significant because deficiencies in one aspect of the home is indicative of deficiencies in another (CDC & HUD, 2006). The data shows that hazards were found in older homes, which will inherently observe multiple hazards at a time. This is another barrier for those who are most likely to live in older homes. If the tenant elects to file one complaint at time to increase the odds of remediation, this would increase the time spent in a home not fit for habitation. Additionally, the decrease in odds of remediation associated with multiple complaints could be indicative of the financial burden placed on the homeowner to keep a home in good repair. This could signal a need to educate homeowners about the associated costs of keeping a home in good repair and the advantages of proactively addressing potential deficiencies in the home before they become hazards.

Limitations

This study was not without limitations. The data from this study were self-reported information detailed in the CCLTHS follow-up survey (Appendix C). This could have created inaccuracies that potentially led to misleading data. For example, the complaints made to the

hotline were never verified, unless the tenant qualified and opted for a SNHD site inspection. In this study, only 40 out of 521 cases received site inspections. Furthermore, there was no way to verify that each case followed the recommended advice provided by the hotline operator. Only 53 cases provided the hotline with a copy of the letter sent to their landlord.

Another limitation was the sample size. The total number of study participants might have not been representative of the Clark County renter community. Many tenants might have not been aware of the existence of the hotline because the only link to it can be found on the SNHD website. Additionally, those that did seek out the assistance of the hotline may have been tenants who had already requested remediation from their landlord but felt as if remediation was not taking place in, what they perceived as, an acceptable amount of time. Also, those who lack the financial and/or social capital might have been reluctant to call the hotline. This includes those who fear landlord retaliation and/or have citizenship and/or language barriers. Furthermore, the extent of tenant participation could have been limited because they could have been evicted or moved before a resolution was found.

Conclusions and Recommendations

In a side-by-side comparison, Nevada's landlord and tenant habitability statutes mirrors RURLTA, the model legislation, and is considered one the strongest in the nation as written. Despite this, 63% of tenants were not able to find some form of resolution related to hazards reported to the hotline. This study suggests that tenants who are most likely to encounter an environmental hazard in their homes are the least likely to get it remediated by their landlord. Tenants were less likely to get their hazard remediated by their landlords if they had multiple complaints, lived in an older home, or had a non-essential complaint. The key is to bridge the disconnect between those in most need and the legislation created to protect them. Regulatory

changes, expanding and improving the hotline, and providing landlords with additional resources could help bridge this disconnect.

Regulatory Changes

The data suggest that there was a significant disparity between the likelihood of remediation of an essential service and non-essential service. Amending the current NRS code to reduce the number of days needed to remediate or make reasonable progress towards remediation of a non-essential service could increase the probability of remediation. Reducing the amount of time in half, from 14 days to 7 days, could increase the landlord's urgency to remediate and reduce the likelihood of the tenant not following through, defaulting on rent, or moving out. This change would not be unprecedented since the amount of time to remediate or make reasonable progress towards remediation of an essential service is 48 hours, which is three days shorter than RURLTA standard.

Another regulatory change that could improve issues with ROU habitability would be requiring a mandatory inspection before a lease is finalized, ensuring a baseline of quality outlined by the NRS is met. The most cost-effective option could require both parties to inspect the house together to identify and address any violations of the NRS code regarding habitability. The other option could require the landlord to pay for a professional inspection, such as those conducted before the sale of a home. Although the upfront cost of this option would be less cost-effective for the landlord, an inspection performed by a professional could yield findings that could be missed by the landlord. These findings could save the landlord time and money in the long term.

Regulatory agencies such as code enforcement and the SNHD can also mandate that all rental homes older than 20 years go through periodic inspections. Like restaurant inspections, rental homes would have to meet a baseline of habitability to obtain licensure. This could increase the probability of the landlords renting homes that meet the requirements for habitability outlined in NRS 118A.290.

Finally, the SNHD does not have jurisdictional enforcement over the habitability of rental properties. Their powers are limited to performing site inspections and providing the tenant with a report of their findings. Although a site inspection report can be useful in a civil court case, it does not force the landlord to come into compliance. Granting the SNHD the ability to cite landlords could help increase the probability of remediation and reduce the amount of time spent fighting landlords. Citations give the SNHD and tenant leverage against the landlord and could prevent complaints from proceeding to civil court.

Hotline Improvements

The hotline helped bridge the gap between tenants in need and the laws created to protect them by acting as a conduit to educational and legal resources. Additionally, data collected by the study allowed for the characterization of hazards in rental homes in Clark County, NV and the effectiveness landlord and tenant habitability statutes. By addressing reporting limitations, expanding the hotline by involving the UNLV law school, implementing a more robust recruitment process, and creating a hotline phone application, the hotline can make additional contributions.

One of the limitations of the study was the fact that most of the data was self-reported and therefore most of the claims made to the hotline and interventions taken by the tenants were

never verified. Instilling a verification mechanism to verify the validity and accuracy of the claims made to the hotline and steps taken to get the hazard remediated could produce more accurate data and result in more resolutions. The verification process can include site visits by code enforcement or the SNHD and would be contingent on the receiving a copy of the letter sent to their landlord. This would be the best way to verify complaints made to the hotline but would be limited by the available resources of the agencies. Another way to verify could require a tenant to provide visual proof of the hazard to the hotline. This would be more cost effective but would be limited because not all hazards can be verified by photo.

Another verification mechanism could include expanding the hotline by involving the UNLV Law School. Currently, hotline operators are not qualified to offer legal advice and refer callers to Nevada Legal Services, a non-profit legal resource organization for low-income individuals. If the Law School got involved by taking all legal referrals, the hotline would be able to verify that tenants did seek legal advice and ensure that study participants received a consistent message.

Another improvement to the hotline could include implementing a more robust recruiting process to obtain a more representative sample of the Clark County renter community. Currently, information about the hotline can only be found on the SNHD's website. This recruitment strategy limits those who either do not have access to or do not know how to use the internet, and do not speak English. Recruitment strategies can be greatly improved by advertising the hotline on multiple platforms (e.g. social media, print ads, television ads, etc.), in different languages.

Finally, the creation of a hotline phone application could recruit renters who are reluctant to talk to a hotline operator. The phone application could provide all the information provided

by the operator (e.g. information on NRS 118A, writing a letter to the landlord, consenting to the study, etc.) and would allow the tenant to upload photos of their hazards and schedule a site with the SNHD. The application could also benefit hotline operators by reducing their call volume.

Landlords

Attention of this study focused on the tenant. It is equally important to look at habitability issues through the eyes of the landlord. Owning and maintaining a rental property requires a substantial financial commitment. We should not assume that the landlord has the financial means to upkeep an older home, has the knowledge of the potential environmental hazards in their properties, or knowledge of Nevada's landlord and tenant habitability statutes. Proactively reaching out to landlords who own homes at most risk could help reduce issues related to environmental hazards in homes.

One way to assist landlords is to proactively target properties that might qualify for weatherization assistance programs. These government programs can provide homeowners with resources such as installing carbon monoxide detectors, fixing broken windows, and replacing broken HVAC systems at little or no cost to the homeowner. Qualifying for these programs could help reduce the financial burden associated with making a home fit for habitation.

Finally, a landlord's ability to rent a home could be contingent on the completion of mandatory courses provided by the SNHD or code enforcement. The courses would educate them on landlord and tenant habitability law, the importance of healthy housing, and how to identify and prevent environmental hazards in the home. As a result, landlords could reduce the incidence of environmental hazards in their rental homes and learn to have funding set aside in anticipation of a potential hazard. Tenants could also benefit from courses because they could

empower tenants to make more informed decisions regarding which homes they want to rent. This would also address the perceived power disparity between landlords and tenants.

The current study contributes to the understanding of the relationship between the age of ROUs and environmental hazards and enhances our knowledge on what levels of intervention are most successful at resolving habitability grievances. Application of this knowledge can be used by public health practitioners to quickly identify homes at risk for hazards, and to advise tenants on steps to take to reduce the amount of time taken to resolve grievances, and to ultimately improve population health. Implementing the above recommendations and policy changes would strengthen the ability to mitigate negative health outcomes and enhance overall public health.

Appendix A: Sample Essential Complaint Letter Template

DATE

Mr./Ms. Landlord
Landlord's Address

Re: Habitability Problem
Tenant's Name and Address

Dear Mr./Ms. Landlord:

Please be advised that I have a problem with my dwelling unit, located at (Insert your address). As you may know, my dwelling unit:

(List problem)

This problem constitutes a failure to supply essential items or services. This/these problem(s) has/have persisted since _____ (Insert date of first occurrence). Nevada Revised Statute (NRS) 118A.380 and/or my lease require(s) you to supply the following in well-maintained, good working order:

1. Heat
2. Air conditioning
3. Running water
4. Hot water
5. Electricity
6. Gas
7. A door lock

Per item number (insert the number or numbers from above that pertains to your problem) above,

I am requesting _____

(Describe what you want, for example: a working air conditioner)

NRS 118A.380 requires you to fix this (these) problem(s) within 48 hours (excluding weekends and holidays) of the date on this letter.

You have 48 hours (excluding weekends and holidays) to remedy this (these) problem(s) or I will: (select one)

- Terminate my rental agreement immediately
- Procure the service and deduct the actual, reasonable cost of the service from the rent
- Recover actual damages
- Withhold rent until the service is restored (rent must be held in a court escrow account)
- Procure comparable housing until the service is restored and recover actual, reasonable cost of the new dwelling's rent, should it exceed the original dwelling's rent, which is abated
- Seek my remedies under Nevada law, including, but not limited to, filing a lawsuit against you for actual damages sustained as a result of your violation of Nevada law

Thank you for your anticipated cooperation in this matter. Please contact me to set up a good time for you to repair the problem(s).

Sincerely,

Tenant signature

Appendix B: Example Non-Essential Complaint Letter Template

DATE

Mr./Ms. Landlord
Landlord's Address

Re: Habitability Problem
Tenant's Name and Address

Dear Mr./Ms. Landlord:

Please be advised that I have a problem with my dwelling unit, located at (Insert your address). As you may know, my dwelling unit:

(List problem)

This/these problem(s) create(s) inhabitable living conditions. This/these problem(s) has/have persisted since _____ (Insert date of first occurrence). Nevada Revised Statute (NRS) 118A.290 and/or my lease require(s) you to supply the following in well-maintained, good working order:

1. Effective waterproofing and weather protection
2. Plumbing facilities
3. Hot and cold water with appropriate fixtures
4. Sewage disposal system
5. Heating facilities
6. Electrical lighting, outlets, wiring and electrical equipment
7. An appropriate number of receptacles for trash
8. Clean, sanitary buildings and grounds, free of debris, filth, trash, and pests
9. Floors, walls, ceilings, stairways, and railings
10. Ventilating, air-conditioning

Per item number (insert the number or numbers from above that pertains to your problem) above,

I am requesting

(Describe what you want, for example: repairs to a leaking toilet)

NRS 118A.355 requires you to fix this (these) problem(s) within 14 days of the date on this letter.

You have 14 days to remedy this (these) problem(s) or I will: (select one)

- Terminate my rental agreement immediately
- Recover actual damages
- Seek my remedies under Nevada law, including, but not limited to, filing a lawsuit against you for actual damages sustained as a result of your violation of Nevada law

Thank you for your anticipated cooperation in this matter. Please contact me to set up a good time for you to repair the problem(s).

Sincerely,

Tenant signature

Appendix C: CCLTHS Follow-Up Survey

1. Does caller provide verbal consent to answer the follow-up survey questions? <i>(If YES, continue to Caller & Household Information, otherwise STOP)</i>	(0) No (1) Yes (2) Previously Consented (99) RTA/NA
2. Who obtained the verbal consent? (Please initial next to your name)	(1) Amanda: ____ (2) Mackenzie: ____ (3) Melissa: ____

----- **Do Not Complete Without Consent** -----

Caller Information

1. First Name:	2. Last Name:
3. Phone Number:	4. Original Call Date:
5. Street Address:	
6. Apt No.: (99) RTA/NA	7. Complex Name: (99) RTA/NA
8. City:	9. Zip Code:
10. Did you call the Clark Co. Landlord-Tenant Hotline as a:	(1) Tenant (2) Landlord (3) Other (99) RTA/NA

Household Demographics

1. Please complete for landlord and/or ALL household occupants:				
	Age	Gender (0) Male (1) Female	Ethnicity (choose 1) (1) Hispanic or Latino (2) Not Hispanic or Latino (99) RTA/NA	Race (choose all that apply) (1) American Indian/Alaska Native (2) Asian (3) Black or African American (4) Native Hawaiian or Pacific Islander (5) White (6) RTA/NA
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
1.10				
2. How many years have you owned or lived in the home? ____ ____ years (99) RTA/NA				
2.1. When was the home built? ____ ____ ____ ____ years (<input type="checkbox"/> Verified by Assessor Record) (99) RTA/NA				

3. Type of home:	(1) Single Family (2) Multi-Family (3) Mobile Home (99) RTA/NA	
3.1. If multi-family, what type of housing?	(1) Apartment (2) Condo (3) Duplex	(4) Townhouse (5) Other: _____ (99) RTA/NA

Hotline Complaint

1. What category did your complaint fall under? <i>(Pre-filled out by CCLTHS staff based on call log)</i>	(1) Mold (2) General Maintenance (3) Bedbugs (4) Cockroaches (5) Other Insect (6) HVAC Outage (7) Odor (8) Water Outage (9) Electric or Gas Outage	(10) Rodent (11) Domestic Animal (12) Pigeon (13) Hoarder (14) Environmental Tobacco Smoke (15) Other: _____ (16) Sewage
1. What type of service was the complaint about? <i>(Pre-filled out by CCLTHS staff based on call log)</i>	(1) Essential Service (2) Non-Essential Service (3) Both	
1.1 Does caller confirm complaint type?	(0) No	

<i>(If answers Doesn't Remember, STOP form here)</i>	(1) Yes (2) Doesn't Remember (99) RTA/NA
<p>2. Did you write and send a letter to your landlord or tenant about the complaint?</p> <p>(If No, skip to Question 3)</p>	(0) No (1) Yes (99) RTA/NA
<p>2.1. If YES, did you contact the Clark Co. Landlord-Tenant Hotline again after sending the letter?</p>	(0) No (1) Yes (99) RTA/NA
<p>2.1.1. If YES, did you provide the SNHD/DEOH with a copy of the letter?</p>	(0) No (1) Yes (99) RTA/NA
<p>2.1.1.2. If YES, did the Southern Nevada Health District (SNHD) perform a site inspection for the complaint?</p>	(0) No (1) Yes (99) RTA/NA

<p>3. Was your complaint resolved?</p> <p>(If YES, skip to Question 3.1)</p> <p>(If NO, skip to Question 3.2)</p>	<p>(0) No</p> <p>(1) Yes</p> <p>(99) RTA/NA</p>
<p>3.1. If YES, was it resolved in the appropriate time frame:</p> <p><i>Tenants:</i> 14 days (Non-Essential Service) or 48 hours (Essential Service)</p> <p><i>Landlords:</i> 5 days (seeking eviction) or 14 days (seeking reimbursement for remediation)</p>	<p>(0) No</p> <p>(1) Yes</p> <p>(99) RTA/NA</p>
<p>3.1.1. If NO, how long did it take to get resolved? _____</p> <p>(99) RTA/NA</p>	
<p>3.1.2. If YES, what was fixed? _____ (99) RTA/NA</p>	

Appendix D: IRB Approval



UNLV Social/Behavioral IRB - Exempt Review Exempt Notice

DATE: September 21, 2018

TO: Shawn Gerstenberger, Ph.D

FROM: Office of Research Integrity - Human Subjects

PROTOCOL TITLE: [1291742-1] Examining Environmental Hazards in Rental Homes and Landlord and Tenant Habitability Laws in Clark County, NV

ACTION: DETERMINATION OF EXEMPT STATUS

EXEMPT DATE: September 21, 2018

REVIEW CATEGORY: Exemption category # 4

Thank you for your submission of New Project materials for this protocol. This memorandum is notification that the protocol referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.101(b) and deemed exempt.

We will retain a copy of this correspondence with our records.

PLEASE NOTE:

Upon final determination of exempt status, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI - HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials.

If your project involves paying research participants, it is recommended to contact Carisa Shaffer, ORI Program Coordinator at (702) 895-2794 to ensure compliance with the Policy for Incentives for Human Research Subjects.

Any changes to the application may cause this protocol to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced protocol has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI - HS of its closure.

If you have questions, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.

Office of Research Integrity - Human Subjects
4505 Maryland Parkway . Box 451047 . Las Vegas, Nevada 89154-1047
(702) 895-2794 . FAX: (702) 895-0805 . IRB@unlv.edu

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B.A. Psychology, University of Nevada, Las Vegas, 2005

PROFESSIONAL EXPERIENCE

2016-present Biological Field Technician, University of Nevada, Las Vegas

2004-present Valet Supervisor/Attendant, MGM Grand Hotel and Casino/SP+, Las Vegas, NV

2014-2015 Investigator/Healthy Homes Specialist/Dust Sampling Technician, University of Nevada, Las Vegas

2003-2004 Fitness Counselor, 24 Hour Fitness, Las Vegas, NV

GRANTS AND AWARDS

Completed

2014 National Institutes of Health IDeA Network for Biomedical Research Excellence, University of Nevada, Las Vegas. Healthy Homes Partnership projects, Investigator.

INVITED TALKS

2014 September 17. Injury Prevention and Public Health class. Bertran, J. University of Nevada, Las Vegas. Healthy homes principles and rating system.

PRESENTATIONS

2014 Bertran, J. The case for EPA lead standards in tile. National Institutes of Health IDeA Network of Biomedical Research (INBRE) Project Presentations and Awards Ceremony, Las Vegas, NV, August 2014.

2014 Bertran, J. The Nevada health care landscape. MPH Internship Poster Day, Las Vegas, NV, May 8, 2015.

RESEARCH EXPERIENCE

- 2015 Moonridge Group and the Nevada Medical Center, Las Vegas, NV, Intern/Researcher
Assisted with the market context portion of the Nevada Medical Center's (NMC) business plan by providing research on the Nevada health care landscape and prospective donors.
- 2014-2015 Henderson Lead Hazard Control and Healthy Homes Partnership, Henderson, NV, Investigator, Healthy Homes Specialist, and Lead Sampling Technician
Taught healthy homes training courses to provide community capacity building, enrolled community members from the target area by planning and implementing outreach and recruitment strategies, aided potential participants with the application and qualification procedures, assisted with lead-based paint risk assessments, conducted healthy homes assessments, and utilized the Healthy Homes Rating System to score identified hazards.
- 2014-2015 Dignity Health Asthma Program, Las Vegas, NV, Investigator and Healthy Homes Specialist
Conducted healthy homes assessments and utilized the Healthy Homes Rating System to score identified hazards in an effort to reduce or eliminate elements that exacerbated asthmatic conditions in children.
- 2014-2015 Clark County Landlord Tenant Hotline, Las Vegas, NV, Investigator and Healthy Homes Specialist
Completed incident reports, enrolled new participants, and coordinated home inspections with the Southern Nevada Health District in an effort to resolve issues between landlords and tenants related to unhealthy housing conditions.
- 2004-2005 Interactive Measurements Group, University of Nevada, Las Vegas, Research Assistant
Prepared testing materials, administered and scored testing sessions, and performed data entry for research pertaining to emotional intelligence.

SERVICE TO THE PROFESSION

To School

- 2015-2016 Public Health Student Association, UNLV

To Community

- 2014-2016 Group Coordinator, Down Syndrome Organization of Southern Nevada
Assist in early intervention programs of therapy, exercises, and activities that proactively address various developmental issues observed in individuals with Down Syndrome.

2014 Participant, Rebuilding Together Day
Assist with the coordination of efforts for the School of Community Health Sciences to select a low-income family and rehabilitate the home to decrease injury and health hazards and create a healthy living environment

PROFESSIONAL MEMBERSHIPS

2014-current National Environmental Health Association
2016-current Nevada Public Health Association