

Work and Health Needs of Individuals with Unstable or Lack of Housing

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LIST OF ABBREVIATIONS

ACA	Affordable Care Act
AIDS	Acquired Immunodeficiency Syndrome
aOR	Adjusted Odds Ratio
BLS	Bureau of Labor Statistics
HIV	Human Immunodeficiency Virus
HUD	US Department of Housing and Urban Development
ICD	International Classification of Diseases
IRB	Institutional Review Board
LCL	Lower Confidence Limit
NIOSH	National Institute for Occupational Safety and Health
NUHS	National University of Health Sciences
PIT	Point-in-Time
SDH	Social Determinants of Health
UIC	University of Illinois at Chicago
US	United States
USDA	United States Department of Agriculture
ULC	Upper Confidence Limit
WHO	World Health Organization

SUMMARY

The bidirectional link between work and health is well established and working towards mitigating disparities in these areas could have substantial impacts on the lives of those that are deeply impacted by poor health and a lack of work. The specific aims of this project were to (1) describe health care utilization of individuals with a lack of housing or affected by homelessness using the Illinois Hospital Discharge database, (2) assess chiropractic interns' attitudes and behaviors towards occupational history taking at a clinic serving a population affected by unstable or a lack of housing and behavior changes following occupational health assessment training, and (3) evaluate needs for a comprehensive return to work program among residents of a residential work rehabilitation program for individuals with unstable or lack of housing by assessing past, present and future employment needs and expectations within this vulnerable population.

Chapter 4 assessed the value of hospital records in augmenting information on homelessness counts on a state-level. Data from the Illinois Hospital Discharge Database (2011-2018) was used to identify outpatient and inpatient visits identified as affected by homelessness. Probabilistic linkage methodology was used to estimate unique individuals rather than visits and this was compared to U.S. Department of Housing and Urban Development (HUD) annual estimates of homelessness based on point-in-time (PIT) counts. The HUD PIT estimates indicate a substantial decline of approximately 24% in homelessness in Illinois; however, estimates of unique individuals visiting the hospital with a code for homelessness more than doubled in this same time period. This demonstrates that other data sources, such as hospital records, are increasingly able to identify and report information related to homelessness. Leveraging these additional data sources may help to augment HUD PIT estimates to provide more accurate estimates of homelessness which are used to direct resources and assess policy and supportive services for those affected by homelessness.

SUMMARY (continued)

This same dataset was leveraged in Chapter 5 to describe the patient characteristics (gender, age, race and ethnicity), facility information (name, location, trauma level), length of stay, total hospital costs, insurance coverage, discharge status, reason for visit, comorbidities, and acute injuries for homeless individuals to enhance the understanding of the burden of homelessness on the healthcare system and identify areas for future interventions in a hospital setting. There is a significant burden of care (154,173 patient visits) and cost (\$2.34 billion dollars in charges) on hospitals for the healthcare of those affected by homelessness. Hospital visits predominantly involved males, adults between the ages of 25-64 years, and non-Hispanic whites and African-Americans. The majority of hospital visits in Illinois for the homeless had comorbidities of depression, psychoses and/or substance abuse (70.2%) and had a routine discharge to home or self-care (81.9%). Discharge to home or self-care, as opposed to another health care institution, was associated with having charity coverage and being Black/African-American. Those experiencing homelessness experience a high burden of health concerns and may lack the supportive services needed for improving their health when routinely discharged to home or self-care. Hospital billing records can be used to prioritize the distribution of limited public health resources for health care programs and transition interventions among those experiencing homelessness.

Chapter 6 implemented a pre-and post-training program evaluation to (1) describe changes in their frequency of occupational history taking before and after a one-hour training and (2) document the attitudes and beliefs of the chiropractic interns regarding occupational health and history taking. All chiropractic interns at one clinic location completed questionnaires assessing their attitudes and perceptions regarding documenting the occupational history of their patients each trimester they were enrolled in the study. Each intern enrolled in the study for two or more trimesters participated in an hour-long training session on taking an occupational history. The supervising clinician independently evaluated charting behaviors of interns for the duration of the study. The supervising clinician assessed

SUMMARY (continued)

20 interns' level of documenting occupational history for 202 new patient or re-examination visits. A large majority of interns (85% at baseline) were interested in occupational health and 80% believed that occupational history taking was "very important". Intern charting behaviors increased after training related to documentation of past occupation (62.9% from 32.4%) and relating the chief complaint to work (59.7% from 30.0%). Detailed occupational history taking remained low throughout the study, but demonstrated a doubling in documentation after training (16.1% from 8.6%). Chiropractic interns and clinicians should be adequately trained on occupational health history documentation practices as they are likely to care for work-related injuries. Short training modules appear to be effective in demonstrating small changes in the documentation related to occupational history taking. The assessment of occupational history taking of chiropractic interns provided data for further educational interventions preparing chiropractic students to address work history in their clinical encounters, even in patient populations that are not currently engaged in traditional employment, which could be modeled in other clinical settings.

Individuals in transitional housing programs often have a goal of reaching stable employment, but the unique needs and barriers for achieving this warrants further study. Chapter 7 reports the results from administering a structured interview guide orally. Descriptive data analysis was done for this exploratory mixed-methods study. Commonly reported reemployment challenges included legal barriers and unmet transportation, housing, and financial needs. More than two-thirds of residents reported no place to live after the program regardless of if they had previous precarious housing. Emerging themes included challenges regarding sufficient time for the transition to being employed, fear of relapse, and lack of long-term goals and planning. Findings suggest that residential rehabilitation programs are an important resource. While these programs tend to focus on reemployment, their

SUMMARY (continued)

services could be enhanced by assessing individual needs and allowing for variation in reemployment preparation.

These projects developed reliable tools and baseline data that can be used to further explore these issues. The results, added to the growing body of literature on these topics, can be applied to inform the design of comprehensive and collaborative programs to address the intersection of health and work in those without stable housing, acknowledging the protective effects of employment on securing and maintaining stable housing.

1. INTRODUCTION

Anti-homeless rhetoric has increased in recent years with frequent news stories highlighting the burdens of this population and the responses proposed by government officials at local and national levels (Chiu, 2019; Dougherty, 2019; Rucker & Stein, 2019). This is happening simultaneously with policy changes designed to limit other safety-net social benefits such as food assistance and unemployment benefits to those having qualifying active employment, volunteer work, or participation in a reemployment program (Karpman, Zuckerman, & Gonzalez, 2018). While these changes can have drastic consequences, it is not always clear what data is driving these changes and how the impact of these changes will be assessed.

The Social Determinants of Health (SDH) model (World Health Organization, 2010) provides a framework that integrates structural and intermediary determinants and how they impact health and well-being. In this work, the structural mechanisms of societal values and social and public policies along with the socioeconomic position, focusing on occupation and income, inform the intermediary determinants of material circumstances such as living conditions, behavior and biological factors, and psychosocial factors, which combined with the mediating effects of the health system, impact health and well-being. A key tenet of the World Health Organization (WHO) in addressing SDH is that changes cannot just be to the intermediary determinants, but interventions and policies need to be developed to reduce health inequities (World Health Organization, 2010). There is a growing imperative for accurate data to inform policies that address unstable housing or homelessness, reemployment and healthy work, and the healthcare of these populations that are deeply affected by health inequities.

2. LITERATURE REVIEW

2.1 Unstable or Lack of Housing

The bidirectional link between work and health is well established and working towards mitigating disparities in these areas could have substantial impacts on the lives of those that are deeply impacted by poor health and a lack of work. Individuals without stable housing are one key group in which both of these attributes are both severe and chronic. This is a diverse group of individuals with unique needs for assistance with employment, health care, and the transition back into mainstream society if they choose. There are subgroups of those with unstable or lack of housing including the chronically homeless (homelessness lasting greater than 1 year or 4 episodes in the past 2 years), the intermittently homeless (episodes that alternate with housing or institutional care), and transitional or crisis homelessness (homeless less than 1 year or 2 times or less) (Fazel, Geddes, & Kushel, 2014).

Stable employment is a critical determinant of their success in these efforts. While many subgroups of this population, such as the mentally ill, teens, LGBTQ individuals, and veterans, have been studied in-depth, there is little published on meeting the needs of the broader diverse groups of individuals with unstable or lack of housing. Exploration of health care utilization, interactions with health providers, and the self-perceived needs of those without stable housing regarding past, present and future employment should be done to inform program and service development for this group of individuals as they seek employment. Failing to properly assess these elements may result in their needs not being met despite investment in this effort.

2.2 Case Definition for Homelessness

Many definitions of homelessness exist leading to confusion of who qualifies as homeless and what services they may access. For the purpose of this study, we are using the definition provided under US law,

“(a) IN GENERAL For purposes of this chapter, the terms “homeless”, “homeless individual”, and “homeless person” means—(1) an individual or family who lacks a fixed,

regular, and adequate nighttime residence; or (2) an individual or family with a primary nighttime residence that is a public or private place not designed for or ordinarily used as a regular sleeping accommodation for human beings, including a car, park, abandoned building, bus or train station, airport, or camping ground; or (3) an individual or family living in a supervised publicly or privately operated shelter designated to provide temporary living arrangements (including hotels and motels paid for by Federal, State, or local government programs for low-income individuals or by charitable organizations, congregate shelters, and transitional housing); or (4) an individual who resided in a shelter or place not meant for human habitation and who is exiting an institution where he or she temporarily resided; or (5) an individual or family who— (A) will imminently lose their housing, including housing they own, rent, or live in without paying rent, are sharing with others, and rooms in hotels or motels not paid for by Federal, State, or local government programs for low-income individuals or by charitable organizations, as evidenced by— (i) a court order resulting from an eviction action that notifies the individual or family that they must leave within 14 days; (ii) the individual or family having a primary nighttime residence that is a room in a hotel or motel and where they lack the resources necessary to reside there for more than 14 days; or (iii) credible evidence indicating that the owner or renter of the housing will not allow the individual or family to stay for more than 14 days, and any oral statement from an individual or family seeking homeless assistance that is found to be credible shall be considered credible evidence for purposes of this clause; (B) has no subsequent residence identified; and (C) lacks the resources or support networks needed to obtain other permanent housing” (US Code, 2012).

In this document, homeless or homelessness will be used when that is the term used by the reference or coding system. Otherwise, in order to acknowledge the differences in definitions and the broad scope that definitions of homeless cover, the terminology of individuals affected by unstable or lack of housing will be used.

2.3 Epidemiology

In the US, counts of homeless are done using annual point-in-time counts of sheltered individuals nightly during a 10-day period in January and biannual counts of unsheltered individuals (Fazel et al., 2014). These counts are likely underestimates as they would miss those that are staying with others temporarily and not on the street or in a shelter. It is estimated that in the USA there are 2.5 to 3.5 million homeless individuals annually, with a point-in-time estimate of 610,042 in any given night (Fazel et al., 2014). The January 2015 point-in-time estimate indicated that 564,708 people in the US were experiencing homelessness (Homelessness Research Institute & National Alliance to End

Homelessness, 2016). Homeless individuals are concentrated in urban centers, which may be a result of a concentration of shelters and social services in those areas (Alexander-Eitzman, Pollio, & North, 2013).

2.4 Associated Factors

There are also subpopulations of those with unstable or lack of housing that are often studied in silos; such as the formerly incarcerated, the LGBTQ community, veterans, HIV positive individuals, those affected by substance abuse, those affected by mental illness, youth, unemployed or precariously employed, and those in poverty (Fazel et al., 2014; Homelessness Research Institute & National Alliance to End Homelessness, 2016). Some of these studied subgroups represent risk factors for homelessness, however, other major life stressors such as a health crisis, divorce, or death of a loved one can also be a risk factor (Fazel et al., 2014). Unstable or lack of housing can also be a risk factor for worse health, including both chronic and infectious diseases (Fazel et al., 2014).

2.5 Health Conditions

Those with unstable or a lack of housing are at an increased risk and severity of many health conditions. Infectious diseases, such as tuberculosis, hepatitis, and HIV, present a much higher burden on this population in comparison with the general population (Fazel et al., 2014). Additionally, chronic infestations of scabies and lice are common (Fazel et al., 2014). Additionally, chronic and age-related conditions are common in this population as these conditions affect the homeless 10-15 years earlier than the general population and the median age of the homeless is approximately 50 years old in the US (Fazel et al., 2014). Age-related health concerns for this population include falls, cognitive impairments, functional impairments, and urinary incontinence (Fazel et al., 2014). Chronic health concerns for those in the US include substance abuse, mental illness, hypertension, diabetes, cardiovascular disease, and potentially stroke (Fazel et al., 2014). Unintentional injuries are also common and the homeless are likely to seek care for falls, cold-related injury, burns, poisoning, assaults, and traumatic brain injury (Fazel et al., 2014). Homeless individuals are more likely than non-homeless to seek care at an

emergency department or hospital, but less than 10% are responsible for more than 50% of visits (Fazel et al., 2014). Frequent users are more likely to have substance abuse and mental disorders (Fazel et al., 2014; Lam, Arora, & Menchine, 2016; Lin, Bharel, Zhang, O’Connell, & Clark, 2015; Mitchell, León, Byrne, Lin, & Bharel, 2017).

2.6 Health Care Utilization

Health care utilization patterns of the homeless may lend insights to programmatic and service needs of this population (Hwang & Burns, 2014). Discharge to medical respite programs has demonstrated some success in limiting readmissions, but it was more common for discharge to be to other settings (own care, nursing homes, etc.) which did not achieve similar results (Kertesz et al., 2009). Safety-net hospitals, which are more likely to serve this population, employed fewer strategies to reduce readmissions (Figueroa, Joynt, Zhou, Orav, & Jha, 2017). Additionally, the Patient Protection and Affordable Care Act implementation (January 1, 2014) may allow for increased access of care outside of emergency departments, but this population has shown frequent hospitalizations and emergency department visits despite this coverage which may be due to a lack of alternative services (Lin et al., 2015). Therefore, more comprehensive interventions are indicated to better address the health needs of those with unstable or lack of housing.

Studies currently tend to look at hospital data covering very short periods of one year or less, restricted to specific facilities serving small geographic regions, include only those identified as homeless through newly implemented screening questionnaires rather than general ICD coding, and limit their inclusion criteria to specific populations such as veterans or the mentally ill (Cheung et al., 2015; Feldman et al., 2017; Lin et al., 2015; Montgomery, Dichter, Thomasson, Roberts, & Byrne, 2015). Therefore, looking at all individuals coded as homeless in state-level data comprising of outpatient and inpatient cases over an extended time frame is a unique feature of this study and will provide system-wide information on health care utilization and needs of this population.

2.7 Occupational History Taking

Occupational illnesses and injuries are a major health burden. In general practice, work-related diseases most commonly involve musculoskeletal complaints of the low back, neck, and shoulder pain (Weevers, van der Beek, Anema, van der Wal, & van Mechelen, 2005). Because of this, clinicians should understand the role of work in many conditions, however, few clinical programs include occupational health as a major focus in their training (Gehanno et al., 2014; Wynn, Aw, Williams, & Harrington, 2003). There are simple employment screening questions that may be included in a patient intake that screen for potential health problems related to work and can be expanded on if indicated (Taiwo, Mobo, & Cantley, 2010). While it is largely accepted that clinicians should assess the contribution of work on health concerns, few health histories contain information beyond a simple description of the current occupation, ignoring work histories and potential on-the-job hazards (Politi, Arena, Schwerha, & Sussman, 2004; Shofer, Haus, & Kushner, 2006). This is in stark contrast to other information routinely collected in clinical visits, such as gender and age, and can vary based on patient characteristics (gender, etc.) (Politi et al., 2004). Additionally, while occupational intake questionnaires help reveal a relationship between presenting symptoms and signs and job hazards in an estimated 23% of patients the use of these questionnaires decreased detailed occupational history documentation in patient charts suggesting that simply including a questionnaire is not sufficient (Thompson, Brodtkin, Kyes, Neighbor, & Evanoff, 2000). Other studies have indicated that intensive focused training may be effective in increasing the number of questions asked related to potential occupational and environmental exposures (Storey et al., 2001). There are many suggested methods for training programs, with worksite visits and case studies demonstrating effectiveness (Braeckman et al., 2009).

There are currently no studies on the occupational history taking attitudes and behaviors of chiropractic interns despite the focus on treating musculoskeletal diseases by chiropractors. In addition, the clinical settings in which patients seek health care is diverse, with 35 million Americans receiving

chiropractic care in 2015 (Daly, 2015). Training programs involving occupational history taking needs to be expanded throughout the health care system.

2.8 Inadequate or Lack of Employment

Adverse effects on individual well-being as a result of unemployment are well-documented in the literature (Vuori, Blonk, & Price, 2015; Wanberg, 2011). While employed individuals reap a multitude of benefits, including earned income to purchase necessities and the ability to participate in societal structures, both physical and psychological health may be diminished when an individual loses or is unable to attain employment (Jahoda, 1982). Unemployment and underemployment are key elements relating to the ability to secure housing (Burke, Johnson, Bourgault, Borgia, & O'Toole, 2013).

There are many reasons that an individual may become unemployed, each with its own set of impacts on the individual's employment prospects. Shifts towards part-time, contingent work over the past several decades have led to increased job insecurity across the labor market (Vuori et al., 2015). These changes are further exacerbated among already vulnerable job-seeking populations, including those who have been previously incarcerated, those who have unstable housing or a lack of housing, and those in other precarious positions.

Individuals with unstable or lack of housing experience many barriers to employment. The same characteristics that contribute to unstable or lack of housing often serve as barriers to obtaining and maintaining employment. Those who experience homelessness may have been formerly incarcerated or may experience issues with substance abuse, mental health, disability, or any combination of these concerns (Zlotnick, Robertson, & Tam, 2002). Individuals who experience these phenomena often have large gaps in their employment histories, posing difficulties when they attempt to re-enter the labor force. These factors further exacerbate perceptions of employment prospects prior to finding work and job security once employed (Shier, Jones, & Graham, 2012). Additional considerations that make

securing employment difficult for those with unstable or a lack of housing include inconsistent access to a mailing address, phone, and internet.

2.9 Life Stressors

Incarceration immediately results in unemployment and may drastically reduce an individual's ability to become re-employed in the future (van der Geest, Bijleveld, Blokland, & Nagin, 2014). High rates of incarceration among low-skilled minority men further exacerbate difficulties that this population faces when seeking employment. There is some evidence that employers statistically discriminate against individuals who are members of highly incarcerated racial groups, regardless of their criminal records (Holzer, Raphael, & Stoll, 2003). Low-skilled workers already face job insecurity in the current labor market, as many applicable jobs that are available to these workers are considered contingent work, where employees can be laid off at will and do not receive employer-provided benefits (Vuori et al., 2015). Low-skilled minority workers who have also previously been incarcerated face a multitude of barriers such as disengagement, neighborhood social and economic climate, and low social support when seeking employment and difficulties obtaining employment after release from prison have been linked to high rates of recidivism (Mears, Wang, & Bales, 2014).

Re-entry into the labor force after being incarcerated is difficult. Various studies have shown that employers are less likely to hire individuals who have been incarcerated, citing concerns related to the reliability and general trustworthiness of former inmates, as well as liability concerns for their companies (Holzer et al., 2003; Mears et al., 2014; Scott, 1986). In times of economic recession, formerly incarcerated individuals have an even harder time obtaining work, as employers are more likely to hire individuals without criminal records (Bushway, Stoll, & Weiman, 2007). Conversely, employers are more likely to hire ex-offenders when the unemployment rate is low. There is evidence that employers are more likely to hire formerly incarcerated individuals who have participated in programs accessed

through recognized intermediary agencies, such as the Welfare-to-Work Partnership and America Works (Holzer et al., 2003).

2.10 Services Provided

Many agencies and organizations provide services to these populations to aid with reemployment. Despite there being many programs designed to rehabilitate and facilitate integration into society and into the workforce, there are relatively few studies that evaluate their effectiveness and most use participant self-reports and official records to measure rates of recidivism, usually within one year of program completion (Wright, Zhang, Farabee, & Braatz, 2014). There is evidence that programs that provide vocational skills training help workers to reenter the workforce following a long-term absence and employers are more likely to hire formerly incarcerated individuals who have participated in programs accessed through recognized intermediary agencies (Graham, Jones, & Shier, 2010; Holzer et al., 2003). However, many reemployment programs focus primarily on job-specific skill training without addressing basic needs, such as transportation and housing, that may impact an individual's ability to obtain and maintain employment in the long term (Hodgson & Turner, 2003). Despite these concerns, these reemployment services serve as important sources of support for vulnerable populations who are attempting to reenter the labor force. Newer reemployment programs employing supportive employment and individual placement and support models have shown positive results in subgroups of the population, such as the severely mentally ill and disabled, that would likely be replicated in the general population (Frederick & VanderWeele, 2019). Questions remain related to the feasibility and cost-effectiveness of delivery of these reemployment programs to more general populations.

While there is a conceptual framework in public health that posits that addressing structural resources and assessing needs may positively impact outcomes (World Health Organization, 2010), there is little evidence that suggests that reemployment programs systematically assess needs and

perceptions of individual participants before or upon entry into these programs (Wright et al., 2014; Zweig, Yahner, & Redcross, 2011). Additionally, while these programs often serve vulnerable populations, the services provided may be the same regardless of unique individual needs and life circumstances. Therefore, it is important to assess if and how the needs of individuals within these programs differ.

2.11 Policies and Legal Protections

Policy and legal protections for these groups related to employment and housing are lacking. In fact, individuals experiencing homelessness have no explicit protections at a federal level, but some states, like Illinois, have laws stating individuals experiencing homelessness cannot be discriminated against for employment because they lack a fixed address (Illinois Compiled Statutes, 2013). On the other hand, individuals currently using drugs have limited employment protections and are specifically omitted in the amendments to the Civil Rights Act that relate to employment discrimination. However, there may be protections for those in treatment for past drug and/or alcohol addiction under the Americans with Disabilities Act, Rehabilitation Act, and Federal Medical Leave Act (Code of Federal Regulations, 2018; US Code, 1995). There are no legal protections for ex-offenders related to housing and employment discrimination despite ex-offenders often having conditions of probation that include the probation officer's approval of housing and the requirement to maintain formal employment (Illinois Compiled Statutes, 2018; US Code, 2008).

3. METHODS

3.1 Scope

The specific aims of this project are to [1] describe health care utilization of individuals with a lack of housing or affected by homelessness using the Illinois Hospital Discharge database, [2] assess chiropractic interns' attitudes and behaviors towards occupational history taking at a clinic serving a population affected by unstable or a lack of housing and behavior changes following occupational health assessment training, and [3] evaluate needs for a comprehensive return to work program among residents of a residential work rehabilitation program for individuals with unstable or lack of housing by assessing past, present and future employment needs and expectations within this vulnerable population. The sub-aims for each are as follows:

Aim 1: Describe the health care utilization of individuals with a lack of housing or affected by homelessness using the Illinois Hospital Discharge database.

- i. Estimate the range of probable repeat visits to estimate the total number of unique homeless patients.
- ii. Describe the number of unique outpatient and inpatient visits in Illinois from 2011-2018 in terms of patient demographics, the reason for visit, type and severity of injuries, causes of injury, comorbidities, location, type of payment and cost, and place of discharge.
- iii. Assess differences before and after the initiation of the Affordable Care Act enrollment (first coverage data January 1, 2014) in Illinois in the number of individuals with a lack of housing or affected by homelessness treated in hospitals, the number of uninsured (self-pay and charity cases) and cost of treatment (total charges).
- iv. Stratify analyses by known subgroups.

Aim 2: Assess chiropractic interns' attitudes and behaviors towards occupational history taking at a clinic serving a population affected by unstable or a lack of housing and behavior changes following occupational health assessment training.

- i. Describe the frequency of occupational history taking of chiropractic interns compared to other standard elements of clinical history taking.
- ii. Develop an occupational history training module for chiropractic interns.
- iii. Assess the effects of a short training on chiropractic intern occupational history taking.
- iv. Describe the attitudes and beliefs of chiropractic interns in regard to occupational health and history taking before and after training.

Aim 3: Evaluate needs for a comprehensive return to work program among residents of a residential work rehabilitation program for individuals with unstable or lack of housing by assessing past, present and future employment needs and expectations within this vulnerable population.

- i. Develop a questionnaire to assess reemployment needs among those in residential programs affected by unstable or a lack of housing.
- ii. Assess this tool through cognitive interviews.
- iii. Describe the self-perceived past, present and future assets, needs, and barriers to reemployment among individuals with unstable or lack of housing.
- iv. Identify areas of priority for programmatic development for the reemployment of individuals with unstable or lack of housing.

3.2 Methods for Illinois Hospital Utilization of Those Affected by Homelessness (Chapters 4 and 5)

3.2.1 Data Source

Data from the Illinois Hospital Discharge Database for years 2011-2018 was used to identify outpatient and inpatient visits where patients are identified as having a lack of housing or affected by homelessness at the time of the clinical visit. The outpatient database includes all patients treated in

emergency rooms for less than 24 hours who were not admitted to the hospital. The inpatient database includes all patients treated for 24 hours or more for any medical reason. Both databases are based on billing records and include variables on patient demographics (age, gender, race/ethnicity), exposure (mechanism of injury), health outcomes (diagnoses, hospital procedures, discharge status), and economics (hospital charges, payer source). Based on the annual state audit of hospitals, the hospitals included in the datasets used for this analysis comprise 96.5% of all patient admissions statewide (Illinois Department of Public Health; Illinois Health Facilities and Services Review, 2013; Lale, Krajewski, & Friedman, 2017). This project is covered under UIC IRB (#2008-0060; Appendix A) approval.

3.2.2 Case Ascertainment

Patient visits with a billing code of V60.0 for “lack of housing” (*International Classification of Diseases, Ninth Revision* [IDC-9; Geneva, Switzerland: World Health Organization; 1980]) or the equivalent code of Z59.0 for “homelessness” (*International Classification of Diseases, Tenth Revision* [IDC-10; Geneva, Switzerland: World Health Organization; 1992]) were identified as cases in accordance with previous studies using hospital data to examine homelessness (Kanak, Stewart, Vinci, Liu, & Sandel, 2018). Alternative codes for inadequate housing (V60.1), which refers to poor infrastructure and unspecified housing or economic circumstances (V60.9), were not included in the case definition despite their inclusion in broader definitions (Peterson et al., 2015) because HUD uses a narrow definition for its estimates and we are unable to verify unstable or lack of housing as opposed to inadequate housing.

The CDC crosswalk between ICD-9 and ICD-10 recommends that V60.0 is equivalent to Z59.0. The difference in coding reflects the transition in the U.S. in Q4 of 2015 from ICD-9 to ICD-10. The coding schemas for ICD-9 and ICD-10 codes are essentially capturing the same type of homeless population despite the slight change in terminology. The ICD-9 V60.0 code captures persons with a lack of housing and explicitly identifies the following subgroups: hobos, social migrants, tramps, transients, and vagabonds. The ICD-10 Z59.0 code captures persons with a lack of housing (permanent) (temporary) or

shelter and explicitly identifies the following subgroups: nomad, nomadism (i.e. new term for hobo), social migrant, tramp, transient, vagabond, vagabondage, and vagrancy.

3.2.3 Identifying Unique Patients Using Probabilistic Linkage

Probabilistic linkage methodology was used to estimate unique individuals using direct matching (Lale et al., 2017). Because individuals affected by homelessness are more likely to be highly transient geographically, we provide three estimates for unique cases: (1) cases per year that match by date of birth, gender, ethnicity, and zip code are treated as the least conservative of unique individuals because they allow someone that moved to a different zip code within that year but had multiple visits to be counted as separate individuals; (2) matched cases on date of birth, gender, and ethnicity were used to identify a moderate estimate of unique individuals; and (3) matched cases by date of birth and gender to identify the most conservative estimate of unique individuals as it is likely that multiple individuals could have the same date of birth and gender and would be counted as one unique person. These variables were chosen because they were nearly universally reported and are not specific to a reason for the visit which may change within the year.

3.2.4 Identifying Unique Visits Using Probabilistic Linkage

Using probabilistic data linkage methodology, we identified unique hospital visits. Identifying duplicates within datasets was done by using the facility, attending clinician, principle ICD code, date of birth, gender, zip code, date of admission, and date of discharge. Then we manually screened these duplicates to identify truly mismatched ICD codes. Duplicates can result from system errors (e.g. a record is submitted twice after data entry), errors between coders (e.g. two or more coders accidentally enter a patient's information twice), or from quality control practices at facilities that intentionally have two coders enter the same patient information. In addition, duplicate entries occur from split billing and sequential billing practices. Split billing generally is used when separate bills are issued for treatment by different specialists during a single hospitalization (e.g. neurologist, endocrinologist, and surgeon). The

patients will have multiple records for the same period of time, but the diagnoses may differ substantially based on the treating physician's specialty. Sequential billing occurs in some hospitals where patients have multiple records with identical diagnoses, but different and consecutive admission and discharge dates. These occur primarily among patients with long lengths of stay. This resulted in removing 4,318 duplicates for a final sample of 154,173 patient visits for those with an ICD code for homelessness.

3.2.5 Covariates

Key variables summarized include patient characteristics (gender, age, race and ethnicity), facility information (name, location, trauma level), length of stay, total hospital costs, insurance coverage, discharge status, the reason for visit, comorbidities, and acute injuries. Metropolitan areas were designated using the US Department of Agriculture (USDA) Rural-Urban Continuum Codes (US Department of Agriculture Economic Research Service, 2013). Total hospital charges is the sum of all procedure, service and facility charges accumulated from the point of admission to discharge. Total hospital charges are in 2018 US dollars adjusted for annual inflation using the Bureau of Labor Statistics (BLS) Consumer Price Index (CPI-U) (US Bureau of Labor Statistics, n.d.). Hospital charges are a proxy measure for cost, but may not directly reflect reimbursement rates, resource consumption or comprehensive economic costs. As data were coded using both the ICD9 and ICD10 classification systems, diagnoses were categorized and crosswalked to summarize groups of conditions. There were 10,448 (6.8%) visits without a coded primary diagnosis, primarily in outpatient visits (n=9,470; 90.6%). The Elixhauser Comorbidity Index was used to assess comorbidities (Elixhauser, Steiner, Harris, & Coffey, 1998).

3.2.6 Statistical Analysis

All statistical analyses were conducted using SAS software (v.9.4; SAS Institute Inc., Cary, NC).

Data from the U.S. Department of Housing and Urban Development (HUD) annual estimates of homelessness based on PIT counts for Illinois were used as a comparison (US Department of Housing and Urban Development, 2018). Crude autoregressive models using maximum likelihood estimation were run to test the significance of the temporal trend. We did not observe evidence of serial correlation based on the Durbin-Watson statistic.

As part of the descriptive analysis, we compared demographic characteristics, geospatial trends, temporal trends, primary diagnosis, comorbid conditions, and hospital course of treatment measures. An adjusted multivariable logistic regression model was developed to evaluate predictors of being discharged to a healthcare facility versus being routinely discharged to home or self-care, which for this population likely meant returning to a state of homelessness. Statistical evaluation of covariates, as well as a priori knowledge, was used to determine the inclusion of covariates in the final models. The final model included patient characteristics (gender, age, race and ethnicity), insurance coverage, operations, acute injuries, diagnoses, and comorbidities. A modified Elixhauser comorbidity index was created for this purpose that excluded depression and psychoses. These groups were modeled separately as crude analysis demonstrated a difference in discharge status based on these comorbidity groups. No evidence of multicollinearity among the independent variables was indicated. A two-sided p-value of less than 0.05 was considered statistically significant.

3.3 Methods for Occupational Health History of Chiropractic Interns (Chapter 6)

3.3.1 Study Site

The study site was a unique clinical setting as it was embedded in a residential rehabilitation program in which up to 174 individuals reside and participate in work rehabilitation. The program lasts up to one year and residents attend counseling and substance abuse recovery programs, work in various occupations within the program, and prepare for employment after completing the program. Many of these residents have experienced precarious housing, incarceration, unemployment, and other life

stressors before joining the program. There is a high turnover of residents, with approximately 50% new to the facility at any given time. Chiropractic interns staff an on-site clinic to perform physicals and address other health concerns for the residents and employees under the supervision of a licensed chiropractor. All residents are required to have a physical exam but are not required to continue care.

3.3.2 Study Population

The interns at the clinic are students completing their last year of the chiropractic program. Students are prioritized to select their clinic location by grade point average and can choose whichever site they prefer until the spots are all filled. The interns see patients at their clinic under the direction of a supervising clinician. Interns may see patients alone or in partnership with another intern depending on the experience level of the intern and the complexity of the patient visit. The clinic internship takes one year to complete. This project received Institutional Review Board approval ((UIC #2016-0213; Appendix B and NUHS #H-1504; Appendix C).

3.3.3 Subject Enrollment

The training program was designed as a case-crossover study with each intern acting as their own controls, as well as allowing for comparisons between intern cohorts. Interns participate in their clinical internships for a total of 3 trimesters, and so five intern cohorts comprising of 20 interns in total were enrolled in the study for a duration of one to three trimesters of their internships (Figure 1). As this was the first clinical experience for the students, the questionnaire was given to all interns at the midpoint of each trimester. Students received the questionnaire each trimester enrolled in the study in the middle of the trimester. If they receive the training that trimester, it was done at the beginning of the trimester.

3.3.4 Behavior Tracking Tool

The behavior tracking tool (Appendix D) was designed to be filled out by the supervising clinician as they review patient charts completed by interns. Prior to the study, charts included a standard

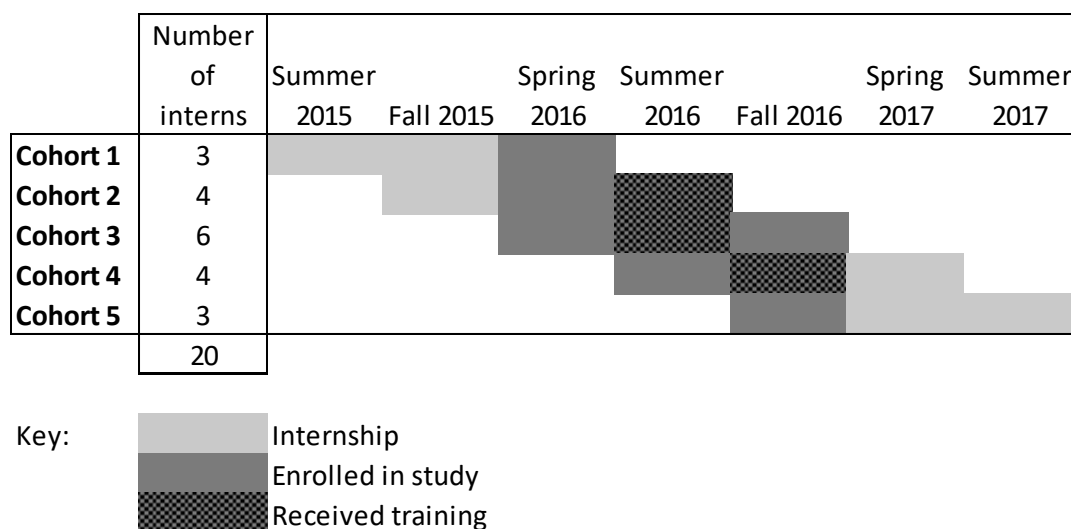


Figure 1. Intern enrollment in the study.

medical history form that contained a question asking “What is your occupation?” There was no change throughout the study period to the standard forms used in the clinic. The data instruments were developed from the existing literature that discusses health professional students taking of occupational history relative to other components of the history (Politi et al., 2004). The supervising clinician recorded whether the intern captured the additional key elements of a patient’s occupational history as well as smoking history, use of medications and gender. This was evaluated exclusively by looking at the patient chart and did not include any additional information that may have been discussed but not documented.

A subset of patient files (n=50; 24.75%) was reviewed by the PI to assess the reliability of the behavior tracking tool using percent agreement and Cohen’s kappa with 95% confidence intervals based on nonzero standard errors using WinPepi. The reliability of the behavior tracking tool between the principal investigator and supervising clinician was high overall (94% agreement; Cohen’s kappa = 0.88, 95% CI 0.82-0.93; Table I). There were moderate to high levels of agreement per question as well (Table I).

Table I
RELIABILITY OF THE BEHAVIOR TRACKING INSTRUMENT

	% Agreement	Kappa	95 % Confidence intervals
Overall	94.0%	0.88	0.82 to 0.93
Current Occupation	94.0%	0.7	0.38 to 1.00
Past Occupation	88.0%	0.74	0.55 to 0.93
Detailed Occupational History	98.0%	0.66	0.03 to 1.00
Chief Complaint Related to Work	94.0%	0.86	0.72 to 1.00
Gender	98.0%	X	
Smoking History	92.0%	X	

3.3.5 Chiropractic Intern Questionnaire

A questionnaire was developed by the PI with input from an occupational medicine physician and chiropractic physician to assess the attitudes, beliefs, and self-perceived behaviors of the chiropractic interns regarding the taking of occupational histories (Appendix E). Intern demographics and training information were also queried. The questionnaire remained the same for each iteration (three total) with only the sample case presentation changing in each version. The case presentation was a very brief vignette that had a series of questions attached to determine what additional information interns would like to know and how they would proceed with the hypothetical clinical encounter. The survey was developed with input from a chiropractor and occupational medicine experts. It was tested using a NUHS intern that was not included in the study group.

3.3.6 Training Program

Interns that had completed at least one trimester of their internship and had not completed a previous occupational history training session (no intern had previously participated in a prior training session) participated in the training session within the first month of the trimester. The one-hour

training session on occupational history taking was developed based on materials used by occupational health experts, including occupational medicine physicians, and other materials (Forst, Nickels, & Conroy, 2009; Haddon, 1968; National Institute for Occupational Safety and Health, 2012; Politi et al., 2004; Taiwo et al., 2010; Yu, 2015). Similar to other in-service training sessions during their internships, the training session was mandatory, took place mid-week at the end of the shift, and lasted approximately one hour. It was conducted by the PI and consisted of a discussion on the importance of occupational history taking, utilization of an occupational history template, working through a case study as a group, performing hazard categorization, and familiarizing themselves with online resources (Appendix F). Interns were trained to gather information regarding past occupations, detailed occupational history of workplace hazards and tenure, and whether the chief complaint was related to current or past work, but these questions were not added to the official medical history forms. The interns were required to remember to ask and document the responses to these questions.

3.3.7 Statistical Analysis

Survey data were analyzed descriptively for this exploratory mixed methods study comparing responses before and after training. The behavior tracking and survey closed-ended responses were analyzed using SAS software for all statistical analyses (v.9.4; Cary, NC), while the survey open-ended responses were assessed in Microsoft Excel using content analysis to identify responses related to the context and application of self-perceived clinically relevant occupational health behaviors (Vaismoradi, Turunen, & Bondas, 2013). Tests of significance were conducted to compare changes pre- and post-training related to the items asked on the behavior tracking form (Table II). However, these were not reported in the manuscript as the data structure was conditional but not directly matched which does not meet the conditions for the chi-square, Fisher's exact two-sided, or McNemar's tests.

A generalized estimating equation (PROC GENMOD) was used to assess behavior changes pre- and post-training using a binary distribution and Toeplitz working correlation structure. The main fixed

Table II
TESTS OF SIGNIFICANCE FOR CHANGES IN CHARTING BEHAVIORS PRE- AND POST-TRAINING

	Chi-square	Fisher's two-sided	McNemar's
Current Occupation	0.17	0.23	<0.01
Past Occupation	<0.01	<0.01	<0.01
Detailed Occupational History	0.11	0.14	<0.01
Chief Complaint Related to Work	<0.01	<0.01	0.04
Gender	X	X	X
Smoking History	X	X	X
Medications	0.50	1.00	<0.01

effect is training completion and the individual intern is a random effect. Fully adjusted models included intern gender, intern age, intern GPA, and the presence of an additional intern in the encounter. This was also modeled using a generalized estimating equation (PROC GENMOD) using a binary distribution and both compound symmetry and unstructured working correlations and a conditional logistic regression model (PROC LOGISTIC). The generalized estimating equation models were more precise as they took the changes across time into account. Models using unstructured working correlations did not converge. Models using compound symmetry were not profoundly different than the Toeplitz (Table III), but Toeplitz was used as it is a moving average correlation structure and best represents the patterns seen in the data related to changes in documentation each month after training.

To assess multicollinearity, a regression model was run (PROC REG) to determine tolerance and variance inflation factor (VIF). Multicollinearity was not present in any model using criteria of tolerance greater than or equal to 0.1 and VIF less than or equal to 10.

Due to small numbers, cohort effects and visit types could not be properly evaluated as there were multiple cohorts that did not have measures after training because of the design of the follow-up. Grade point average (GPA) was imputed using the median GPA for one intern (twelve patient visits) that

Table III
HIERARCHICAL MODELS OF PRE- VERSUS POST-TRAINING CHARTING BEHAVIORS ASSUMING
COMPOUND SYMMETRY WORKING CORRELATION

	Crude				Fully Adjusted			
	OR	Confidence Interval		p-value	OR	Confidence Interval		p-value
Current Occupation	2.86	0.76	10.86	0.12	5.78	1.29	25.96	0.02
Past Occupation	2.68	1.00	7.16	0.05	2.67	1.03	6.94	0.04
Detailed Occupational History	2.00	0.65	6.14	0.23	2.81	1.06	7.45	0.04
Chief Complaint Related to Work	2.80	1.57	4.99	0.00	3.54	1.82	6.90	0.00

did not provide this information. Modeling using a continuous measure of days since training could not be completed due to the small sample size. To descriptively evaluate the effect of time from training on charting behaviors, a variable that reflects the time since training in months was created.

3.4 Methods for Reemployment Needs Assessment (Chapter 7)

3.4.1 Study Population

In this mixed-methods study, we recruited residents in a religious-based residential rehabilitation program in Chicago. This program has many locations nationwide. Despite the program being rooted in Christian beliefs, those not of those beliefs were allowed to participate if they completed the required activities of all participants. At this site, up to 174 individuals reside and participate in work rehabilitation. The program lasts up to one year and residents attend counseling and substance abuse recovery programs using the Alcoholics Anonymous model, meet with social workers, work in various occupations within the program, and prepare for employment after completing the program. Common jobs assigned to participants include reception, call centers, loading and unloading delivery trucks, retail, janitorial, and maintenance. Participants receive a small stipend, lodging, and meals for their work.

Participants come to the program via different pathways, including the criminal justice system, referral from other social services and charities, and self-referral. While not a requirement, many of these residents have experienced precarious housing, incarceration, unemployment, and other life stressors before joining the program. Participants advance through a 'levels' curriculum. There is a high turnover of residents as approximately 50% are new to the facility at any given time (level one). While there is no official data on reasons for this turnover, it is not from job placement through the program. Levels one through five take approximately one month each. Once the participant reaches level six, they remain at this level until they leave the program as they seek alternate housing and employment. While the program generally follows a traditional two-step approach to reemployment by focusing on issues such as substance abuse first, residents begin working within the program upon entry and begin reemployment-training beginning after one month.

Eligible study participants were adults who had reached level-two status and were fluent in English. It is uncertain exactly how many in the program are not fluent in English, but is estimated to be very few based on the requirements of the program. Level-two status is an internal criterion that reflects having been in the program long enough to be in the initial stages of preparing for reemployment. Convenience sampling was used.

The IRB-approved (UIC #2106-0278, Appendix G) consent document and initial parts of the recruitment process and interviews clearly articulated that qualification for services from their program was not contingent on their participation in this study. With input from the program director, it was determined that compensation would not be offered to participants as it may pose an undue influence due to their limited income and minimal expenses as they are residents in the program with full room and board provided at no cost.

3.4.2 Initial Interview Instrument

An initial questionnaire was developed with assistance from the UIC Survey Research Laboratory based on the known needs of those with unstable or a lack of housing, as well as the general population, when seeking future employment. The initial instrument (Appendix H) consisted of predominantly closed-ended questions with added structured and open-ended probes for constructs that may not have been readily understood by the respondent and for questions where appropriate response dimensions were unknown. Additional unstructured probes were used when the respondent seemed uncertain or when responses were inconsistent.

During the initial development stage, 12 cognitive interviews (Willis, 2004) were conducted with the target study population to assess respondent comprehension of survey questions and make revisions as needed. All interviews were conducted in-person at the residential facility by one interviewer with a request to audio record. Any additional information offered by the respondent to contextualize answers was also recorded. The interviewer had no affiliation with the rehabilitation program.

3.4.3 Cognitive Interview Results

Quantitative results from the cognitive interviews were excluded from the project manuscript as these questions were inconsistent between the various versions, particularly related to housing status before and after their time in the program. Variables that primarily overlap between questionnaire versions are reported here. Cognitive interviews lasted on average 42 minutes (range 25-61 minutes) and only one participant declined audio recording, which is similar to the main sample.

Cognitive interview demographics are reported in Table IV. Similar to the main sample, over 50% of cognitive interviewees reported educational attainment beyond a high school diploma and had, on average, more than 5 close friends and family members. Additionally, religious and spiritual beliefs were reported as being very or extremely important in their life (66.7%) and all participants reported being

born in the US. In contrast to the main sample, cognitive interviewees were more likely to be male, older, with more dependents, a member of the US Armed Forces, and married, separated, or divorced.

Demographic questions were altered based on feedback. As this was a religious-based recovery program, participants were asked about the importance of their religious beliefs. Participants felt this was not adequate, separating religion from spirituality, so both were incorporated into the question. Dependents were also defined as many participants said they had children, but they would not be considered dependents. While having other children in their life may be of importance, defining dependents as reliant on the individual for financial support and generally under 19 years of age was done to convey a measure of financial pressure and a potential employment barrier.

Only one cognitive interviewee stated having a job was somewhat important for their future (rather than extremely or very important). Similar to the main sample, finding a job was a priority to most participants and the majority were confident they would get a job in the next year (Table V). While these questions did not have much variation in responses and were not anticipated to be as helpful for analysis and potential modeling, they were kept as they helped build rapport and make the interviewee comfortable. Cognitive interviewees reported they would document, on average, three jobs on their resumes and it was an average of 3.8 months since they were previously employed.

One-fourth of cognitive interviews reported being previously discriminated against in finding or keeping a job. Over half felt overqualified for jobs they were applying for, while none felt underqualified. This is more pronounced in both directions than in the main sample. However, similar to the main sample, less than half reported overqualification as a barrier to getting a job. Cognitive interviewees also felt less confident in their computer skills versus other skills, as did those with a history of previous precarious housing (Table V). Here, the definition of “such as customer service skills, ability to get along well with coworkers and customers, and speaking with others” was added to the question asking about people skills based on how participants answered the probe asking them to identify what they think of when

TABLE IV
DEMOGRAPHIC CHARACTERISTICS OF COGNITIVE INTERVIEW PARTICIPANTS (n=12)

Categorical Variables	n	%
Male	11	91.7%
Race and Ethnicity		
<i>Non-Hispanic Black/African American</i>	7	58.3%
<i>Non-Hispanic White</i>	3	25.0%
<i>Non-Hispanic Native American/Alaskan Native</i>	2	16.7%
<i>Hispanic</i>	0	0.0%
<i>Other/Choose not to answer</i>	0	0.0%
Marital Status		
<i>Never been married</i>	4	33.3%
<i>Married</i>	1	8.3%
<i>Separated</i>	2	16.7%
<i>Divorced</i>	5	41.7%
Member of US Armed Forces	4	33.3%
Last Grade Completed		
<i>Less than HS</i>	1	8.3%
<i>HS Grad/GED</i>	4	33.3%
<i>Some college/vocational training</i>	5	41.7%
<i>College Degree</i>	2	16.7%
Continuous Variables	mean	range
Interview Length (minutes-average/range)	42	25-61
Age	51	42-56
Number of Dependents	1.9	0-7
Number of Close Relatives	5.2	1-15
Number of Close Friends	10.2	0-75

asked about people skills. Cognitive interviewees were slightly more likely to report both having attended job training programs that were helpful (58.3%) and attending job training programs that were not helpful (25.0%).

Cognitive interviewees did not report substantially different health, legal, or familial responsibilities barriers to reemployment (Table VI). Probes were included to define what was meant by the specific barrier so that these definitions could be incorporated into the question. For example, in the question related to legal barriers, the definition “Legal problems include anything that employers may look at regarding debt, jail, court, or interactions with police.” was added to the question based on participant input. There may have been an increase related to substance abuse problems currently affecting their ability to be hired or keep a job, but this may be due to how the question was asked. The original question had to be separated related to these problems previously affecting their ability to get or keep a job versus currently affecting their ability. As many were in active recovery from substance abuse, they saw it as having a very different impact on their life.

Additionally, all the barriers questions were expanded in that these barriers could also impact their ability to keep the job as well as get hired. Many participants reported that they could get a job, but some of these barriers would come to light within the first weeks of having a job that would result in termination. The majority of cognitive interviewees also were more likely to report the reasons for their unemployment were within their control (58.3%).

A matrix of needed supportive services was added based on responses. Participants identified additional needs that the program may or may not help meet, but were vital to a successful transition to stable employment. The needs most commonly identified, such as housing, transportation, employment services, and financial management, were added to the matrix and there were open fields so participants could identify others. Participants were also asked to indicate if they personally needed

TABLE V
PERCEIVED JOB PREPAREDNESS (COGNITIVE INTERVIEWS ONLY)

	n	%
How prepared do you feel to get a job?		
<i>Extremely/Very</i>	8	66.7%
<i>Somewhat</i>	4	33.3%
<i>Not very/Not at all</i>	0	0.0%
Right now, how much of a priority is finding a new job?		
<i>Extreme/Important</i>	10	83.3%
<i>Somewhat</i>	2	16.7%
<i>Not important/Not at all</i>	0	0.0%
How confident are you that you have enough _____ for the job you want?		
Math Skills		
<i>Extremely/Very</i>	9	75.0%
<i>Somewhat</i>	3	25.0%
<i>Not very/Not at all</i>	0	0.0%
Reading Skills		
<i>Extremely/Very</i>	10	83.3%
<i>Somewhat</i>	2	16.7%
<i>Not very/Not at all</i>	0	0.0%
Computer Skills		
<i>Extremely/Very</i>	6	50.0%
<i>Somewhat</i>	2	16.7%
<i>Not very/Not at all</i>	4	33.3%
People Skills		
<i>Extremely/Very</i>	11	91.7%
<i>Somewhat</i>	1	8.3%
<i>Not very/Not at all</i>	0	0.0%
Writing Skills		
<i>Extremely/Very</i>	6	50.0%
<i>Somewhat</i>	5	41.7%
<i>Not very/Not at all</i>	1	8.3%
Steps Taken in Current Job Search (n=9)		
<i>Thought about employment</i>	9	100.0%
<i>Attended job training program</i>	3	33.3%
<i>Prepared resume</i>	9	100.0%
<i>Attended job fairs</i>	1	11.1%
<i>Applied for jobs</i>	3	33.3%
<i>Attended interviews (1 missing data)</i>	1	11.1%
<i>Other</i>	5	55.6%

TABLE VI
BARRIERS TO REEMPLOYMENT (COGNITIVE INTERVIEWS ONLY)

To what degree does a _____ your ability to be hired or keep a job?	Great degree (n,%)		Moderate degree (n,%)		Small degree (n,%)		Not at all (n,%)	
<i>physical health condition or illness that you have been treated for currently affect</i>	0	0.0%	1	8.3%	4	33.3%	7	58.3%
<i>psychological or nervous condition that you have been treated for currently affect</i>	1	8.3%	2	16.7%	0	0.0%	9	75.0%
<i>past or present legal problems currently affect</i>	0	0.0%	4	33.3%	2	16.7%	6	50.0%
<i>past or present substance abuse problems currently affect</i>	2	16.7%	3	25.0%	0	0.0%	7	58.3%
<i>responsibilities to care for a child or other family member currently affect</i>	0	0.0%	1	8.3%	0	0.0%	11	91.7%

those services, if it was available in the program, if it was needed in the program, and any additional comments they had. The comments often identified ways in which services or policies did not adequately meet the needs they saw for themselves and/or others. While only asked in a subset of the cognitive interviews, these participants almost universally reported various employment needs of personal importance (Table VII). However, they were slightly less likely than the main sample to report that the program needing to provide these services with the exception of needing additional guidance on workplace interactions and expectations. For cognitive interviewees, the greatest reported disparity in need and provision of services was also related to funding for housing to assist in their transition to stable employment.

3.4.4 Additional Cognitive Interview Instrument Modifications

Cognitive interviews were conducted specifically in hopes of addressing concerns regarding identifying appropriate dependent measures for potential quantitative modeling, evaluate if participants' responses were consistent with realistic expectations, cognitive load specifically related to

TABLE VII
EMPLOYMENT PROGRAM NEEDS (COGNITIVE INTERVIEWS ONLY, N=9)

	n	%
Needs of Personal Importance (n=9)		
<i>Transportation</i>	9	100.0%
<i>Funding for Transportation</i>	8	88.9%
<i>Housing</i>	9	100.0%
<i>Funding for Housing</i>	9	100.0%
<i>Ability to Attend Job Fairs</i>	9	100.0%
<i>Knowledge of Hiring Companies</i>	9	100.0%
<i>Guidance for Interaction and Expectations</i>	9	100.0%
Program Needs (n=9)		
<i>Transportation</i>	5	55.6%
<i>Funding for Transportation</i>	7	77.8%
<i>Housing</i>	6	66.7%
<i>Funding for Housing</i>	8	88.9%
<i>Ability to Attend Job Fairs</i>	3	33.3%
<i>Knowledge of Hiring Companies</i>	3	33.3%
<i>Guidance for Interactions and Expectations</i>	7	77.8%

the job history matrix, length of the questionnaire, and privacy concerns particularly in regards to sensitive questions dealing with health, legal, housing, and employment issues. Based on participant responses and feedback, there were major modifications in the questionnaire.

Housing status was a critical construct used to group participants. Initially, there were three questions related to how many different places a participant lived in the past year, how many places they paid rent or a mortgage, and the places they stayed at without paying. This was completely revised to a different series of three questions related to having a place to live once leaving the program, if they have previous experiences of living someplace that did not own, rent, or were an invited guest, and the length of time they spent at those places. The questions related to housing status were completely reworked as respondents were unsure how to classify their living situation in the past year, especially

their stay at the facility. Also, these questions only addressed previous housing insecurity and did not account for future housing insecurity, which would be an important construct for transitioning from their current situation.

The initial questionnaire was inadequate in some domains. For example, the initial survey contained one question related to confidence in finding a new job in the next year. This was not sufficient, so additional questions were added to query the exact length of time they think it will take to get a job and what steps they have taken in their job search.

While there were many revisions to the original instrument, some anticipated changes were not needed. The job history matrix was left without changes as participants generally did not find it difficult to complete. Many even offered additional context such as why the employment ended. The survey was expected to be too lengthy, but participants overwhelmingly felt that the interview was an appropriate length and was not too difficult to complete.

3.4.5 Final Interview Instrument

Appropriate changes were made to the study inclusion criteria and questionnaire with regards to the development of response categories and question order, content, and wording. The final instrument also queried information regarding job histories, financial and social assets, and the respondents' motivation and expectations for their return to the workforce, which was determined to be of relevance and importance in the initial development stages (Appendix I). Thirty-nine residents were subsequently interviewed using the structured interview guide between August 2016 and July 2017 until response saturation was reached. All interviews were conducted in-person at the residential facility by one interviewer with a request to audio record. Any additional information offered by the respondent to contextualize answers was also recorded. The interviewer had no affiliation with the rehabilitation program.

3.4.6 Analysis

The interviews were transcribed into Microsoft Excel by a research assistant. Responses were read and re-read by the interviewer. Data were analyzed descriptively for this exploratory study comparing those who reported previous unstable housing to those who did not. The closed-ended responses using the final interview guide were analyzed using SAS 9.4, while the open-ended responses from all interviews were assessed in Microsoft Excel using content analysis. Content analysis allows for descriptive analysis of qualitative data similar to thematic analysis, while also taking into account a quantification of the qualitative data (Vaismoradi et al., 2013). This analysis primarily complemented the quantitative data and identified new concepts.

Coding was completed by the interviewer and another author listened to a subset of interviews to verify coding (5 (12.8%) interviews) in addition to reviewing the transcribed data file. As the interviews were structured, most responses fell within the code assigned each question; however, responses where new information emerged that highlighted information or topics were assigned new codes to represent this added information. Discrepancies between reviewers were discussed until both reviewers agreed on the final interpretation. Responses were left in the participants' words rather than recoded to reflect external definitions of variables, such as housing status.

4. COMPARISON OF STATE HOSPITAL VISITS WITH HOUSING AND URBAN DEVELOPMENT ESTIMATES OF HOMELESS, 2011-2018

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4.1 Introduction

As anti-homeless rhetoric has increased in recent years, there is a growing imperative for accurate data to inform policies that address homelessness (Chiu, 2019; Dougherty, 2019; Rucker & Stein, 2019). Annually, the US Department of Housing and Urban Development (HUD) publishes the results of an annual point-in-time (PIT) estimate of those suffering from homelessness by state. This estimate is the most widely used estimate of homelessness nationally and drives policy and funding, but it has been acknowledged that this count of sheltered and unsheltered individuals experiencing homelessness is an undercount (National Law Center on Homelessness & Poverty, 2017). Alternative data sources can be used to provide information to supplement these estimates. We aimed to evaluate hospital records for their value in augmenting homelessness counts at the state-level.

4.2 Methods

We used data from the Illinois Hospital Discharge Database for years 2011-2018 was used to identify outpatient and inpatient visits in which patients were identified as having a lack of housing or being affected by homelessness. The outpatient database includes all patients treated in emergency departments for less than 24 hours who were not admitted to the hospital. The inpatient database

includes all patients treated for 24 hours or more for any medical reason. Based on the annual state audit of hospitals, the hospitals included in the datasets used for this analysis comprise 96.5% of all patient admissions statewide (Illinois Department of Public Health; Illinois Health Facilities and Services Review, 2013). This project is IRB approved (Protocol #2008-0060). We used data from the U.S. Department of Housing and Urban Development (HUD) annual estimates of homelessness based on PIT counts for Illinois as a comparison (US Department of Housing and Urban Development, 2018).

We identified patient visits with a billing code of V60.0 for “lack of housing” (*International Classification of Diseases, Ninth Revision* [Geneva, Switzerland: World Health Organization; 1980]) or the equivalent code of Z59.0 for “homelessness” (*International Classification of Diseases, Tenth Revision* [Geneva, Switzerland: World Health Organization; 1992]) as cases in accordance with previous studies using hospital data to examine homelessness (Kanak et al., 2018). We did not include alternative codes for inadequate housing (V60.1), which refers to poor infrastructure, and unspecified housing or economic circumstances (V60.9), despite their inclusion in broader definitions (Peterson et al., 2015) because HUD uses a narrow definition for its estimates and we are unable to verify unstable or lack of housing as opposed to inadequate housing.

We used probabilistic linkage methodology to estimate unique individuals using direct matching (Lale et al., 2017). Because individuals affected by homelessness are more likely to be highly transient geographically, we provide three estimates for unique cases: (1) we treated cases per year that match by date of birth, gender, race/ethnicity, and zip code as the least conservative estimate of unique individuals because they allow someone that moved to a different zip code within that year but had multiple visits to be counted as separate individuals; (2) we used matched cases on date of birth, gender, and race/ethnicity to identify a moderate estimate of unique individuals; and (3) we used matched cases by date of birth and gender to identify the most conservative estimate of unique individuals as it is likely that multiple individuals could have the same date of birth and gender and

would be counted as 1 unique person. We chose these variables because they were nearly universally reported and they were not specific to a reason for the visit, which may change within the year. We ran crude autoregressive models using maximum likelihood estimation to test significance of temporal trend. We did not observe evidence of serial correlation based on the Durbin-Watson statistic. We analyzed data using SAS version 9.4 (SAS Institute, Cary, NC).

4.3 Results

The HUD PIT estimates indicate a substantial decline of approximately 24% in homelessness in Illinois from 2011-2018 (Table VIII, $p < 0.001$). However, hospital visits with a code for homelessness tripled in this same period (Table VIII, $p < 0.001$). Similarly, estimates of unique individuals visiting the hospital with a code for homelessness more than doubled in this time period (Table VIII, $p < 0.001$). Beginning in 2015, the estimated number of unique individuals classified as homeless using the moderate estimate exceeded the HUD estimates, and the gap continues to widen through 2018 (Table VIII).

4.4 Discussion

Hospital billing data indicate that the estimated number of unique individuals experiencing homelessness is increasing, whereas HUD estimates show a significant average annual decline of 544 individuals experiencing homelessness per year. The hospital data exceeded the HUD estimates by the year 2016 even when we used the most conservative deduplication strategy. This implies a substantial undercount in HUD estimates based on PIT counts even though it is unlikely that every homeless individual would be treated in a hospital in any given year. In 1 study, approximately one-third of those in a health care program for the homeless were hospitalized and two-thirds had an emergency department visit (Lin et al., 2015). Hospital data will likely miss healthier and younger individuals experiencing homelessness that are unsheltered, living in vehicles, or temporarily homeless due to socioeconomic conditions.

TABLE VIII
COMPARISON OF ESTIMATED UNIQUE PATIENTS IN ILLINOIS HOSPITALS AFFECTED BY HOMELESSNESS
WITH HUD ESTIMATES

Year	Total Number of Visits	Least Conservative Estimates of Unique Cases (Linked on Date of Birth, Gender, Race/Ethnicity, & Zip Code)	Moderate Estimates of Unique Cases (Linked on Date of Birth, Gender, & Race/Ethnicity)	Most Conservative Estimates of Unique Cases (Linked on Date of Birth & Gender)	HUD Estimates
2011	9882	8207	7304	6613	14009
2012	13359	11231	9875	8756	14144
2013	15850	12971	11263	9877	13425
2014	18094	14807	12845	11054	13107
2015	19946	15998	13875	11902	13177
2016	22251	18508	15750	13212	11590
2017	25026	20341	17200	14335	10798
2018	29765	23758	19447	15815	10643
Average Annual Change ^a	+2602 p<0.001	+2050 p<0.001	+1620 p<0.001	+1228 p<0.001	-544 p<0.001

^ap-values are based on the unadjusted autoregressive model and no AR term was used as the Durbin-Watson statistic did not indicate autocorrelation

There may be many explanations for the increase in Illinois hospital visits of those identified as homeless, such as better identification of these individuals by providers and enhanced reporting within hospital systems. As identification and reporting improve, hospital claims become a more viable source to estimate counts of homelessness that could augment current HUD PIT estimates. Hospital claims data also present opportunities to determine the impact of policy changes on those affected by homelessness (Kanak et al., 2018).

Another explanation for the rise in visits is increased hospital utilization by individuals experiencing homelessness. Individuals experiencing homelessness have been reported to be more likely than the nonhomeless to seek care at an emergency department (Fazel et al., 2014). Increased Medicaid coverage through the Patient Protection and Affordable Care Act, implemented January 1, 2014, may allow increased access to care outside emergency departments. This population has still shown higher rates of hospitalization visits despite Medicaid and universal health care coverage, which may be because of a lack of alternative services (Fazel et al., 2014; Lin et al., 2015).

The HUD PIT estimates provide critical data, but due to limitations in defining and accessing the homeless population, supplementing their estimates with alternative data sources would enhance surveillance. Different sources have been proposed, such as Department of Education, American Community Survey, and other data to help augment measures for specific sub-populations of the homeless (Chicago Coalition for the Homeless, 2019; National Law Center on Homelessness & Poverty, 2017). Although using hospital data may not adequately capture healthy individuals or those that seek care elsewhere, it could capture estimates for larger geographical areas, provide a way to measure some of those often missed in PIT counts, and continuously capture data throughout the year through a data system in existence in almost every state.

There are several limitations in this study. First is the lack of unique identifiers to deterministically identify the number of individuals seen in Illinois hospitals who are affected by homelessness.

Additionally, there may be misclassifications because of the use of billing records and variations by facility in identifying and reporting homelessness in the billing records.

4.5 Public Health Implications

Although HUD estimates suggest that homelessness is decreasing in Illinois, hospital records show that the number of those suffering from homelessness is increasing. As other data sources, such as hospital records, are increasingly able to identify and report information related to homelessness, using these additional data sources may help to augment HUD PIT estimates to provide more accurate estimates of homelessness. These estimates are of critical public health importance because they are used to direct resources and assess the reach and efficacy of policy and supportive services for those affected by homelessness.

5. HEALTH CARE UTILIZATION OF INDIVIDUALS WITH A LACK OF HOUSING OR AFFECTED BY

HOMELESSNESS: ILLINOIS, 2011-2018

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5.1 Introduction

Those with unstable or a lack of housing are at an increased risk and increased severity of many health conditions, but these health concerns are difficult to measure and address with early intervention. Most studies tend to focus on only a subset of this varied population -- measuring a narrow window of time, in one health care facility, or a segment of the population with a common concern (e.g. LGBTQ youth). In reality, the homeless population is varied. It comprises of families that move to where there is available work, individuals living out of personal vehicles, individuals that sleep in makeshift homes predominately in urban settings, persons living in various public and private run shelters, and rough sleeping encampments (Rossi, 1989; Wasserman & Clair, 2010). Hospitals can play an important role in surveillance of this population because they may be the only point of contact a person affected by homelessness has with the formal public health infrastructure, outside of law enforcement and public education services. In addition, it is likely to be the only location we can gather comprehensive and reliable information about the health characteristics of these individuals.

A systematic review on the health of homeless individuals in high-income countries noted that while there are many common public health priorities shared among the homeless across these countries, surveillance needs to occur regularly within these health systems since the optimal public health strategies for this population can vary across time and region and their health care needs are

generally greater than the general population (Fazel et al., 2014). Infectious diseases, such as tuberculosis, hepatitis, HIV, and chronic infestations of scabies and lice are more common among homeless individuals (Fazel et al., 2014). Chronic age-related conditions affect the homeless 10-15 years earlier than the general population, which is important since the median age of the homeless in the U.S. is approximately 50 years old (Fazel et al., 2014). In the US, these include substance abuse, mental illness, diabetes, cardiovascular disease, cerebrovascular disease, cognitive impairments, and functional impairments (Fazel et al., 2014). Homeless individuals are more likely than non-homeless to seek care at an emergency department or hospital, particularly the subset of individuals with substance abuse and mental disorders have been shown to seek care in the hospital setting more frequently during a calendar year (Fazel et al., 2014; Lam et al., 2016; Lin et al., 2015; Mitchell et al., 2017).

Improved surveillance data of health care utilization patterns of the homeless may lend insights to programmatic and service needs of this population (Hwang & Burns, 2014). Studies currently tend to look at hospital data covering very short periods of one year or less, restricted to specific facilities serving small geographic regions, include only those identified as homeless through newly implemented screening questionnaires rather than general ICD (*International Classification of Diseases*; Geneva, Switzerland: World Health Organization) coding, and limit their inclusion criteria to specific populations such as veterans or the mentally ill (Cheung et al., 2015; Feldman et al., 2017; Lin et al., 2015; Montgomery et al., 2015). We aimed to describe all individuals coded as homeless in state-level data comprising of outpatient and inpatient cases over a multi-year time frame to provide public health surveillance data on the health care utilization and needs of this population.

5.2 Methods

5.2.1 Data Source

Data from the Illinois Hospital Discharge Database for years 2011-2018 was used to identify outpatient and inpatient visits where patients are identified as having a lack of housing or affected by

homelessness at the time of the clinical visit. The outpatient database includes all patients treated in emergency rooms for less than 24 hours who were not admitted to the hospital. The inpatient database includes all patients treated for 24 hours or more for any medical reason. Both databases are based on billing records and include variables on patient demographics (age, gender, race/ethnicity), exposure (mechanism of injury), health outcomes (diagnoses, hospital procedures, discharge status), and economics (hospital charges, payer source). Based on the annual state audit of hospitals, the hospitals included in the datasets used for this analysis comprise 96.5% of all patient admissions statewide (Illinois Department of Public Health; Illinois Health Facilities and Services Review, 2013; Lale, Krajewski, & Friedman, 2017). This project is covered under UIC IRB (#2008-0060) approval.

5.2.2 Case Ascertainment

Patient visits with a billing code of V60.0 for “lack of housing” (*International Classification of Diseases, Ninth Revision* [ICD-9; Geneva, Switzerland: World Health Organization; 1980]) or the equivalent code of Z59.0 for “homelessness” (*International Classification of Diseases, Tenth Revision* [ICD-10; Geneva, Switzerland: World Health Organization; 1992]) were identified as cases in accordance with previous studies using hospital data to examine homelessness (Kanak et al., 2018). Alternative codes for inadequate housing (V60.1), which refers to poor infrastructure, and unspecified housing or economic circumstances (V60.9), were not included in the case definition despite their inclusion in broader definitions (Peterson et al., 2015) because we do not have the capacity to verify unstable or lack of housing as opposed to inadequate housing.

The CDC crosswalk between ICD-9 and ICD-10 recommends that V60.0 is equivalent to Z59.0. The difference in coding reflects the transition in the U.S. in Q4 of 2015 from ICD-9 to ICD-10. The coding schemas for ICD-9 and ICD-10 codes are essentially capturing the same type of homeless population despite the slight change in terminology. The ICD-9 V60.0 codes captures persons with a lack of housing and explicitly identifies the following subgroups: hobos, social migrants, tramps, transients, and

vagabonds. The ICD-10 Z59.0 code captures persons with a lack of housing (permanent) (temporary) or shelter and explicitly identifies the following subgroups: nomad, nomadism (i.e. new term for hobo), social migrant, tramp, transient, vagabond, vagabondage, and vagrancy.

5.2.3 Identifying Unique Visits Using Probabilistic Linkage

Using probabilistic data linkage methodology, we identified unique hospital visits. Identifying duplicates within datasets was done by using the facility, attending clinician, principle ICD code, date of birth, gender, zip code, date of admission, and date of discharge. Then we manually screened these duplicates to identify truly mismatched ICD codes. Duplicates can result from system errors (e.g. a record is submitted twice after data entry), errors between coders (e.g. two or more coders accidentally enter a patient's information twice), or from quality control practices at facilities that intentionally have two coders enter the same patient information. In addition, duplicate entries occur from split billing and sequential billing practices. Split billing generally is used when separate bills are issued for treatment by different specialists during a single hospitalization (e.g. neurologist, endocrinologist, and surgeon). The patients will have multiple records for the same period of time, but the diagnoses may differ substantially based on the treating physician's specialty. Sequential billing occurs in some hospitals where patients have multiple records with identical diagnoses, but different and consecutive admission and discharge dates. These occur primarily among patients with long lengths of stay. This resulted in removing 4,318 duplicates for a final sample of 154,173 patient visits for those with an ICD code for homelessness.

5.2.4 Covariates

Key variables summarized include patient characteristics (gender, age, race and ethnicity), facility information (name, location, trauma level), length of stay, total hospital costs, insurance coverage, discharge status, the reason for visit, comorbidities, and acute injuries. Metropolitan areas were designated using the US Department of Agriculture (USDA) Rural-Urban Continuum Codes (US

Department of Agriculture Economic Research Service, 2013). Total hospital charges is the sum of all procedure, service, and facility charges accumulated from the point of admission to discharge. Total hospital charges are in 2018 US dollars adjusted for annual inflation using the Bureau of Labor Statistics (BLS) Consumer Price Index (CPI-U) (US Bureau of Labor Statistics, n.d.). Hospital charges are a proxy measure for cost, but may not directly reflect reimbursement rates, resource consumption, or comprehensive economic costs. As data were coded using both the ICD9 and ICD10 classification system, the diagnosis was categorized and crosswalked to summarize groups of conditions. There were 10,448 (6.8%) visits without a coded primary diagnosis, primarily in outpatient visits (n=9,470; 90.6%). The Elixhauser Comorbidity Index was used to assess comorbidities (Elixhauser et al., 1998).

5.2.5 Statistical Analysis

All statistical analyses were conducted using SAS software (v.9.4; SAS Institute Inc., Cary, NC). As part of the descriptive analysis, we compared demographic characteristics, geospatial trends, temporal trends, primary diagnosis, comorbid conditions, and hospital course of treatment measures.

An adjusted multivariable logistic regression model was developed to evaluate predictors of being discharged to a healthcare facility versus being routinely discharged to home or self-care, which for this population likely meant returning to a state of homelessness. Statistical evaluation of covariates, as well as a priori knowledge, was used to determine the inclusion of covariates in the final models. The final model included patient characteristics (gender, age, race and ethnicity), insurance coverage, operations, acute injuries, diagnoses, and comorbidities. A modified Elixhauser comorbidity index was created for this purpose that excluded depression and psychoses. These groups were modeled separately as crude analysis demonstrated a difference in discharge status based on these comorbidity groups. No evidence of multicollinearity among the independent variables was indicated. A two-sided p-value of less than 0.05 was considered statistically significant.

5.3 Results

5.3.1 Characteristics of the Homeless Being Treated in the Hospital Setting

The number of hospital visits of those with reported homelessness increased between 2011-2018 from 9,882 to 29,765 (average annual increase=2,602, $p<0.001$). There was minimal variability in visits seen by month or day of the week. Hospital visits predominantly involved males, adults between the ages of 25-64 years, and non-Hispanic whites and African-Americans (Table IX). Government insurance was the primary payer for these visits (Table IX). There were dramatic increases in those covered by Medicare and Medicaid (48.9% of visits in 2011 to 77.7% in 2018) and conversely, reductions in self-pay (i.e. no health insurance; 32.0% to 10.5%) and charity care (9.6% to 1.5%) (Figure 2). This change was concentrated around the implementation of the Affordable Care Act (2014). Total cumulative charges in 2018 real dollars for treating homeless patients between 2011-2018 in Illinois were \$2.34 billion USD with most of the changes occurring among inpatient cases (\$2.02 billion).

5.3.2 Location and Type of Hospitals Treating Homeless in Illinois

The vast majority of visits were for those who identified as being Illinois residents; 93.1% of visits had patient zip codes located in Illinois and less than 2% of those claiming Medicaid coverage did so through a state other than Illinois Medicaid. The majority of visits were in facilities within Chicago (48.3%) and the surrounding suburbs (31.0%). In addition, a large proportion of visits occurred in facilities with a level I or II trauma unit (30.3% and 22.2% respectively). Approximately, 30% of inpatient cases and 40% of outpatient cases were treated in just 10 hospitals within Illinois out of approximately 208 hospitals reporting to the billing system annually. Over 95% of visits were to metropolitan hospitals located in USDA metropolitan areas.

TABLE IX
DEMOGRAPHIC CHARACTERISTICS OF PATIENT VISITS OF THOSE EXPERIENCING HOMELESSNESS

	Inpatient (N=76,952)	%	Outpatient (N=77,221)	%
Gender				
<i>Female</i>	20,445	26.57	20,809	26.95
<i>Male</i>	56,498	73.42	56,411	73.05
<i>Unknown</i>	9	0.01	1	0.00
Age				
<i>0 to 4 yrs</i>	121	0.16	240	0.31
<i>5 to 9 yrs</i>	86	0.11	120	0.16
<i>10 to 14 yrs</i>	148	0.19	99	0.13
<i>15 to 19 yrs</i>	1,315	1.71	1,049	1.36
<i>20 to 24 yrs</i>	5,592	7.27	4,558	5.90
<i>25 to 34 yrs</i>	13,983	18.17	12,067	15.63
<i>35 to 44 yrs</i>	15,435	20.06	15,467	20.03
<i>45 to 54 yrs</i>	21,671	28.16	21,804	28.24
<i>55 to 64 yrs</i>	14,740	19.15	17,729	22.96
<i>65 to 74 yrs</i>	3,283	4.27	3,370	4.36
<i>75 yrs and older</i>	578	0.75	712	0.92
<i>Unknown</i>	0	0.00	6	0.01
Mean Age (sd)	44	13.63	45	13.66
Race/Ethnicity				
<i>Non-Hispanic White</i>	35,021	45.51	31,332	40.57
<i>Non-Hispanic African-American</i>	27,324	35.51	33,992	44.02
<i>Hispanic</i>	5,159	6.70	4,981	6.45
<i>Asian</i>	292	0.38	319	0.41
<i>Pacific Islander</i>	1,268	1.65	161	0.21
<i>American Indian/Alaska Native</i>	250	0.32	129	0.17
<i>Other</i>	5,334	6.93	4,617	5.98
<i>Unknown</i>	2,304	2.99	1,690	2.19
Primary payer type				
<i>Medicaid</i>	39,002	50.68	35,665	46.19
<i>Medicare</i>	14,819	19.26	13,627	17.65
<i>Self-pay/Self-administered</i>	8,377	10.89	15,969	20.68
<i>Charity</i>	2,019	2.62	3,754	4.86
<i>Private/Commercial Insurance</i>	11,124	14.46	7,131	9.23
<i>Military (Champus Tricare, Champva)</i>	90	0.12	65	0.08
<i>Workers' Compensation</i>	7	0.01	18	0.02
<i>Other</i>	1,514	1.97	992	1.28
Median Hospital Charges (IQR)	\$16,025.50	\$10,002.00- \$27,450.00	\$2,049.12	\$921.00- \$4,478.00

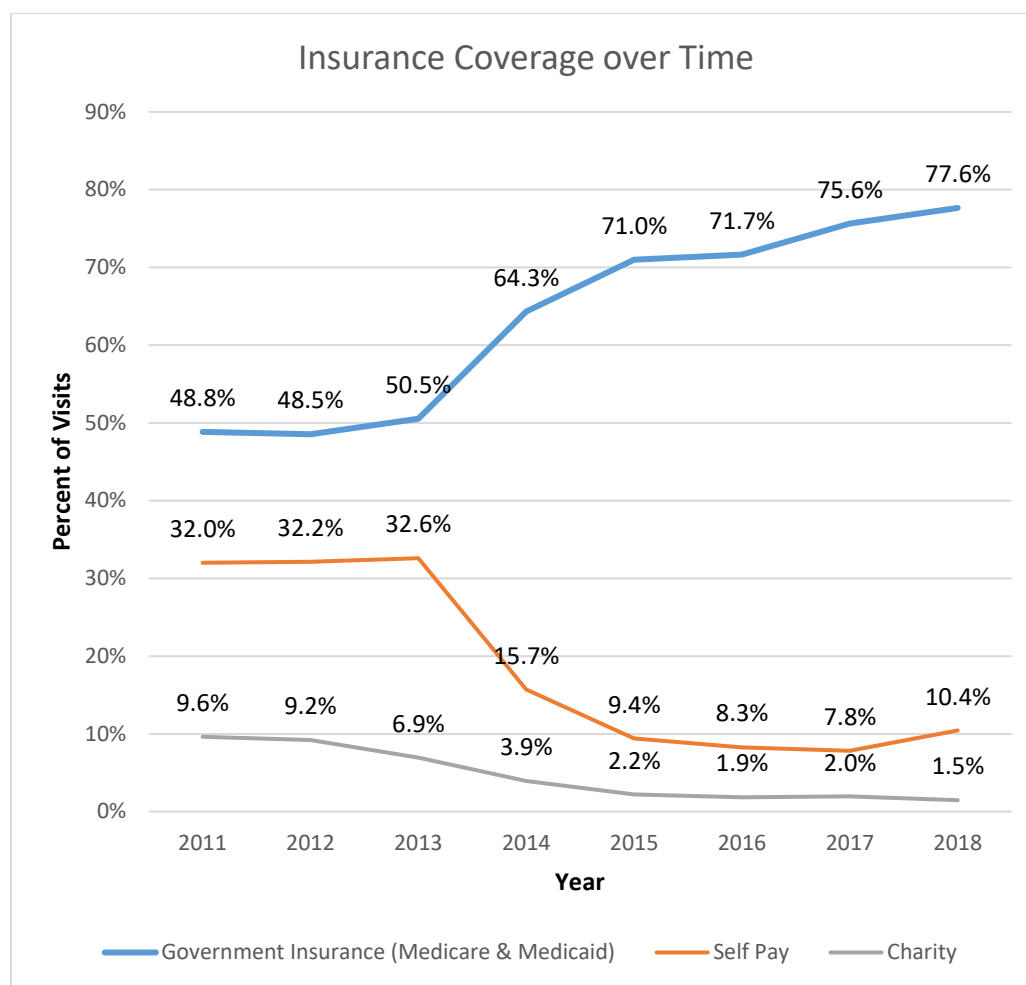


Figure 2. Percent of visits covered by government insurance, self-pay, and charity each year.

5.3.3 Reason for Hospital Visits

The most common primary reasons for hospital visits were mental disorders, substance abuse (illicit drug and alcohol), musculoskeletal and connective tissue disorders, diseases of the respiratory system, diseases of the circulatory system, and skin diseases. This was similar when comparing males and females; however, pregnancy complications replaced diseases of the circulatory system as the fifth most common primary diagnosis in females. When comparing primary diagnosis for the following major age groups -- children (under 18 years), adults (aged 18-64), and older adults (aged 65 and older) -- mental disorders remained the most common diagnosis in all three age groups. However, among

children, diseases of the respiratory system, infectious diseases, skin diseases, superficial injuries, and conditions of the eye and ear were the next most common in children. In older adults, mental disorders were followed by diseases of the circulatory system, diseases of the respiratory system, substance abuse, musculoskeletal and connective tissue disorders, and skin diseases. There was little variation when comparing those with governmental insurance to those that were self-pay or charity, with only skin diseases being more common than diseases of the circulatory system in self-pay or charity visits.

The primary reason for the hospital visits coincided strongly with the reported co-morbid conditions as characterized by the Elixhauser Comorbidity Index (Table X). Drug abuse, depression, alcohol abuse, or psychoses was found in 108,232 visits (70.2%). HIV/AIDS was identified as a comorbidity in 1,691 visits (1.1%).

When stratifying mental disorders, the most common diagnosis was for mood disorders (n=24,507; 31.9% of inpatient visits versus n=4,502; 5.8% of outpatient visits) followed by non-mood psychotic disorders (e.g. schizophrenia, schizotypal, and delusional disorders; n=14,122; 18.4% of inpatient visits versus n=3,719; 4.8% of outpatient visits). The most common substance abuse diagnoses were as follows: alcohol (n=5,609; 7.3% of inpatient visits versus n=10,534; 13.6% of outpatient visits), opioids and analgesics (n=1,371; 1.8% of inpatient visits versus n=570; 0.7% of outpatient visits), cocaine (n=221; 0.3% of inpatient visits versus n=290; 0.4% of outpatient visits), sedatives, hypnotics, and anxiolytics (n=234; 0.3% of inpatient visits versus n=61; 0.1% of outpatient visits), other stimulants (n=141; 0.2% of inpatient visits versus n=60; 0.1% of outpatient visits), and cannabis and hallucinogens (n=64; 0.1% of inpatient visits versus n=124; 0.2% of outpatient visits).

Acute injuries only accounted for 15.2% of visits (n=23,457) and these injuries were most commonly due to exposures to weather and environmental conditions (n=2,988; 12.7%; of which n=2,304 were cold-related and n=300 were heat-related), falls (n=2,862; 12.2%), assaults (n=1,813; 7.7%), suicide attempts (n=1,242; 5.3%), and poisonings or adverse effects of drugs (n=1,233; 5.3%).

TABLE X
ELIXHAUSER COMORBIDITIES IN PATIENT VISITS OF THOSE EXPERIENCING HOMELESSNESS

	Inpatient (N=76,952)	%	Outpatient (N=77,221)	%
Mean Number of Comorbidities (sd)	3.07	1.68	1.37	1.33
Number of patient visits with 3+ comorbidities	45,013	58.49	13,233	17.14
Type of Comorbidity				
<i>Drug Abuse</i>	37,428	48.64	11,706	15.16
<i>Depression</i>	29,184	37.92	12,422	16.09
<i>Alcohol Abuse</i>	28,433	36.95	18,338	23.75
<i>Psychoses</i>	22,378	29.08	11,276	14.60
<i>Hypertension (Uncomplicated)</i>	22,274	28.95	14,776	19.13
<i>Chronic Pulmonary Disease</i>	17,419	22.64	9,674	12.53
<i>Fluid And Electrolyte Disorders</i>	12,495	16.24	2,555	3.31
<i>Other Neurological Disorders</i>	7,814	10.15	4,258	5.51
<i>Diabetes (Uncomplicated)</i>	6,805	8.84	5,537	7.17
<i>Obesity</i>	6,706	8.71	1,105	1.43
<i>Cardiac Arrhythmia</i>	5,981	7.77	2,851	3.69
<i>Liver Disease</i>	4,935	6.41	1,241	1.61
<i>Congestive Heart Failure</i>	4,313	5.60	1,705	2.21
<i>Hypertension (Complicated)</i>	3,617	4.70	1,159	1.50
<i>Diabetes (Complicated)</i>	3,601	4.68	1,315	1.70
<i>Coagulopathy</i>	3,052	3.97	413	0.53
<i>Renal Failure</i>	3,031	3.94	848	1.10
<i>Hypothyroidism</i>	2,906	3.78	863	1.12
<i>Weight Loss</i>	2,871	3.73	300	0.39
<i>Deficiency Anemia</i>	2,777	3.61	442	0.57
<i>Peripheral Vascular Disorders</i>	1,411	1.83	453	0.59
<i>Pulmonary Circulation Disorders</i>	1,105	1.44	144	0.19
<i>HIV/AIDS</i>	968	1.26	723	0.94
<i>Solid Tumor without Metastasis</i>	957	1.24	222	0.29
<i>Valvular Disease</i>	888	1.15	281	0.36
<i>Rheumatoid Arthritis/collagen</i>	664	0.86	402	0.52
<i>Paralysis</i>	563	0.73	188	0.24
<i>Peptic Ulcer Disease without Bleeding</i>	554	0.72	121	0.16
<i>Metastatic Cancer</i>	421	0.55	57	0.07
<i>Blood Loss Anemia</i>	261	0.34	20	0.03
<i>Lymphoma</i>	126	0.16	34	0.04

5.3.4 Length of Stay and Discharge Outcomes

A small percentage of hospitalizations resulted in death or discharge to hospice (n=351; 0.23%) (Table XI). The large majority of visits (81.9%) had a routine discharge to home or self-care (76.4% of inpatient visits and 87.4% of outpatient visits) (Table XI). Approximately 4.8% of visits (n=7,472) resulted in being discharged or transferred to psychiatric facilities (Table XI), of which 397 (5.3%) were following suicide attempts and 3,560 (47.6%) had a primary diagnosis code for a mental disorder. Individuals discharged or transferred to psychiatric facilities were predominantly male (n=5,456; 73.0%), white (n=3,756; 50.3%), aged 45-54 years (n=2,029; 27.2%) and with government insurance (n=5,156; 69.0%). Few were discharged or transferred to a court or law enforcement (0.37%) (Table XI). Visits resulting in being discharged or transferred to a court or law enforcement had a primary diagnosis code for a mental disorder (n=239; 42.1%) or drug and alcohol abuse (n=88; 16.0%) and individuals were predominantly male (n=437; 76.9%), white (n=329; 57.9%), aged 25-34 years (n=159; 28.0%), and with government insurance (n=353; 62.1%).

In the final multivariable logistic regression model, we identified several predictors of discharge to a healthcare facility, as opposed to discharge to home or self-care, which were similar between inpatient and outpatient visits. The strongest predictor that a homeless individual would be discharged to a secondary healthcare facility was a suicide attempt (Table XII). Other factors consistently associated with discharge to a healthcare facility include having governmental insurance, serious comorbidities as measured by the modified Elixhauser index, depression, and psychoses (Table XII). Suicide attempts, depression, and psychoses were much stronger predictors for outpatient visits than inpatient visits (Table XII). Having charity coverage and being Black/African-American were consistently associated with not being discharged to a healthcare facility (Table XII).

TABLE XI
LENGTH OF STAY AND DISCHARGE STATUS OF PATIENT VISITS OF THOSE EXPERIENCING HOMELESSNESS

	Inpatient (N=76,952)	%	Outpatient (N=77,221)	%
Length of Stay				
<i>Outpatient visits greater than one day</i>	NA	NA	5,615	7.27
<i>Inpatient length of stay (mean days (sd))</i>	6.21	6.99	NA	NA
Visit Characteristics				
<i>Operations</i>	5,941	7.72	565	0.73
<i>Suffered an acute injury in the hospital</i>	755	0.98	38	0.05
Discharge Description				
<i>Routine discharge to home or self-care</i>	58,803	76.42	67,485	87.39
<i>Discharge/transferred to long-term/intermediate facility</i>	8,704	11.31	646	0.84
<i>Discharged/transferred to a psychiatric hospital or psychiatric distinct unit of a hospital</i>	2,601	3.38	4,871	6.31
<i>Left against medical advice/discontinued care</i>	3,458	4.49	2,260	2.93
<i>Discharged/transferred to a short-term/acute facility</i>	1,297	1.69	877	1.14
<i>Other</i>	1,088	1.41	697	0.90
<i>Discharged/transferred to court/law enforcement</i>	291	0.38	277	0.36
<i>Discharge/transferred to home health care service</i>	416	0.54	51	0.07
<i>Expired/hospice</i>	294	0.38	57	0.07

5.4 Discussion

This study found that the large majority of hospital visits in Illinois for the homeless had comorbidities of depression, psychoses and/or substance abuse (70.2%). While only a small fraction of visits were treated for acute injuries, the most common causes of injury were from weather-related risks, falls, and being assaulted. Mental health issues were the most common primary diagnosis across all major age-groups, even in children. Among the hospital visits for the female homeless, pregnancy complications were identified in the top 5 primary diagnoses.

The large majority of visits (81.9%) had a routine discharge to home or self-care (76.4% of inpatient visits and 87.4% of outpatient visits) which for this population would predominately involve returning to their homeless conditions. However, this study demonstrates that disparities persist for

TABLE XII
PREDICTORS OF DISCHARGE TO ANOTHER HEALTHCARE FACILITY COMPARED TO ROUTINE DISCHARGE TO HOME OR SELF-CARE

	Inpatient			Outpatient			All		
	aOR	LCL	UCL	aOR	LCL	UCL	aOR	LCL	UCL
Charity	0.61	0.52	0.71	0.67	0.56	0.80	0.63	0.56	0.71
Self-Pay	0.59	0.54	0.65	0.95	0.85	1.06	0.74	0.70	0.79
Black/African-American	0.81	0.78	0.85	0.66	0.62	0.70	0.76	0.74	0.79
Other Race/Ethnicity	1.01	0.94	1.08	0.80	0.71	0.91	0.94	0.88	0.99
Hispanic or Latino	0.91	0.84	0.99	1.00	0.89	1.12	0.94	0.88	1.01
Year of Visit	0.98	0.97	0.99	1.01	1.00	1.03	0.99	0.98	0.99
Male	0.94	0.90	0.99	1.02	0.96	1.09	1.01	0.97	1.05
Age (per 10 years)	1.31	1.28	1.32	0.86	0.84	0.88	1.09	1.08	1.10
Government Insurance	1.11	1.05	1.17	1.18	1.08	1.29	1.13	1.08	1.19
Additional Comorbidity	1.09	1.08	1.10	1.11	1.09	1.13	1.17	1.15	1.18
Injury	1.74	1.65	1.83	0.71	0.65	0.78	1.34	1.28	1.39
Depression	1.09	1.05	1.14	4.26	4.02	4.51	1.91	1.85	1.98
Psychoses	1.75	1.67	1.83	4.26	4.01	4.53	2.76	2.66	2.86
Operation	2.42	2.27	2.58	1.06	0.77	1.45	3.14	2.95	3.33
Suicide Attempt	2.52	2.19	2.91	7.75	5.86	10.25	3.15	2.78	3.57

racial groups or those that are uninsured. Most importantly, African-Americans represented 40% of the hospital visits despite representing less than 15% of the Illinois population (or approximately 30% in Chicago), and African-Americans were far less likely to be discharged to a secondary facility that could delay return to or assist with transitioning out of homelessness.

This work provides comprehensive details on what has been observed in other studies examining the health concerns of the homeless; there is a high prevalence of mental disorders, substance abuse, infectious disease, and chronic disease seen at an earlier age (Fazel et al., 2014; Lam et al., 2016; Lin et al., 2015; Mitchell et al., 2017) and observed very few patients over the age of 75 years. There has traditionally been a lot of focus on homeless subpopulations suffering from health conditions with significant consequences, such as HIV/AIDS. This data shows there is a much higher prevalence of other conditions and there may be unintended health consequences from focusing exclusively on narrow subgroups, rather than developing broad programs. However, policies that have been successful in addressing conditions like HIV/AIDs in this population could provide insights for further improving the general health care of those affected by homelessness.

There remains a significant burden of care and cost to hospitals for the healthcare of those affected by homelessness. However, with the expansion of the insurance coverage in Illinois because of the Patient Protection and Affordable Care Act implementation (January 1, 2014), the proportion of patient visits without any insurance coverage decreased dramatically. While reimbursement rates fluctuate, it can be assumed they are significantly lower than \$2.34 billion dollars in charges for this population found in this study and these charges only represent one component of direct costs. These visits are concentrated in a small percentage of hospitals within the state of Illinois and demonstrates that this burden of care falls disproportionately on specific facilities. While it may be hard to adequately address and accommodate at the facility level, this clustering of visits may provide benefits when trying

to reach this population or implement interventions that provide a transition from homelessness to residency programs.

It is not feasible to develop transition programs in every hospital but our data show that programs could be housed in a small fraction of hospitals that treat the vast majority of the homeless population seen in emergency departments. Discharge to medical respite programs which are short-term residential care programs for those too sick to be discharged back to the streets have demonstrated some success in limiting readmissions, but it occurs far less frequently. Most homeless individuals are discharged to other settings which have not been shown to achieve similar results as medical respite programs (Kertesz et al., 2009). Safety-net hospitals, which provide care regardless of insurance status or ability to pay, are more likely to serve this population but have been shown to employ fewer strategies to reduce readmissions (Figueroa et al., 2017).

The Affordable Care Act may allow for increased access to care outside of emergency departments, but this population has shown frequent hospitalizations and emergency department visits despite this coverage, which may be due to a lack of alternative services (Lin et al., 2015). For example, while those with insurance coverage are better able to access mental health treatment, Illinois has one of the lowest Medicaid-to-Medicare fee ratios resulting in physicians getting reimbursed much less through Medicaid than they would receive for the same service through Medicare. This can create a barrier for the Medicaid population in accessing services as providers may be more reluctant to treat this population and may contribute to the behavioral health care professional shortage in Illinois (14 professionals per 10,000 residents compared to the already less-than-ideal national average of 21 per 10,000) (Heun-Johnson, Menchine, Goldman, & Seabury, 2018). Illinois spends \$77 per capita on mental health services compared to the \$133 national average, with approximately three-quarters of those funds going to community-based mental health programs and one-quarter to in-state psychiatric hospitals (Heun-Johnson et al., 2018). Mental illness is a known risk factor for incarceration and has

significant costs to individuals and society (Heun-Johnson et al., 2018). Therefore, more comprehensive interventions are indicated to better address the health needs of those with unstable or lack of housing.

5.4.1 Limitations

There are several limitations to this study. Primarily, misclassification is a concern as many individuals may not be coded as having a lack of housing or affected by homelessness and there is no way to validate the cases in terms of those presently without shelter, duration of lack of housing, or cause of lack of housing. Because of common social biases for this population, substance abuse and mental illness may be coded differently in this population. Additionally, ICD9 and ICD10 codes cannot be cross-walked in a one-to-one fashion and there may be some lost information that is incongruent between the two systems.

5.5 Conclusions

Hospital discharge data are a valuable public health surveillance tool for evaluating healthcare issues affecting the homeless. Those experiencing homelessness experience a high burden of health concerns and may lack the supportive services needed for improving their health when routinely discharged to home or self-care. Hospital billing records can be used to prioritize the distribution of limited public health resources for health care programs and interventions among those experiencing homelessness. While hospitals provide a valuable source of care to this population, they are likely experiencing a larger burden of care as this is a main access point for psychiatric and other healthcare services since other facilities have been shut down or experienced a loss in funding or reimbursement. Additionally, there is evidence that when these health services are not taken on by hospitals, it is shifted to other social systems that are not designed to address psychiatric and other medical needs, such as the criminal justice (Heun-Johnson et al., 2018). Therefore, it is imperative that this population has access to services at the most cost-effective, primary prevention point.

6. CHIROPRACTIC INTERNS' ATTITUDES AND BEHAVIORS TOWARDS OCCUPATIONAL HISTORY

TAKING A CLINIC SERVING THOSE AFFECTED BY UNSTABLE OR A LACK OF HOUSING

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6.1 Introduction

Occupational illnesses and injuries are a major health burden. In general practice, work-related diseases most commonly involve musculoskeletal complaints of the low back, neck, and shoulder (Weevers et al., 2005). Because of this, health care providers should understand the role of work in causing or exacerbating many musculoskeletal conditions. However, few clinical programs include occupational health as a major focus in their training (Gehanno et al., 2014; Wynn et al., 2003).

There are simple employment questions that may be included in a patient intake form to screen for potential work-related health problems which can then be expanded on if indicated (Taiwo et al., 2010). While it is largely accepted that clinicians should assess the contribution of work to health concerns, few health histories ask for anything more than a simple description of current occupation. Rarely do clinicians inquire about work histories and potential on-the-job hazards (Politi et al., 2004; Shofer et al., 2006). Additionally, studies show that the comprehensiveness of occupational history taking is inconsistent based on patient characteristics (e.g. gender, age, and other clinical risk factors) (Politi et al., 2004).

The use of patient-reported occupational intake questionnaires identified that 23% of patients were presenting symptoms, signs, and job hazards related to their current health (Thompson et al., 2000). However, integration of these questionnaires into the intake forms decreased the level of occupational history detail in patient charts by physicians, suggesting that a questionnaire is not sufficient (Thompson et al., 2000). Other studies indicate that intensive training, such as worksite visits and case studies, are effective and increase the number of occupational and environmental exposures questions asked by the provider (Braeckman et al., 2009; Storey et al., 2001).

The clinical settings in which patients seek health care is diverse, with 35 million Americans receiving chiropractic care in 2015 (Daly, 2015). Despite chiropractors' focus on treating musculoskeletal conditions, to the best of our knowledge no data exist on chiropractic interns' or clinicians' occupational history taking attitudes and behaviors. Research assessing the efficacy of occupational history taking training programs are needed to identify optimal training designs and to determine if these programs are effective across clinical disciplines.

This study uses a pre-and post-training program evaluation of chiropractic interns to (1) describe changes in their frequency of occupational history taking before and after the training and (2) document the attitudes and beliefs regarding occupational health and history taking.

6.2 Methods

6.2.1 Study Site

The study site took place at a clinic embedded in a residential rehabilitation program in which more than 170 individuals can reside and participate in work rehabilitation. The 12-month program includes counseling and substance abuse recovery, employment preparation and provides work experience through various program-related jobs. Many of these residents have a history of precarious housing, incarceration, unemployment, and other life stressors. The turnover of residents is high with

approximately 50% new to the facility at any given time and each required to participate in a physical exam at entry. None are required to continue care.

6.2.2 Study Population

The interns at this clinic are completing their last year of chiropractic school which requires them to complete a 12-month internship. Under the supervision of a licensed chiropractor, chiropractic interns staff the clinic to perform physicals and address other health concerns for both residents and employees. Interns may see patients alone or in partnership with another intern depending on the experience level of the intern and the complexity of the patient visit. This project received Institutional Review Board approval (NUHS #H-1504 and UIC #2016-0213).

6.2.3 Subject Enrollment

Using a rolling hierarchical case-crossover design, five clinical internship cohorts were enrolled in the study for a duration of one to three trimesters (Figure 1) which coincided with the 1-year timeframe for recruitment, training, and follow-up. The first trimester served as the non-intervention baseline period. Each intern then participated in one training session within the first month of the second trimester (third trimester for cohort two). Similar to other training sessions during their internships, the training session was mandatory, took place mid-week at the end of the shift, and lasted approximately one hour. The final cohort recruited in the study did not receive training and we only have baseline data from the initial questionnaire. Students received the general questionnaire during the middle of each trimester that they were enrolled in the study. Interns completed the same questionnaire up to three times during the period of follow-up.

6.2.4 Training Program

Based on materials used by occupational health experts, including occupational medicine physicians, and other materials (Forst et al., 2009; Haddon, 1968; National Institute for Occupational Safety and Health, 2012; Politi et al., 2004; Taiwo et al., 2010; Yu, 2015), a one-hour training program on

occupational history taking was developed by the PI with input from the study team. The training program consisted of an interactive discussion-based curriculum covering the importance of occupational history taking, utilization of an occupational history template, working through a case study, performing hazard categorization, and online resources familiarization. Interns were trained to gather information regarding past occupations, detailed occupational history of workplace hazards and tenure, whether the chief complaint was related to current or past work, and providing clinical recommendations for managing musculoskeletal issues while working.

6.2.5 Instruments

Aim 1 was assessed using a behavior tracking tool designed to be filled out by the supervising clinician as they reviewed interns' charting of patients. The supervising clinician used this tool to track whether the interns' charts captured smoking history, use of medications, gender and key elements of a patient's occupational history. There was no change throughout the study period to the clinic's standard forms and each chart included a standard medical history form with only one work-related question, "What is your occupation?" The interns were required to remember to ask other occupational history questions and document the responses. Chart evaluations did not include additional information that may have been discussed but was not documented in the chart. A subset of 50 (24.8%) of patient files was reviewed by the lead author to assess the reliability of the behavior tracking tool; reliability was high (94% agreement; Cohen's kappa = 0.88, 95% CI 0.82-0.93).

In addition to basic demographics and training information, a questionnaire was developed to assess the attitudes, beliefs, and self-perceived behaviors of the chiropractic interns regarding the taking of occupational histories for Aim 2. The questionnaire was the same for each of the three iterations, but the hypothetical clinical encounter case vignette changed on each version. This brief vignette was followed by a series of questions asking interns to identify additional information interns would like to know and how they would proceed with the hypothetical clinical encounter.

6.2.6 Analysis

Data were analyzed descriptively for this exploratory mixed methods study comparing pre and post-training responses. SAS software (v.9.4; Cary, NC) was used to analyze quantitative data and carry out statistical analyses. Open-ended responses were assessed in Microsoft Excel using content analysis to understand the context and application of self-perceived clinically-relevant occupational health behaviors (Vaismoradi et al., 2013).

A generalized estimating equation (PROC GENMOD) was used to assess behavior changes pre- and post-training using a binary distribution and Toeplitz working correlation structure. The main fixed effect is training completion and the individual intern is a random effect. Due to small numbers, cohort effects and visit types could not be properly evaluated as there were multiple cohorts that did not have measures after training because of the design of the follow-up. Grade point average (GPA) was imputed for one intern who did not provide this information, using the median GPA of the cohort. This intern contributed 12 patient evaluations. Due to sample size, modeling using a continuous measure of days since training could not be completed. To descriptively evaluate the effect of time from training on charting behaviors, a variable that reflects the time since training in months was created.

6.3 Results

6.3.1 Demographics and Interest in Occupational Health

Of the 20 participating interns, the majority were female (n=12; 60%), with a median age of 27 years (range 25-48 years), were in the program for approximately 11 trimesters (range 10-14 trimesters), and their grade point averages were fairly evenly distributed as follows: 2.50-2.99 GPA, n=6 (30%); 3.00-3.49 GPA, n=7 (35%); and 3.50+ GPA, n=6 (30%). There was a total of 202 patient charts evaluated with 83% being new patient visits (Table XIII). While interns can see patients in partnership with another intern, this was only done in 56 visits (27.7%) and there were no visits in which the secondary intern had completed the occupational history training when the primary had not.

TABLE XIII
CHARTING BEHAVIORS BEFORE AND AFTER TRAINING

	All visits (n=202)		New Patient Visits (n=168)		Reexamination Visits (n=32)	
	Before Training (n=140)	After Training (n=62)	Before Training (n=110)	After Training (n=58)	Before Training (n=30)	After Training (n=2)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Current Occupation	128 (91.4%)	60 (96.8%)	103 (93.6%)	56 (96.6%)	25 (83.3%)	2 (100.0%)
Past Occupation	51 (36.4%)	39 (62.9%)	40 (36.4%)	37 (63.8%)	11 (36.7%)	0 (0.0%)
Detailed Occupational History	12 (8.6%)	10 (16.1%)	9 (8.2%)	10 (17.2%)	3 (10.0%)	0 (0.0%)
Chief Complaint Related to Work	42 (30.0%)	37 (59.7%)	36 (32.7%)	36 (62.1%)	6 (20.0%)	0 (0.0%)
Gender	140 (100.0%)	62 (100.0%)	110 (100.0%)	58 (100.0%)	30 (100.0%)	2 (100.0%)
Smoking History	140 (100.0%)	62 (100.0%)	110 (100.0%)	58 (100.0%)	30 (100.0%)	2 (100.0%)
Medications	139 (99.3%)	62 (100.0%)	110 (100.0%)	58 (100.0%)	29 (96.7%)	2 (100.0%)

A large majority (85% at baseline) were interested in occupational health and 80% believed that occupational history taking was “very important”. For example, one 27-year-old female wrote, *“I believe work is a strong component of health for 2 main reasons. 1. That access to meaningful work is one of many factors determining health. 2. That an individual may be exposed to hazardous materials or physically/emotionally challenging work places.”* Similarly, a 26-year-old male commented, *“I would say it has a large influence on health. Many people who work spend more time at work than anywhere else during the day. Thus, if there was a poor work environment, it could certainly affect one’s health dramatically.”*

6.3.2 Occupational Health History Taking

Documentation of the patient's current occupation was high throughout data collection (Table XIII). Intern charting behaviors increased after training related to documentation of past occupation (all visits, 62.9% from 32.4%) and relating the chief complaint to work (all visits, 59.7% from 30.0%; Table 1). Detailed occupational history taking remained low throughout the study, but demonstrated a doubling in documentation after training (16.1% from 8.6%; Table XIII). Other standard components of clinical history taking including gender, smoking history, and medications were nearly universally documented by the interns (Table XIII).

In the self-assessment, all interns perceived they asked about current occupation for all or most new patient visits, but other occupational history taking documentation behaviors varied greatly with limited positive changes after training (Table XIV). Attitudes reflected more consistent documentation of components of occupational history taking for new patient visits as opposed to reexaminations; however, there were so few reexamination visits after training it is difficult to compare the self-report with actual charting behaviors (Tables XIII and XIV).

Comments at baseline and after training showed changes in awareness and the value of more detailed occupational health histories. At baseline before training a 27-year-old female wrote, *"Past occupation history is reported if brought up."* Another 26-year-old female stated, *"I only take past occupational hx if there may be a symptom/problem that could be caused by a past exposure. Or if they recently changed jobs. Or other random things."*

After training, interns seemed to recognize there were additional needs in practice and the scope of what was asked during patient encounters. Comments indicated a diffidence in how assertively occupational histories should be asked and reported. For example, one 26-year-old female intern commented, *"I ask pts what work they use to do before coming here and then what they do here now. That's it as far as occupational history."* Another 27-year-old female intern said, *"I need a lot more*

TABLE XIV
SELF-PERCEIVED FREQUENCY OF CHARTING BEHAVIORS BEFORE AND AFTER TRAINING

	Before Training (n=20 surveys)		After Training (n=20 surveys)	
	n	%	n	%
Frequency of Taking Occupational Histories on New Patient Visits				
<i>Every new patient</i>	15	75.0%	17	85.0%
<i>Most new patients</i>	3	15.0%	2	10.0%
<i>Some new patients</i>	2	10.0%	1	5.0%
<i>Few new patients</i>	0	0.0%	0	0.0%
<i>Never</i>	0	0.0%	0	0.0%
Frequency Recording Current Occupation on New Patient Visits				
<i>Every new patient</i>	19	95.0%	19	95.0%
<i>Most new patients</i>	1	5.0%	1	5.0%
<i>Some new patients</i>	0	0.0%	0	0.0%
<i>Few new patients</i>	0	0.0%	0	0.0%
<i>Never</i>	0	0.0%	0	0.0%
Frequency Recording Past Occupation on New Patient Visits				
<i>Every new patient</i>	3	15.0%	7	35.0%
<i>Most new patients</i>	5	25.0%	6	30.0%
<i>Some new patients</i>	9	45.0%	3	15.0%
<i>Few new patients</i>	3	15.0%	3	15.0%
<i>Never</i>	0	0.0%	1	5.0%
Frequency Taking Occupational History on Reexamination Visits				
<i>Every patient</i>	2	10.0%	4	20.0%
<i>Most patients</i>	6	30.0%	5	25.0%
<i>Some patients</i>	4	20.0%	4	20.0%
<i>Few patients</i>	6	30.0%	5	25.0%
<i>Never</i>	2	10.0%	2	10.0%
Frequency Recording Current Occupation on Reexamination Visits				
<i>Every patient</i>	3	15.0%	3	15.0%
<i>Most patients</i>	3	15.0%	6	30.0%
<i>Some patients</i>	7	35.0%	2	10.0%
<i>Few patients</i>	6	30.0%	5	25.0%
<i>Never</i>	1	5.0%	4	20.0%
Frequency Recording Past Occupation on Reexamination Visits				
<i>Every patient</i>	1	5.0%	2	10.0%
<i>Most patients</i>	1	5.0%	2	10.0%
<i>Some patients</i>	4	20.0%	2	10.0%
<i>Few patients</i>	6	30.0%	6	30.0%
<i>Never</i>	8	40.0%	8	40.0%

practice w/ taking occupation histories.” and “I have not taken a full/complete occupational history so may not include everything.”

Prior to training, when presented with a case vignette on the questionnaire that all interns identified as possibly being related to work, most interns (85%) asked for additional information about work from the hypothetical patient in the case study. After the interns received the training, all provided responses included inquiries regarding occupational histories.

6.3.3 Time since Training

Charting behavior changes peaked during the second month after training and then exhibited varying levels of decay over time (Table XV). These changes appear to be least sustained in taking detailed occupational history with less decay in documenting past occupation or relating the chief complaint to work (Table XV).

TABLE XV
DOCUMENTATION PRESENT IN VISITS BY TIME AFTER TRAINING

	Patient's Current Occupation		Patient's Past Occupation		Detailed Occupational History		Chief Complaint Related to Work	
	n	%	n	%	n	%	n	%
Before (n=140)	128	91.4%	51	36.4%	12	8.6%	42	30.0%
First Month (n=17)	16	94.1%	8	47.1%	0	0.0%	6	35.3%
Second Month (n=16)	16	100.0%	12	75.0%	7	43.8%	12	75.0%
Third Month (n=18)	17	94.4%	12	66.7%	2	11.1%	11	61.1%
Fourth+ Month (n=11)	11	100.0%	7	63.6%	1	9.01%	8	72.7%

6.3.4 Hierarchical Models

The multivariable hierarchical models confirmed significant changes after training in charting behaviors related to documenting past occupation (aOR=2.77; 95% CI 1.03-7.44) and relating the chief complaint to work (aOR=4.09; 95% CI 1.85-9.01) when adjusting for intern gender, intern age, intern GPA, and the presence of an additional intern (Table XVI). Documentation of current occupation (aOR=5.94; 95% CI 1.34-26.25) also improved, with the wide range in confidence interval reflecting the high documentation throughout the study. A subsequent adjusted model also showed a statistically significant impact of training on documentation of more detailed occupational histories (aOR=2.95; 95% CI 1.12-7.82).

TABLE XVI
HIERARCHICAL MODELS OF PRE- VERSUS POST-TRAINING CHARTING BEHAVIORS

	Crude				Fully Adjusted			
	OR	Confidence Interval		p-value	OR	Confidence Interval		p-value
Current Occupation	2.82	0.82	9.73	0.10	5.94	1.34	26.25	0.02
Past Occupation	2.93	1.06	8.08	0.04	2.77	1.03	7.44	0.04
Detailed Occupational History	2.02	0.67	6.05	0.21	2.95	1.12	7.82	0.03
Chief Complaint Related to Work	3.42	1.74	6.70	0.00	4.09	1.85	9.01	0.00

6.3.5 Additional Self-Reported Behaviors

It appears that interns using additional resources related to occupational health decreased after training (40.0% before and 20.0% after). Upon further examination, the resources were from more narrow sources focusing on materials from classes and seminars regarding environmental health and

clinical treatments related to rehabilitation before the training and after the training transformed to wider searches using the internet and PubMed, which suggests looking for more information about diverse work-related exposures and conditions.

When asked in the self-assessment, half of the interns reported that they would differentially ask about occupational histories based on patient demographics such as age and gender, as well as other clinical characteristics (such as body habitus and comorbidities). This study was unable to document how this would manifest or link these perceptions to behaviors in this cohort.

6.4 Discussion

Despite the unique clinical setting, the importance of occupational health history taking for chiropractors and patients with atypical employment and social histories remains germane. Appropriately taking an adequate clinical history, of which occupational information would be relevant, and integrating that information with other assessments to develop patient diagnoses is required by The Council on Chiropractic Education (The Council on Chiropractic Education, 2018). At baseline documenting current occupation was relatively high among the chiropractic interns, which is likely due to it being an available field on the original comprehensive history intake form. However, additional detailed occupational information was not usually included in the intern's documentation of the patient encounter, which may be related to their lack of using additional resources to learn more about potential occupational exposures and work-related conditions. This is similar to other assessments that find health care providers deficient in their occupational health history taking (Cimrin, Sevinc, Kundak, Ellidokuz, & Itil, 1999; Politi et al., 2004; Shofer et al., 2006; Thompson et al., 2000). This forms the basis for the National Institute for Occupational Safety and Health's interest in getting work-related variables into the Electronic Health Record and also in the development of autocoding software for narrative data on industry and occupation (Institute of Medicine, 2011; National Institute for Occupational Safety and Health, 2018).

Additional training on occupational history taking did not substantially change all occupational history recordkeeping behaviors, but we did observe a significant increase in the proportion of patient visits where their chief complaint was related to their work and past occupations in addition to current occupation were documented. The interns' perceptions of the frequency of documenting specific elements of occupational health histories, such as current or past occupation, coincided with their actual chart behaviors. Conversely, interns perceived they were documenting complete occupational health histories at a higher rate than was actually documented. This may be related to their beliefs that work impacts health and their interest in learning more about occupational health. While the training emphasized that a comprehensive occupational health history includes details on job activities and exposures, it appears that interns perceived simply documenting current and past job titles as sufficient and representative of a comprehensive occupational history.

It is impossible to determine if some interns were asking detailed questions about occupational history but failing to adequately document the occupational history on the patient records. Interventions aimed at increasing occupational health training, not necessarily occupational health history documentation, have previously focused on teaching through worksite visits, case studies, clinical skill evaluations, and lectures (Braeckman et al., 2009; Gehanno et al., 2014; Kipen & Craner, 1992; Koh, Chia, Jeyaratnam, Chia, & Singh, 1995; Schenk et al., 1999; Storey et al., 2001). Other interventions that focused on documentation relied on the use of augmented questionnaires for history taking (Lewis et al., 2002; Rosenstock, Logerfo, Heyer, & Carter, 1984; Thompson et al., 2000). These are many potential avenues for improving comprehensive occupational health history taking; however, they have limited effectiveness. While electronic health records may offer many possibilities related to documentation of occupational health history taking, the structure should be carefully examined to ensure that the appropriate level of detail is being included.

To further develop occupational history taking training, one concern to address is how to better incorporate occupational history taking in reexamination visits as opposed to new patient visits. Medical history taking tends to be most comprehensive during new patient visits so it appears this is where the occupational history taking is more readily addressed; however, occupational exposures and how an individual is affected by them can change over time. Workplace hazards and their effect on human health are significant public health problems. It is important for clinicians to regularly ask about workplace hazards just as is commonly done for smoking, alcohol consumption, and diet.

Additionally, occupational history taking training may be enhanced by periods of reinforcement. While the data is limited in this study, it suggests that training could be reinforced after the original contact to target those that were resistant to the original training or those that are having difficulty implementing these practices in their clinical encounters. This study saw the peak effect of training in the second month, suggesting it takes some time for these behaviors to become a habit. An additional training session may also be of value even further from the initial training, as the effects of training wear off which was seen in our study beginning three months after training.

The number of chief complaints related to work in this patient population was high (interns related work to their chief complaint in 59.7% of visits after training). While studies have shown that work-related conditions are encountered in approximately a quarter of patients treated in general medical practice (Thompson et al., 2000; Weevers et al., 2005), our findings indicate that chiropractors may encounter work-related musculoskeletal issues at a substantially higher rate. Musculoskeletal disorders are the most common adverse health effects reported in the BLS Survey of Occupational Injuries and Illnesses (US Bureau of Labor Statistics, 2018). The high correlation between work and the chief complaint is likely a reflection of this clinic serving patients primarily involved in new job tasks, particularly manual labor, without having become sufficiently physically conditioned. Further studies

should determine if similar behaviors and attitudes are observed in more traditional chiropractic practice settings.

Additionally, the possibility of differential documentation of occupational health histories related to age, sex and comorbidities should be further explored, as social biases may lead to decreased identification of occupational health-related risks or conditions, particularly in women, the elderly, newly employed, those with informal employment (e.g. volunteers or compulsory employment), and those employed in jobs not perceived as hazardous. While perceived discrimination of patients in clinical encounters has been reported (Hall et al., 2015), more work needs to be done to determine the effect of social biases on clinical encounters and how they may impact medical history interviews and clinical outcomes, particularly in relation to work-related conditions. It would also be important to further explore the establishment of these biases in clinical care such as whether students enter training programs with these biases, the curriculum and training reinforce these biases, or they develop in response to clinical experiences and constraints (e.g. limited duration of the patient encounter).

6.4.1 Limitations

While the small sample size restricts the conclusions that may be drawn, it demonstrates that a more comprehensive study of this nature is feasible in chiropractic clinical training programs. Due to low power, the confidence intervals are wide and are close to 1 on their lower bounds so the point estimates should be cautiously interpreted until confirmed by a larger study.

The generalizability of this study may be limited as these are interns at one clinic site seeing a specific patient population. However, many chiropractic schools have clinical internships at community clinics that may see similar populations. The patient population in the residential rehabilitation program may not be representative of most other precariously housed and precariously employed populations. Also, as these patients are not engaged in formal employment, the occupational history taking behaviors may be different from what interns do in other clinical settings treating patients with more typical or

standard employment. Regardless, occupational history taking should not be limited to patients with formal employment or those employed in specific jobs.

This study did not identify barriers to taking occupational histories by the chiropractic interns, was unable to link occupational history taking behaviors with patient characteristics, and could not separate the effects of increased clinical experience because they were all interns. The interns were required to remember to ask and document the responses to occupational history questions without the assistance of additional guides within the patient chart which may have reduced adoption of new charting behaviors, but this helps us better assess if interns internalized the training because it required them to remember to ask the questions.

6.5 Conclusion

Chiropractic interns and clinicians should be adequately trained on occupational health history documentation practices as they are likely to care for work-related injuries. Short training modules, as done with other health disciplines, appear to be effective in demonstrating small changes in the documentation related to occupational history taking. This may be expanded through additional exposure over the course of the chiropractic training and during continuing education programs. Additional research needs to be done to determine the most effective ways to foster occupational health history taking related to educational and policy changes that are meaningful for improved patient outcomes. Attention needs to be directed towards making sure students and clinicians are not neglecting to ask important clinical questions related to occupation based on social biases, especially when in unique clinical settings.

7. NEEDS EVALUATION FOR A COMPREHENSIVE REEMPLOYMENT PROGRAM AMONG RESIDENTS OF A WORK REHABILITATION PROGRAM FOR INDIVIDUALS WITH UNSTABLE OR LACK OF HOUSING

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7.1 Introduction

Adverse effects on individual well-being as a result of unemployment and underemployment are well-documented (Vuori et al., 2015; Wanberg, 2011). While employed individuals reap a multitude of benefits, including earned income to purchase necessities and the ability to participate in societal structures, both physical and psychological health may be diminished when an individual loses or is unable to attain or sustain adequate employment (Jahoda, 1982; Wanberg, 2011). This also involves a feedback loop where physical and psychological health problems precipitate unstable employment (Lappalainen, Manninen, & Räsänen, 2017; Lipscomb, Loomis, McDonald, Argue, & Wing, 2006; McCutcheon, Kramer, Edenberg, & Nurnberger, 2014). Unemployment and underemployment, in turn, are barriers to securing stable housing (Burke et al., 2013).

Shifts towards part-time, contingent work over the past several decades have led to increased job insecurity across the labor market (Vuori et al., 2015). These changes increase the vulnerability of specific job-seeking individuals, especially those who have been previously incarcerated and those who

have unstable housing or a lack of housing. The same characteristics that serve as barriers to obtaining and maintaining employment, such as having been formerly incarcerated, or having experienced substance abuse, mental illness, and physical disability, also contribute to unstable or lack of housing (Zlotnick et al., 2002).

Individuals who experience these phenomena often have large gaps in their employment histories and other challenges that further exacerbate their perceptions of employment prospects prior to finding work and job security once employed (Shier et al., 2012; van der Geest et al., 2014). Other considerations that make securing employment difficult for those with unstable or a lack of housing include inconsistent access to a mailing address, phone, and internet. Additionally, there is some evidence that employers discriminate against individuals who are members of highly incarcerated racial groups, regardless of their criminal records (Holzer et al., 2003).

Policy and legal protections for these groups related to employment and housing are lacking. In fact, individuals experiencing homelessness have no explicit protections at a federal level, but some states, like Illinois, have laws stating individuals experiencing homelessness cannot be discriminated against for employment because they lack a fixed address (Illinois Compiled Statutes, 2013). On the other hand, individuals currently using drugs have limited employment protections and are specifically omitted in the amendments to the Civil Rights Act that relate to employment discrimination. However, there may be protections for those in treatment for past drug and/or alcohol addiction under the Americans with Disabilities Act, Rehabilitation Act, and Federal Medical Leave Act (Code of Federal Regulations, 2018; US Code, 1995). There are no legal protections for ex-offenders related to housing and employment discrimination despite ex-offenders often having conditions of probation that include the probation officer's approval of housing and the requirement to maintain formal employment (Illinois Compiled Statutes, 2018; US Code, 2008).

Many agencies and organizations provide services to these populations to aid with reemployment. Despite there being many programs designed to rehabilitate and facilitate integration into society and into the workforce, there are relatively few studies that evaluate their effectiveness and most use participant self-reports and official records to measure rates of recidivism, usually within 1 year of program completion (Wright et al., 2014). There is evidence that programs that provide vocational skills training help workers to reenter the workforce following a long-term absence and employers are more likely to hire formerly incarcerated individuals who have participated in programs accessed through recognized intermediary agencies (Graham et al., 2010; Holzer et al., 2003). However, many reemployment programs focus primarily on job-specific skill training without addressing basic needs, such as transportation and housing, that may impact an individual's ability to obtain and maintain employment in the long term (Hodgson & Turner, 2003). Despite these concerns, these reemployment services serve as important sources of support for vulnerable populations who are attempting to reenter the labor force. Newer reemployment programs employing supportive employment and individual placement and support models have shown positive results in subgroups of the population, such as the severely mentally ill and disabled, that would likely be replicated in the general population (Frederick & VanderWeele, 2019). Questions remain related to the feasibility and cost-effectiveness of delivery of these reemployment programs to more general populations.

While there is a conceptual framework in public health that posits that addressing structural resources and assessing needs may positively impact outcomes (World Health Organization, 2010), there is little evidence that suggests that reemployment programs systematically assess needs and perceptions of individual participants before or upon entry into these programs (Wright et al., 2014; Zweig et al., 2011). Additionally, while these programs often serve vulnerable populations, the services provided may be the same regardless of unique individual needs and life circumstances. Therefore, it is important to assess if and how the needs of individuals within these programs differ. The aims of this

study are to (1) assess needs and barriers for reemployment among individuals of a residential rehabilitation program and (2) compare these needs and barriers between those with and without a self-reported history of unstable housing.

7.2 Methods

7.2.1 Study Population

In this mixed methods study, we recruited residents in a religious-based residential rehabilitation program in Chicago. This program has many locations nationwide. Despite the program being rooted in Christian beliefs, those not of those beliefs were allowed to participate if they completed the required activities of all participants. At this site, up to 174 individuals reside and participate in work rehabilitation. The program lasts up to 1 year and residents attend counseling and substance abuse recovery programs using the Alcoholics Anonymous model, meet with social workers, work in various occupations within the program, and prepare for employment after completing the program. Common jobs assigned to participants include reception, call centers, loading and unloading delivery trucks, retail, janitorial, and maintenance. Participants receive a small stipend, lodging, and meals for their work.

Participants come to the program via different pathways, including the criminal justice system, referral from other social services and charities, and self-referral. While not a requirement, many of these residents have experienced precarious housing, incarceration, unemployment, and other life stressors before joining the program. Participants advance through a “levels” curriculum. There is a high turnover of residents as approximately 50% are new to the facility at any given time (level one). While there is no official data on reasons for this turnover, it is not from job placement through the program. Levels one through five take approximately 1 month each. Once the participant reaches level six, they remain at this level until they leave the program as they seek alternate housing and employment. While the program generally follows a traditional two-step approach to reemployment by focusing on issues

such as substance abuse first, residents begin working within the program upon entry and begin reemployment-training beginning after 1 month.

Eligible study participants were adults who had reached level-two status and were fluent in English. It is uncertain exactly how many in the program are not fluent in English, but is estimated to be very few based on the requirements of the program. Level-two status is an internal criterion that reflects having been in the program long enough to be in the initial stages of preparing for reemployment. Convenience sampling was used.

The IRB-approved (University of Illinois at Chicago protocol #2016-0278) consent document and initial parts of the recruitment process and interviews clearly articulated that qualification for services from their program was not contingent on their participation in this study. With input from the program director, it was determined that compensation would not be offered to participants as it may pose an undue influence due to their limited income and minimal expenses as they are residents in the program with full room and board provided at no cost.

7.2.2 Interview Instrument

An initial questionnaire was developed with assistance from the UIC Survey Research Laboratory based on the known needs of those with unstable or a lack of housing, as well as the general population, when seeking future employment. During the initial development stage, 12 cognitive interviews (Willis, 2004) were conducted with the target study population to assess respondent comprehension of survey questions and make revisions as needed. The initial instrument consisted of predominantly closed-ended questions with added structured and open-ended probes for constructs that may not have been readily understood by the respondent and for questions where appropriate response dimensions were unknown. Additional unstructured probes were used when the respondent seemed uncertain or when responses were inconsistent.

Through information voluntarily offered by the respondent during the cognitive interviews and the value of the information retrieved, open-ended questions were included in the final structured interview guide. Any additional information offered by the respondent to contextualize answers was also recorded. The final instrument also queried information regarding job histories, financial and social assets, and the respondents' motivation and expectations for their return to the workforce, which was determined to be of relevance and importance in the initial development stages (Appendix I).

Appropriate changes were made to the questionnaire and 39 residents were subsequently interviewed using the structured interview guide between August 2016 and July 2017 until response saturation was reached. All interviews were conducted in-person at the residential facility by one interviewer with a request to audio record. The interviewer had no affiliation with the rehabilitation program.

7.2.3 Analysis

The interviews were transcribed into Microsoft Excel by a research assistant. Responses were read and re-read by the interviewer. Data were analyzed descriptively for this exploratory study comparing those who reported previous unstable housing to those who did not. The closed-ended responses using the final interview guide were analyzed using SAS 9.4, while the open-ended responses from all interviews were assessed in Microsoft Excel using content analysis. Content analysis allows for descriptive analysis of qualitative data similar to thematic analysis, while also taking into account a quantification of the qualitative data (Vaismoradi et al., 2013). This analysis primarily complemented the quantitative data and identified new concepts.

Coding was completed by the interviewer and another author listened to a subset of interviews to verify coding (5 (12.8%) interviews) in addition to reviewing the transcribed data file. As the interviews were structured, most responses fell within the code assigned each question; however, responses where new information emerged that highlighted information or topics were assigned new

codes to represent this added information. Discrepancies between reviewers were discussed until both reviewers agreed on the final interpretation. Responses were left in the participants' words rather than recoded to reflect external definitions of variables, such as housing status.

7.3 Results

Interviews lasted 42 minutes on average (range of 23-70 minutes) and all were audio recorded. Respondent demographic information is reported in Table XVII. Of note, over 50% of the respondents reported educational attainment beyond a high school diploma and had, on average, more than five close friends and family members. Residents with reported histories of precarious housing were disproportionately involved at earlier levels in the program, identified racially as black, and had some college or vocational training. Those that reported histories of unstable housing were also more likely to acknowledge religious or spiritual beliefs as being extremely or very important in their life (78.3% vs. 56.3%). All participants reported being born in the United States.

More than two-thirds of residents reported not having a place to live once leaving the program regardless of whether they had a history of precarious housing prior to entering the program: 73.9% of those with any reported previous unstable housing and 68.7% of those without a history of unstable housing. This is likely an underestimate as some reported having a place to live after the program, but these housing arrangements included transitional housing or precarious arrangements with family that fit the criteria for precarious housing as defined by United States law (US Code, 2012). The following section is primarily driven by the quantitative findings contextualized by the content analysis.

7.3.1 Attitudes Towards Future Employment and Reflections on Past Employment

All participants stated having a job was extremely or very important for their future. Finding a job was a priority to most participants and over 90% were confident they would get a job in the next year; however, level of preparedness and steps taken in their current job search varied (Table XVIII). Participants reporting previous unstable housing indicated that they would document approximately six

TABLE XVII
DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

	History of Precarious Housing			
	Yes (n=23)		No (n=16)	
Categorical Variables	n	%	n	%
Male	16	69.6%	12	75.0%
Level Status				
<i>Level 2</i>	8	34.8%	1	6.3%
<i>Level 3</i>	8	34.8%	2	12.5%
<i>Level 4</i>	2	8.7%	5	31.3%
<i>Level 5</i>	1	4.3%	1	6.3%
<i>Level 6</i>	3	13.0%	5	31.3%
<i>Employed</i>	1	4.3%	2	12.5%
Race and Ethnicity				
<i>Non-Hispanic Black/African American</i>	12	52.2%	5	31.3%
<i>Non-Hispanic White</i>	7	30.4%	7	43.8%
<i>Non-Hispanic Native American/Alaskan Native</i>	1	4.3%	1	6.3%
<i>Hispanic</i>	2	8.7%	0	0.0%
<i>Other/Choose not to answer</i>	1	4.3%	3	18.8%
Marital Status				
<i>Never been married</i>	15	65.2%	12	75.0%
<i>Married</i>	0	0.0%	0	0.0%
<i>Divorced/Widowed</i>	8	34.8%	4	25.0%
Member of US Armed Forces	2	8.7%	2	12.5%
Highest Level of Education				
<i>Less than HS</i>	5	21.7%	3	18.8%
<i>HS Grad/GED</i>	3	13.0%	8	50.0%
<i>Some college/Vocational training</i>	13	56.5%	4	25.0%
<i>College degree</i>	2	8.7%	1	6.3%
Continuous Variables	mean (sd)	range	mean (sd)	range
Age	45.8 (11.4)	24-61	43.9 (9.8)	26-62
Number of Dependents	0.4 (0.8)	0-2	0.1 (0.3)	0-1
Number of Close Relatives	4.9 (5.7)	1-25	5.6 (8.4)	0-30
Number of Close Friends	2.0 (1.8)	0-6	4.3 (4.8)	0-20

jobs on average on their resumes compared to an average of five jobs among those with previous stable housing. On average, it had been three months since residents had last been employed; 4.3 months for those with previous unstable housing and 1.8 months for those with previous stable housing. There was congruence between what was reported as the jobs they would document on their resumes, the jobs they felt best prepared to get now, and the best job they would like to get someday. If the type of future employment differed from past work, the jobs discussed during the interview often related to their current circumstances with many expressing interest in jobs that involved helping others that were also experiencing similar hardships such as addiction. Future aspirations of owning their own business were often reported as the best job they would like to get. A 55-year-old male said, *“Basically, just own my own business in what I'm doing now and continue to rebuild some of these neighborhoods that have just been torn completely down.”*

The group of participants with previous episodes of unstable housing was more likely to report instances of discrimination related to finding or keeping a job (52.5% vs 25.0%) and not having a desire to seek employment (21.7% vs 16.7%). Those with previous stable housing were far more likely to report feeling overqualified for jobs they applied for (43.8% vs. 18.8% underqualified), while those with previous episodes of unstable housing reported overqualification and underqualification with the same frequency (30.4%). Less than half reported their overqualifications to be a barrier in getting a job. In regard to personal assessments of preparedness for future employment, participants with previous episodes of unstable housing disproportionately reported feeling “not confident” with their computer skills compared to those with previous stable housing (Table XVIII).

7.3.2 Previous Experience with Job Training Programs

Those with previous episodes of unstable housing were more likely to report having attended previous employment training programs (69.6% vs. 50.0%). Helpful trainings were often reported to contain specific job skills, reemployment skills (resume writing and interviewing), and life skills (financial

management) training. They often reported these programs worked to build their confidence and self-esteem. Trainings that were not helpful were described as using outdated material, not having good employment placement rates, and not keeping in line with what was advertised. Additionally, there was a sense that employment training programs may not adequately consider the needs of the groups they are serving by appropriately tailoring the curriculum and resources offered. A 30-year-old female said:

“Some trainings it's just about the numbers and not about, or filling seats, and not necessarily about the people making or living a sustainable lifestyle or income. You know most of those types of programs are funded or tax deductible or whatever the case might be and it's just about putting something together really quick just to say you did it and not really meeting need. Like, when you go to an employment training you want to go and feel prepared to get a job.”

7.3.3 Barriers to Reemployment

Those with prior episodes of unstable housing also disproportionately reported psychological health issues and previous substance abuse as key barriers to finding and maintaining employment (Table XIX). Legal barriers, including issues that are reported on background checks such as debt, jail, court, or interactions with police, affected over half of the participants interviewed in both groups (Table XIX). A 45-year-old male said:

“Legal issues can basically...basically that to me when that part comes up then you're put into a separate category. Even though you might have served your time, you're still under that stigma of 'you did this'. Instead of 'you paid your time it's over', it lingers to follow you because now it puts you in this category of now you bad or someone who makes bad decisions and it's not fair. I just don't. If you done something wrong, you paid your consequence, it's over and done. But in today's society it follows you and it puts you in this category of outcast or reject and I've experienced it. Even though it's supposed to be equal opportunity employers but still once that information is gotten, they're like eh they can make a decision not to hire. Well they can't say oh we don't want to hire you because of your background check, they'll just say oh well you just don't fit what we're doing and they'll cover up and really it's to the fact that oh he has a background we don't know if we want someone like that in our establishment.”

TABLE XVIII
PERCEIVED JOB PREPAREDNESS

	History of Precarious Housing			
	Yes (n=23)		No (n=16)	
	n	%	n	%
How prepared do you feel to get a job?				
<i>Extremely/Very</i>	13	56.5%	9	56.3%
<i>Somewhat</i>	7	30.4%	6	37.5%
<i>Not very/Not at all</i>	3	13.0%	1	6.3%
Right now, how much of a priority is finding a new job?				
<i>Extreme/Important</i>	20	87.0%	12	75.0%
<i>Somewhat</i>	2	8.7%	2	12.5%
<i>Not important/Not at all</i>	1	4.3%	2	12.5%
How confident are you that you have enough _____ for the job you want?				
Math Skills				
<i>Extremely/Very</i>	17	73.9%	11	68.8%
<i>Somewhat</i>	5	21.7%	5	31.3%
<i>Not very/Not at all</i>	1	4.3%	0	0.0%
Reading Skills				
<i>Extremely/Very</i>	21	91.3%	14	87.5%
<i>Somewhat</i>	1	4.3%	2	12.5%
<i>Not very/Not at all</i>	1	4.3%	0	0.0%
Computer Skills				
<i>Extremely/Very</i>	12	52.2%	8	50.0%
<i>Somewhat</i>	2	8.7%	7	43.8%
<i>Not very/Not at all</i>	9	39.1%	1	6.3%
People Skills				
<i>Extremely/Very</i>	23	100.0%	14	87.5%
<i>Somewhat</i>	0	0.0%	2	12.5%
<i>Not very/Not at all</i>	0	0.0%	0	0.0%
Writing Skills				
<i>Extremely/Very</i>	17	73.9%	10	62.5%
<i>Somewhat</i>	5	21.7%	5	31.3%
<i>Not very/Not at all</i>	1	4.3%	1	6.3%
Steps Taken in Current Job Search				
<i>Thought about employment</i>	22	95.7%	15	93.8%
<i>Attended job training program</i>	6	26.1%	3	18.8%
<i>Prepared resume</i>	16	69.6%	12	75.0%
<i>Attended job fairs</i>	4	17.4%	2	12.5%
<i>Applied for jobs</i>	9	39.1%	7	43.8%
<i>Attended interviews</i>	8	34.8%	3	18.8%
<i>Other</i>	11	47.8%	4	25.0%

TABLE XIX
BARRIERS TO REEMPLOYMENT

	History of Precarious Housing															
	Yes (n=23)								No (n=16)							
	Great degree		Moderate degree		Small degree		Not at all		Great degree		Moderate degree		Small degree		Not at all	
To what degree does a _____ your ability to be hired or keep a job?	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<i>physical health condition or illness that you have been treated for currently affect</i>	0	0.0 %	3	13.0 %	4	17.4 %	16	69.6 %	0	0.0 %	1	6.3 %	3	18.8 %	12	75.0 %
<i>psychological or nervous condition that you have been treated for currently affect</i>	1	4.3 %	1	4.3 %	3	13.0 %	18	78.3 %	0	0.0 %	1	6.3 %	1	6.3 %	14	87.5 %
<i>past or present legal problems currently affect</i>	4	17.4 %	4	17.4 %	5	21.7 %	10	43.5 %	4	25.0 %	4	25.0 %	2	12.5 %	6	37.5 %
<i>past substance abuse problems previously affected</i>	9	39.1 %	6	26.1 %	3	13.0 %	5	21.7 %	1	6.3 %	4	25.0 %	3	18.8 %	8	50.0 %
<i>past or present substance abuse problems currently affect</i>	2	8.7 %	0	0.0 %	3	13.0 %	18	78.3 %	0	0.0 %	0	0.0 %	3	18.8 %	13	81.3 %
<i>responsibilities to care for a child or other family member currently affect</i>	0	0.0 %	1	4.3 %	0	0.0 %	22	95.7 %	0	0.0 %	1	6.3 %	0	0.0 %	15	93.8 %

The majority of participants were more likely to attribute their unemployment to reasons that were within their personal control rather than structural determinants or macroeconomic factors such as the recession (68.6% overall). For example, a 57-year-old male exemplified this when he said:

“Because you do what you got to do. You control your own destiny, if you want to work you have to put in the effort too, it's not gonna come to you, things are not gonna knock on your door, life's not like that. You have to go get what you want.”

7.3.4 Employment Program Needs

Aside from having the ability to attend job fairs and guidance for workplace interactions and expectations, those with previous episodes of unstable housing were more likely to report transportation, housing, and financial needs as important in supporting their transition to employment (Table XX). Despite these needs being overwhelmingly reported as being of personal importance, less than half felt each of these needs were addressed in the program. The largest disparity between self-reported need and availability for support within the program was funding for housing to assist in their transition to stable employment. One 52-year-old man, described the challenges of getting a place to live once becoming employed:

“I got 30 days to find an apartment. If I start a job after 30 days, nine out of ten I'm not gonna get paid for two weeks so that means, okay, we'll say cause if I got in and the pay period is, I'm gonna go in a new pay period, I'm not gonna get my first check for three weeks almost, that's one check. Now how am I gonna move into a new apartment when let's say my one check is, I'll just give you a small, say I take home \$700, after taxes I'm taking home \$700 now I gotta get back to work two weeks, I only got one other week left to find somewhere to stay. Now there's no places that's immediately gonna let me in cause they got me on some waiting list or something so you know where's the help at? That's what I mean they put you in positions that are unsuccessful. ... Now if you had somewhere that you have \$500 and you need \$1500 well okay he did save up \$500 which is showing on my part that hey I have this and you know you already know I only got one check, I got to get back and forth, I got to eat and if a place were to give you assistance then that would be great. It would also be great if they had some places where they could help you get into it.”

A large proportion of respondents regardless of history of precarious housing reported that the program needs additional employment services and assistance to meet basic needs.

TABLE XX
EMPLOYMENT PROGRAM NEEDS

	History of Precarious Housing			
	Yes (n=23)		No (n=16)	
Needs of Personal Importance	n	%	n	%
<i>Transportation</i>	22	95.7%	14	87.5%
<i>Funding for transportation</i>	21	91.3%	13	81.3%
<i>Housing</i>	22	95.7%	14	87.5%
<i>Funding for housing</i>	22	95.7%	13	81.3%
<i>Ability to attend job fairs</i>	18	78.3%	15	93.8%
<i>Knowledge of hiring companies</i>	22	95.7%	14	87.5%
<i>Guidance for workplace interactions and expectations</i>	18	78.3%	13	81.3%
<i>Financial management</i>	15	65.2%	9	56.3%
Program Needs	n	%	n	%
<i>Transportation</i>	13	56.5%	9	56.3%
<i>Funding for transportation</i>	21	91.3%	11	68.8%
<i>Housing</i>	19	82.6%	9	56.3%
<i>Funding for housing</i>	23	100.0%	16	100.0%
<i>Ability to attend job fairs</i>	18	78.3%	8	50.0%
<i>Knowledge of hiring companies</i>	18	78.3%	14	87.5%
<i>Guidance for workplace interactions and expectations</i>	17	73.9%	8	50.0%
<i>Financial management</i>	21	91.3%	14	87.5%

Enhanced employment services that were discussed by the participants included additional education or vocational training, renewal of licenses needed for specific employment such as forklift operator's license, training on interviewing and other skills, access to job-appropriate attire or money to purchase such clothing, and additional time to transition to fully independent living. Additional basic needs discussed by the residents included continued program support after transitioning to community living (aftercare programs), access to medical and mental health services, access to a cell phone, budget training, and assistance with obtaining a driver's license.

The following section contains emerging themes identified solely through content analysis.

7.3.5 Time

Lack of time was mentioned as an important barrier to reemployment. The participants reported a need for sufficient time to partake in the job search, the timing of when the program began to offer assistance with different aspects of a job search, such as the introduction of computer privileges, and the time needed to complete each of these steps. A 50-year-old male discussed this in the context of the amount of time he could dedicate to the job search despite having been in the program for six months, saying:

"It's like here, you don't get a phone till ... like 6 months into the program and then it's like you get one job search day per week so you only look for jobs 4 times a month ... but you've been here 6 months already so you haven't been interacting with anybody, haven't got any job leads so now all of a sudden it's like you need to find a job. ... Oh yeah, you can call in the daytime or something like that but the only thing is that I can call you, but when you call me back I'm not able to talk to you because say I'm in work therapy so you leave a message so then I call you back and then you return the call and then you leave another message so it's like not communicating period."

7.3.6 Communication

Communication manifested in two important ways. First, it was unclear to many of the respondents what services were provided in the program and when participants could access reemployment services during the program (i.e. timing). A 56-year-old male was unsure what was offered in the program saying *"Well I'm not sure if they do that yet, maybe when I get into another level*

they might do all those things I said needed to but I'm not sure." Additionally, limited access to phone and internet service was identified as a critical barrier to reemployment, such as described above regarding the ability to call and communicate with potential employers.

7.3.7 Fear of Relapse

While participants were eager to become employed, many expressed fear of relapse related to substance abuse. Some causes of relapse that were expected included going out on their own too early, not having stable employment, and lack of stable housing that would lead them to their lives back on the streets. The structure of their work, such as various shiftwork and long commutes, also contributed to a fear of relapse as they prevented participants from attending and accessing support programs such as Alcoholics Anonymous or Narcotics Anonymous meetings for continued sobriety. A 34-year-old male described missing meetings due to his work hours and commute:

"The hours at my last job- 11-7 every day. Because I knew that I'm the type of person that would need a meeting during the day, 11-7 is not me going to the job and then coming home, I'm unable to get a meeting in anytime between then. Cause I'd have to get up at, where I was staying at I'd have to leave there at 8 o'clock in the morning, travel two hours to get to the job and two hours back."

Participants also reported that the workplaces themselves encouraged relapse, as drugs and alcohol were readily accessible in those environments. A 36-year-old female illustrated this when she said, *"In the culinary industry there's alcohol all over the place. Being surrounded by it, yeah definitely fearful of relapse."* Similarly, one 37-year-old man stated that his workplace was where he could find the best drugs, saying *"This might sound bad but [company omitted] has really good drugs, and [company omitted] had really good drugs I know that's bad to say."*

7.3.8 Goals and Planning

Unexpectedly, many respondents reported enjoying the interviews because it made them consider many elements related to their transition to employment. A 43-year-old male described the

interview, saying, *“It was like going to school, made me think about stuff and that I gotta go back and rethink.”*

Additionally, respondents expressed surprise and discomfort when asked about the best job they would like to get someday as it was something they never really considered or had been asked previously. One 57-year-old male said *“One day? Oh, that’s a good question, the best job I would like to be...well...”* Another respondent, a 30-year-old male, showed how hard it is to plan and think about their future employment *“I never thought of it like that, I never went as far out as to...”*

7.4 Discussion

Overall, participants reported that these programs are beneficial and necessary, but enhancements should be made to improve their employment and housing prospects. These participants, beneficiaries in a residential rehabilitation program, demonstrated a high level of personal accountability for their circumstances and were willing to follow rules set by others, which has been noted among the unstably housed who choose to stay in shelters (Rossi, 1989). The structure of this program is also in alignment with many other programs that treat addiction and mental illness as a root cause; these programs often ignore or diminish the importance of services, such as job training or placement, geared towards overcoming economic constraints (Wasserman & Clair, 2010).

While the participants in this study generally acknowledged the need for the services in addressing their history of substance abuse, many expressed frustrations about not being able to do enough to change their life circumstances that resulted in their dependency on the program for housing, clothing, and meals. There is increasing evidence that abstinence-based pathways may not be the preferred method of recovery and the focus should be on helping individuals fulfill their basic needs and increase their quality-of-life (Collins et al., 2016).

These participants also had extensive work histories, which is seen in other groups with substance abuse and lack of regular employment (Draus, Roddy, & Greenwald, 2010), and implies that

obtaining employment is not simply an issue of not having a job or job search skills. This aligns with evidence that participants find value in reemployment programs that reinforce life skills (Graham et al., 2010). Business ownership in areas related to their work history was expressed as a goal of many participants and may allow them to bypass some of the barriers they cited regarding employment. Offering small business ownership training may serve as an opportunity to teach life skills (such as financial management in the context of career-building) and motivate participants through building self-esteem related to their aspirations.

Addressing reemployment needs and barriers in a more direct and substantial way may be of benefit to the program and its beneficiaries. While more work needs to be done to confirm these findings, these data suggest there are significant ways to improve these programs.

7.4.1 Program Recommendations

Programs may consider adding an enhanced individual needs assessments early in enrollment. Ideally, this would be done with a counselor or outside party, as there could be concerns regarding confidentiality. From this initial screening, participants could be connected to services and resources most in line with their needs and goals. It may also help to identify cases that require more specialized, one-on-one intervention or areas in which sustained mentorship may be beneficial. This does not mean that every element of the program needs to be individually tailored, as there was an acknowledgment that programs are designed with the collective needs of the group in mind and that the structure offered is beneficial. Rather, it is important to recognize participants' unique experiences to provide an environment that fosters empathy and a feeling of being heard. This may help to include some principles of successful individualized placement and support models without needing as many resources.

Not only would a needs assessment offer the program a view on how to provide more comprehensive supportive services as needed and the possibility for participants to feel recognition as individuals in the program, but this practice also may serve as an opportunity for participants to conduct

a self-assessment of areas they have overlooked in their personal lives. Participants in our study found the process of going through the interviews informative and helped them identify how they can better prepare for the transition back to the community. This can help the residents focus on realistic future goals and how to achieve them in a systematic manner.

While it may be convenient for individual needs assessments to be self-administered and primarily consist of closed-ended questions, there would likely be much information missed. If the needs assessments cannot be done in-person, space for open-ended questions or comments is of critical importance. For example, when asking about confidence in their skill level, participants would comment on why they were selecting a response which would often express additional training needs or why a skill was more applicable to the line of work they were interested in. Additionally, some participants reported being affected by legal barriers only to a small degree or not at all, as they felt they worked around these barriers by simply not applying for jobs that would require a background check. Participants often shared the personal adjustments they made, but these workarounds did not expand reemployment options and failed to address some root causes.

There was discontent among participants in the uncertainty of what they could expect and when during the course of the program. To address this, transparency and clear communication are needed to articulate the expectations for the program, including at what point certain services are offered. There was also concern that communication was not uniform, with some participants receiving all the relevant information and others not. Increased transparency can improve a sense of equitable access to resources within the program and better manage expectations over time.

7.4.2 Policy Implications

Some jobs present real concerns to participants that may outweigh the benefit of having a job. The goal should not be simply to find reemployment. For some, the work environment exposes them to risk factors, such as access to drugs and alcohol, which could trigger a relapse. There is literature on how

substance abuse can negatively impact the workplace, but more research should be done on how the workplace influences and exacerbates substance abuse. Workers should also be educated about their rights related to their protections for ongoing substance abuse treatment and policies strengthened to support employment throughout recovery.

In addition, many held the view that any job would be adequate in helping them reintegrate into the larger society. In particular, many did not understand the risks associated with temporary employment positions. Temporary work may not allow for the pathway to permanent employment, contrary to what many assumed, which would only create future instability. Longer-term access to supportive resources may help alleviate these concerns; however, participants realized there would be no supports once they were employed. Development of appropriate outcome measures that take in to account the long-term potential of employment should be considered, with funding agencies and others adopting these measures.

One element of concern is that the largest barriers and needs are often not adequately addressed. Specifically, participants indicated that legal barriers and access to basic necessities including money and housing support were fundamental issues that needed to be addressed. Programs that explicitly engage with these individuals should anticipate their needs and directly address them in their programs or collaborate with other social programs to better address these basic needs. While it may be unlikely that legal services and additional housing could be provided through every individual program, achieving program goals may be hampered by not addressing these fundamental needs. For example, programs addressing recidivism of prisoners often do not provide legal services but rather focus on life and employment skills that might benefit a wider population but are more difficult to successfully apply for former prisoners (Olson, 2013; Zweig et al., 2011).

Housing status after treatment programs is highly correlated with the individual's housing status and income prior to treatment. Therefore, obtaining a job and leaving a treatment program may not be

sufficient for long-term housing and economic stability (Dyb, 2016). In particular, the startup costs for getting a rental, establishing adequate credit histories, and learning to budget finances are not frequently addressed in these programs. It may result in greater program success if these structural issues receive attention. Funding agencies could consider having programs leverage other community resources to best mitigate the largest barriers.

7.4.3 Limitations

Individuals with unstable or a lack of housing that agree to live in shelters or rehabilitation programs are known to be different from other subgroups of those experiencing homelessness (Wasserman & Clair, 2010), which may limit the generalizability of this needs assessment. Because participants in this study are already engaged in a program, it is possible that they were more invested to successfully transition back into employment; however, these are the people that transition programs are ideally designed for because a person must be ready for change (Coppin, 2017). Additionally, this study was designed to explore a wide range of factors that impact post-program employment. While this may help to identify areas of needs that are of importance to this group, it is likely inadequate in fully informing the details of programmatic development. Also, this study is cross-sectional in nature so none of the self-reported needs or assets identified can be linked to successful employment. Perhaps the most important limitation, though, is that this research was conducted in one program in one location only. Nonetheless, the information gathered may be helpful in identifying services that are more appealing to those in this position and their implementation may facilitate meaningful outcomes.

7.5 Conclusions

Residential rehabilitation programs, such as the one in this study, are often acknowledged as a great resource to their beneficiaries. Programs often focus on employment as a crucial step in improving an individual's life circumstances. Services could be enhanced by carefully assessing the needs of each participant and allowing for some individualization of reemployment preparation that also focuses on

basic needs. Where there are resource constraints in meeting needs, community partnerships could be established to create a social support network for these individuals. Programs, funding agencies, and policymakers should develop evaluation tools with metrics and emphasize actions that support long-term, sufficient employment. An area that may show promise are small business ownership training, as it was a goal of many and offers an independent route to reemployment for those with legal barriers.

8. DISCUSSION

8.1 Summary

8.1.1 Hospital Data

Based on hospital billing data, the estimated number of unique homeless individuals is increasing in contrast to HUD estimates showing a significant average annual decline of 544 homeless individuals per year. The hospital data exceeds the HUD estimates by the year 2016 even when using the most conservative deduplication strategy. This implies a substantial undercount in HUD estimates based on PIT counts even though it is unlikely that every homeless individual would be treated in a hospital in any given year. In one study, approximately one-third of those in a health care program for the homeless were hospitalized and two-thirds had an emergency department visit (Lin et al., 2015). Hospital data will likely miss healthier and younger homeless individuals that are unsheltered, living in vehicles, or temporarily homeless due to socioeconomic conditions.

There may be many explanations for the increases seen in Illinois hospital visits by those identified as homeless, such as better identification of these individuals by providers and enhanced reporting within hospital systems. As identification and reporting improve, hospital claims become a more viable source to estimate counts of homelessness that could augment current HUD PIT estimates. Hospital claims data also present opportunities to determine the impact of policy changes on those affected by homelessness (Kanak et al., 2018).

Other explanations for the increase in visits include increased hospital utilization by homeless individuals. Homeless individuals have been reported to be more likely than non-homeless to seek care at an emergency department (Fazel et al., 2014). Increased Medicaid coverage through the Patient Protection and Affordable Care Act, implemented January 1, 2014, may allow for increased access of care outside of emergency departments, this population has still shown higher rates of hospitalizations

visits despite Medicaid or universal health care coverage which may be due to a lack of alternative services (Fazel et al., 2014; Lin et al., 2015).

The HUD PIT estimates provide critical data, but due to limitations in defining and accessing the homeless population, supplementing their estimates with alternative data sources would enhance surveillance. Different sources have been proposed, such as Department of Education, American Community Survey, and other data to help augment measures for specific sub-populations of the homeless (Chicago Coalition for the Homeless, 2019; National Law Center on Homelessness & Poverty, 2017). While using hospital data may not adequately capture healthy individuals or those that seek care elsewhere, it could capture estimates for larger geographical areas, provide a way to measure some of those often missed in PIT counts, and continuously capture data throughout the year through a data system in existence in almost every state.

This study found that the large majority of hospital visits in Illinois for the homeless had comorbidities of depression, psychoses and/or substance abuse (70.2%). While only a small fraction of visits were treated for acute injuries, the most common causes of injury were from weather-related risks, falls, and from being assaulted. Mental health issues were the most common primary diagnosis across all major age-groups, even in children. Among the hospital visits for the female homeless, pregnancy complications were identified in the top 5 primary diagnoses. The large majority of visits (81.9%) had a routine discharge to home or self-care (76.4% of inpatient visits and 87.4% of outpatient visits) which for this population would predominately involve returning to their homeless conditions. However, this study demonstrates that disparities persist for racial groups or those that are uninsured. Most importantly, African-Americans represented 40% of the hospital visits despite representing less than 15% of the Illinois population (or approximately 30% in Chicago), and African-Americans were far less likely to be discharged to a secondary facility.

This work confirms what has been observed in other studies examining the health concerns of the homeless, as we have a high prevalence of mental disorders, substance abuse, infectious disease, chronic diseases seen at an earlier age, and injuries (Fazel et al., 2014; Lam et al., 2016; Lin et al., 2015; Mitchell et al., 2017) and observed very few patients over the age of 75 years. There has traditionally been a lot of focus on homeless subpopulations suffering from health conditions with significant consequences, such as HIV/AIDS. This data shows there is a higher prevalence of other conditions that also warrant care and exclusively focusing on very narrow subgroups may be missing much larger proportions of this population resulting in unintended adverse health consequences.

There remains a significant burden of care and cost on hospitals for the healthcare of those affected by homelessness. However, with the implementation of the insurance coverage expansion in Illinois because of the Affordable Care Act in 2014, the proportion of patient visits without any insurance coverage decreased dramatically. While reimbursement rates fluctuate, it can be assumed they are significantly lower than \$2.34 billion dollars in charges for this population found in this study. These charges only represent one component of direct costs and do not account for indirect costs to individuals, hospitals or society. Additionally, these visits are concentrated in a small percentage of hospitals within the state of Illinois and demonstrates that this burden of care falls disproportionately on specific facilities. While it may be hard to adequately address and accommodate at the facility level, this clustering of visits may provide benefits when trying to reach this population or implement interventions that provide a transition from homelessness to residency programs.

Because of limited resources, it is not feasible to develop transition programs in every hospital but our data show that programs could be housed in a small fraction of hospitals that treat the vast majority of the homeless population seen in emergency departments. Discharge to medical respite programs which are short-term residential care programs for those too sick to be discharged back to the streets have demonstrated some success in limiting readmissions, but it occurs far less frequently. Most

homeless individuals are discharged to other settings which have not been shown to achieve similar results as medical respite programs (Kertesz et al., 2009). Safety-net hospitals, which provide care regardless of insurance status or ability to pay, are more likely to serve this population but have been shown to employ fewer strategies to reduce readmissions (Figueroa et al., 2017). Additionally, the Patient Protection and Affordable Care Act implementation (January 1, 2014) may allow for increased access of care outside of emergency departments, but this population has shown frequent hospitalizations and emergency department visits despite this coverage, which may be due to a lack of alternative services (Lin et al., 2015). Therefore, more comprehensive interventions are indicated to better address the health needs of those with unstable or lack of housing.

While those with insurance coverage are better able to access mental health treatment, Illinois has one of the lowest Medicaid-to-Medicare fee ratios resulting in physicians getting reimbursed much less through Medicaid than they would receive for the same service through Medicare. This can create a barrier for the Medicaid population in accessing services as providers may be more reluctant to treat this population and may in part be responsible for the behavioral health care professional shortage in Illinois (14 professionals per 10,000 residents compared to the already less-than-ideal national average of 21 per 10,000) (Heun-Johnson et al., 2018). There has been a pronounced decline in mental health services and facilities beginning in the 1960s. Illinois spends \$77 per capita on mental health services compared to the \$133 national average, with approximately three-quarters of those funds going to community-based mental health programs funded or operated by state mental health agencies and one-quarter to mental health services in state psychiatric hospitals (Heun-Johnson et al., 2018). Mental illness is a known risk factor for incarceration and still has a significant direct and indirect costs to individuals and societies (Heun-Johnson et al., 2018), which is more pronounced in those affected by homelessness.

8.1.2 Occupational History Taking

Despite the unique clinical setting, the importance of occupational health history taking for chiropractors and patients with atypical employment and social histories remains germane. Appropriately taking an adequate clinical history, of which occupational information would be relevant, and integrating that information with other assessments to develop patient diagnoses is required by The Council on Chiropractic Education (The Council on Chiropractic Education, 2018). At baseline documenting current occupation was relatively high among the chiropractic interns, which is likely due to it being an available field on the original comprehensive history intake form. However, additional detailed occupational information was not usually included in the intern's documentation of the patient encounter, which may be related to their lack of using additional resources to learn more about potential occupational exposures and work-related conditions. This is similar to other assessments that find health care providers deficient in their occupational health history taking (Cimrin et al., 1999; Politi et al., 2004; Shofer et al., 2006; Thompson et al., 2000). This forms the basis for the National Institute for Occupational Safety and Health's interest in getting work-related variables into the Electronic Health Record and also in the development of autocoding software for narrative data on industry and occupation (Institute of Medicine, 2011; National Institute for Occupational Safety and Health, 2018).

Additional training on occupational history taking did not substantially change all occupational history recordkeeping behaviors, but we did observe a significant increase in the proportion of patient visits where their chief complaint was related to their work and past occupations in addition to current occupation were documented. The interns' perceptions of the frequency of documenting specific elements of occupational health histories, such as current or past occupation, coincided with their actual chart behaviors. Conversely, interns perceived they were documenting complete occupational health histories at a higher rate than was actually documented. This may be related to their beliefs that work impacts health and their interest in learning more about occupational health. While the training

emphasized that a comprehensive occupational health history includes details on job activities and exposures, it appears that interns perceived simply documenting current and past job titles as sufficient and representative of a comprehensive occupational history.

It is impossible to determine if some interns were asking detailed questions about occupational history but failing to adequately document the occupational history on the patient records.

Interventions aimed at increasing occupational health training, not necessarily occupational health history documentation, have previously focused on teaching through worksite visits, case studies, clinical skill evaluations, and lectures (Braeckman et al., 2009; Gehanno et al., 2014; Kipen & Craner, 1992; Koh et al., 1995; Schenk et al., 1999; Storey et al., 2001). Other interventions that focused on documentation relied on the use of augmented questionnaires for history taking (Lewis et al., 2002; Rosenstock et al., 1984; Thompson et al., 2000). These are many potential avenues for improving comprehensive occupational health history taking; however, they have limited effectiveness. While electronic health records may offer many possibilities related to documentation of occupational health history taking, the structure should be carefully examined to ensure that the appropriate level of detail is being included.

To further develop occupational history taking training, one concern to address is how to better incorporate occupational history taking in reexamination visits as opposed to new patient visits. Medical history taking tends to be most comprehensive during new patient visits so it appears this is where the occupational history taking is more readily addressed; however, occupational exposures and how an individual is affected by them can change over time. Workplace hazards and their effect on human health are significant public health problems. It is important for clinicians to regularly ask about workplace hazards just as is commonly done for smoking, alcohol consumption, and diet.

Additionally, occupational history taking training may be enhanced by periods of reinforcement. While the data is limited in this study, it suggests that training could be reinforced after the original

contact to target those that were resistant to the original training or those that are having difficulty implementing these practices in their clinical encounters. This study saw the peak effect of training in the second month, suggesting it takes some time for these behaviors to become a habit. An additional training session may also be of value even further from the initial training, as the effects of training wear off which was seen in our study beginning three months after training.

The number of chief complaints related to work in this patient population was high (interns related work to their chief complaint in 59.7% of visits after training). While studies have shown that work-related conditions are encountered in approximately a quarter of patients treated in general medical practice (Thompson et al., 2000; Weevers et al., 2005), our findings indicate that chiropractors may encounter work-related musculoskeletal issues at a substantially higher rate. Musculoskeletal disorders are the most common adverse health effects reported in the BLS Survey of Occupational Injuries and Illnesses (US Bureau of Labor Statistics, 2018). The high correlation between work and the chief complaint is likely a reflection of this clinic serving patients primarily involved in new job tasks, particularly manual labor, without having become sufficiently physically conditioned. Further studies should determine if similar behaviors and attitudes are observed in more traditional chiropractic practice settings.

Additionally, the possibility of differential documentation of occupational health histories related to age, sex and comorbidities should be further explored, as social biases may lead to decreased identification of occupational health-related risks or conditions, particularly in women, the elderly, newly employed, those with informal employment (e.g. volunteers or compulsory employment), and those employed in jobs not perceived as hazardous. While perceived discrimination of patients in clinical encounters has been reported (Hall et al., 2015), more work needs to be done to determine the effect of social biases on clinical encounters and how they may impact medical history interviews and clinical outcomes, particularly in relation to work-related conditions. It would also be important to further

explore the establishment of these biases in clinical care such as whether students enter training programs with these biases, the curriculum and training reinforce these biases, or they develop in response to clinical experiences and constraints (e.g. limited duration of the patient encounter).

8.1.3 Reemployment Needs

Overall, participants reported that these programs are beneficial and necessary, but enhancements should be made to improve their employment and housing prospects. These participants, beneficiaries in a residential rehabilitation program, demonstrated a high level of personal accountability for their circumstances and were willing to follow rules set by others, which has been noted among the unstably housed who choose to stay in shelters (Rossi, 1989). The structure of this program is also in alignment with many other programs that treat addiction and mental illness as a root cause; these programs often ignore or diminish the importance of services, such as job training or placement, geared towards overcoming economic constraints (Wasserman & Clair, 2010).

While the participants in this study generally acknowledged the need for the services in addressing their history of substance abuse, many expressed frustrations about not being able to do enough to change their life circumstances that resulted in their dependency on the program for housing, clothing, and meals. There is increasing evidence that abstinence-based pathways may not be the preferred method of recovery and the focus should be on helping individuals fulfill their basic needs and increase their quality-of-life (Collins et al., 2016).

These participants also had extensive work histories, which is seen in other groups with substance abuse and lack of regular employment (Draus et al., 2010), and implies that obtaining employment is not simply an issue of not having a job or job search skills. This aligns with evidence that participants find value in reemployment programs that reinforce life skills (Graham et al., 2010). Business ownership in areas related to their work history was expressed as a goal of many participants and may allow them to bypass some of the barriers they cited regarding employment. Offering small

business ownership training may serve as an opportunity to teach life skills (such as financial management in the context of career-building) and motivate participants through building self-esteem related to their aspirations.

Addressing reemployment needs and barriers in a more direct and substantial way may be of benefit to the program and its beneficiaries. While more work needs to be done to confirm these findings, these data suggest there are significant ways to improve these programs.

Programs may consider adding an enhanced individual needs assessments early in enrollment. Ideally, this would be done with a counselor or outside party, as there could be concerns regarding confidentiality. From this initial screening, participants could be connected to services and resources most in line with their needs and goals. It may also help to identify cases that require more specialized, one-on-one intervention or areas in which sustained mentorship may be beneficial. This does not mean that every element of the program needs to be individually tailored, as there was an acknowledgment that programs are designed with the collective needs of the group in mind and that the structure offered is beneficial. Rather, it is important to recognize participants' unique experiences to provide an environment that fosters empathy and a feeling of being heard. This may help to include some principles of successful individualized placement and support models without needing as many resources.

Not only would a needs assessment offer the program a view on how to provide more comprehensive supportive services as needed and the possibility for participants to feel recognition as individuals in the program, but this practice also may serve as an opportunity for participants to conduct a self-assessment of areas they have overlooked in their personal lives. Participants in our study found the process of going through the interviews informative and helped them identify how they can better prepare for the transition back to the community. This can help the residents focus on realistic future goals and how to achieve them in a systematic manner.

While it may be convenient for individual needs assessments to be self-administered and primarily consist of closed-ended questions, there would likely be much information missed. If the needs assessments cannot be done in-person, space for open-ended questions or comments is of critical importance. For example, when asking about confidence in their skill level, participants would comment on why they were selecting a response which would often express additional training needs or why a skill was more applicable to the line of work they were interested in. Additionally, some participants reported being affected by legal barriers only to a small degree or not at all, as they felt they worked around these barriers by simply not applying for jobs that would require a background check. Participants often shared the personal adjustments they made, but these workarounds did not expand reemployment options and failed to address some root causes.

There was discontent among participants in the uncertainty of what they could expect and when during the course of the program. To address this, transparency and clear communication are needed to articulate the expectations for the program, including at what point certain services are offered. There was also concern that communication was not uniform, with some participants receiving all the relevant information and others not. Increased transparency can improve a sense of equitable access to resources within the program and better manage expectations over time.

Some jobs present real concerns to participants that may outweigh the benefit of having a job. The goal should not be simply to find reemployment. For some, the work environment exposes them to risk factors, such as access to drugs and alcohol, which could trigger a relapse. There is literature on how substance abuse can negatively impact the workplace, but more research should be done on how the workplace influences and exacerbates substance abuse. Workers should also be educated about their rights related to their protections for ongoing substance abuse treatment and policies strengthened to support employment throughout recovery.

In addition, many held the view that any job would be adequate in helping them reintegrate into the larger society. In particular, many did not understand the risks associated with temporary employment positions. Temporary work may not allow for the pathway to permanent employment, contrary to what many assumed, which would only create future instability. Longer-term access to supportive resources may help alleviate these concerns; however, participants realized there would be no supports once they were employed. Development of appropriate outcome measures that take in to account the long-term potential of employment should be considered, with funding agencies and others adopting these measures.

One element of concern is that the largest barriers and needs are often not adequately addressed. Specifically, participants indicated that legal barriers and access to basic necessities including money and housing support were fundamental issues that needed to be addressed. Programs that explicitly engage with these individuals should anticipate their needs and directly address them in their programs or collaborate with other social programs to better address these basic needs. While it may be unlikely that legal services and additional housing could be provided through every individual program, achieving program goals may be hampered by not addressing these fundamental needs. For example, programs addressing recidivism of prisoners often do not provide legal services but rather focus on life and employment skills that might benefit a wider population but are more difficult to successfully apply for former prisoners (Olson, 2013; Zweig et al., 2011).

Housing status after treatment programs is highly correlated with the individual's housing status and income prior to treatment. Therefore, obtaining a job and leaving a treatment program may not be sufficient for long-term housing and economic stability (Dyb, 2016). In particular, the startup costs for getting a rental, establishing adequate credit histories, and learning to budget finances are not frequently addressed in these programs. It may result in greater program success if these structural

issues receive attention. Funding agencies could consider having programs leverage other community resources to best mitigate the largest barriers.

8.2 Limitations

There are several limitations related to the use of hospital discharge data. First, the lack of unique identifiers to deterministically identify the number of individuals seen in Illinois hospitals that are affected by homelessness. Additionally, misclassification is a concern as many individuals may not be coded as having a lack of housing or affected by homelessness and there is no way to validate the cases in terms of those presently without shelter, duration of lack of housing, or cause of lack of housing. Because of common social biases for this population, substance abuse and mental illness may be coded differently in this population. Additionally, ICD9 and ICD10 codes cannot be cross-walked in a one-to-one fashion and there may be some lost information that is incongruent between the two systems.

While the small sample size restricts the conclusions that may be drawn in the occupational history taking study, it demonstrates that a more comprehensive study of this nature is feasible in chiropractic clinical training programs. Due to low power, the confidence intervals are wide and are close to 1 on their lower bounds so the point estimates should be cautiously interpreted until confirmed by a larger study. The generalizability of this study may be limited as these are interns at one clinic site seeing a specific patient population. However, many chiropractic schools have clinical internships at community clinics that may see similar populations. The patient population in the residential rehabilitation program may not be representative of most other precariously housed and precariously employed populations. Also, as these patients are not engaged in formal employment, the occupational history taking behaviors may be different from what interns do in other clinical settings treating patients with more typical or standard employment. Regardless, occupational history taking should not be limited to patients with formal employment or those employed in specific jobs.

This study did not identify barriers to taking occupational histories by the chiropractic interns, was unable to link occupational history taking behaviors with patient characteristics, and could not separate the effects of increased clinical experience because they were all interns. The interns were required to remember to ask and document the responses to occupational history questions without the assistance of additional guides within the patient chart which may have reduced adoption of new charting behaviors, but this helps us better assess if interns internalized the training because it required them to remember to ask the questions.

Individuals with unstable or a lack of housing that agree to live in shelters or rehabilitation programs are known to be different from other subgroups of those experiencing homelessness (Wasserman & Clair, 2010), which may limit the generalizability of this needs assessment. Because participants in this study are already engaged in a program, it is possible that they were more invested to successfully transition back into employment; however, these are the people that transition programs are ideally designed for because a person must be ready for change (Coppin, 2017). Additionally, this study was designed to explore a wide range of factors that impact post-program employment. While this may help to identify areas of needs that are of importance to this group, it is likely inadequate in fully informing the details of programmatic development. Also, this study is cross-sectional in nature so none of the self-reported needs or assets identified can be linked to successful employment. Perhaps the most important limitation, though, is that this research was conducted in one program in one location only. Nonetheless, the information gathered may be helpful in identifying services that are more appealing to those in this position and their implementation may facilitate meaningful outcomes.

8.3 Public Health Policy

Because much of this work is preliminary, public health policy changes would be contingent on the replication, validation, and expansion of these lines of question. Despite this, there are many

potential avenues to systematically apply policy changes aimed at reducing the health inequities experienced by this population.

Most importantly, standardizing the definitions of who would qualify as homeless or in danger of becoming homeless is imperative. Currently, this may vary depending on which agency is assessing an individual's status. Also, there has been little done to determine how health care providers determine if someone should be coded as homeless and how this is routinely done in practice. Having a universal standard would be important in improving the accuracy and reliability of hospital discharge records in monitoring this population and augmenting counts. This may also prevent unconscious bias from influencing who is coded as homeless or not.

How programs are funded for those with insufficient housing and/or employment may also benefit from some policy changes. These programs are often funded or targeted for subgroups of the larger population, without offering services directly or through partnerships that either address the root causes of the subgroup or providing a service that would only be applicable to that subgroup. By limiting the services to those subgroups, it may be neglecting the larger population that would benefit from those services and may be able to benefit from early intervention. It also may allow for smaller segments of the population to receive services, despite other subgroups having as profound of a need. Finally, it may help to reinforce stereotypes and biases about these specific groups, which is counterproductive to mitigating the health inequities experienced by these groups.

The homeless or those affected by substance abuse may benefit from increased protection. Policy and legal protections related to employment and housing are lacking. Individuals experiencing homelessness have no explicit protections at a federal level, but some states, like Illinois, have laws stating individuals experiencing homelessness cannot be discriminated against for employment because they lack a fixed address (Illinois Compiled Statutes, 2013). Similarly, individuals currently using drugs have limited employment protections and are specifically omitted in the amendments to the Civil Rights

Act that relate to employment discrimination. However, there may be protections for those in treatment for past drug and/or alcohol addiction under the Americans with Disabilities Act, Rehabilitation Act, and Federal Medical Leave Act (Code of Federal Regulations, 2018; US Code, 1995). Finally, there are no legal protections for ex-offenders related to housing and employment discrimination despite ex-offenders often having conditions of probation that include the probation officer's approval of housing and the requirement to maintain formal employment (Illinois Compiled Statutes, 2018; US Code, 2008). Reexamining these policies and how they affect the long-term reintegration and participation of individuals that have been impacted by any number of life circumstances may result in meaningful changes.

This is important as there are increasingly requirements such as employment for receipt of safety net social benefits. These program requirements feed into the notions that any employment is better than no employment, which may not be true for many individuals as it puts them at risk for relapse or other risk factors for not being able to successfully provide for themselves. They will also put a larger burden on reemployment programs or other systems to verify participation to be eligible for these benefits. As many of these programs already face underfunding and many constraints in being able to provide services to this population, they may become overwhelmed as more people are required to take part. At a minimum, when policies such as these are enacted, there should be a mechanism included that specifies how the impact of the policy change will be assessed in a comprehensive manner rather than just saying there were less expenditures in that program.

Finally, public health stresses primary prevention as the most efficient point of contact, and alongside evidence of cost-shifting from various policy changes, this work suggests that directing money towards the provision of services that can serve as a primary prevention point. One example would be having mental health and substance abuse treatment accessible and affordable at an earlier time point. This represents a large portion of the visits to the hospitals within this population and has long been

associated with increased challenges in obtaining and keeping employment and housing. The positive impact of the Affordable Care Act has had in providing health insurance coverage to individuals affected by homelessness could be enhanced by increased access to services outside of the hospital setting.

8.4 Future Research Implications

While HUD estimates suggest that homelessness is decreasing in Illinois, hospital records suggest that the number of those suffering from homelessness is increasing. As other data sources such as hospital records are increasingly able to identify and report information related to homelessness, leveraging these additional data sources may help to augment HUD PIT estimates to provide more accurate estimates of homelessness. These estimates are of critical public health importance because they are used to direct resources and assess the reach and efficacy of policy and supportive services for those affected by homelessness. Future research should replicate the use of state-level data from hospitals, schools, and other surveillance systems to provide counts of those affected by homelessness. Then, research would need to be done on how best to incorporate this data with PIT counts to develop estimates that are more reflective of the homeless population.

Hospital discharge data are a valuable public health surveillance tool for evaluating healthcare issues affecting the homeless and could continue to be used to evaluate the need and impact of policy changes on this population. Those experiencing homelessness experience a high burden of health concerns and may lack the supportive services needed for improving their health when routinely discharged to home or self-care. Hospital billing records can be used to prioritize the distribution of limited public health resources for health care programs and transition interventions among those experiencing homelessness. Hospitals are a key point of contact for the homeless population since they are unlikely to intersect with any other formal public system that could assist with housing, employment, and healthcare. While hospitals provide a valuable source of care to this population, they are likely experiencing a larger burden of care as this is a main access point for psychiatric and other

healthcare services since other facilities have been shut down or experienced a loss in funding or reimbursement. Additionally, there is evidence that when this burden is not taken on by hospitals, it is shifted to other social systems that are not designed to address psychiatric and other medical needs, such as the criminal justice (Heun-Johnson et al., 2018). Therefore, it is imperative that this population has access to services at the most cost-effective, primary prevention point. Research should continue to be done to monitor the healthcare needs and burdens of this population and interventions could be implemented and evaluated using this data source. While there would be substantial challenges in systematically evaluating cost-shifting, it would provide value in better assessing the impact of policy changes.

Chiropractic interns and clinicians should be adequately trained on occupational health history documentation practices as they are likely to care for work-related injuries. Short training modules, as done with other health disciplines, appear to be effective in demonstrating small changes in the documentation related to occupational history taking. This may be expanded through additional exposure over the course of the chiropractic training and during continuing education programs. Additional research needs to be done to determine the most effective ways to foster occupational health history taking related to educational and policy changes that are meaningful for improved patient outcomes. Attention needs to be directed towards making sure students and clinicians are not neglecting to ask important clinical questions related to occupation based on social biases, especially when in unique clinical settings.

Residential rehabilitation programs, such as the one in this study, are often acknowledged as a great resource to their beneficiaries. Programs often focus on employment as a crucial step in improving an individual's life circumstances. Services could be enhanced by carefully assessing the needs of each participant and allowing for some individualization of reemployment preparation that also focuses on basic needs. Where there are resource constraints in meeting needs, community partnerships could be

established to create a social support network for these individuals. Programs, funding agencies, and policymakers should develop evaluation tools with metrics and emphasize actions that support long-term, sufficient employment. An area that may show promise are small business ownership training, as it was a goal of many and offers an independent route to reemployment for those with legal barriers. Future research should evaluate the needs in various reemployment programs to see which needs are generalizable to the larger population. Then, as interventions, community partnerships, or altered program models are implemented, they should be thoroughly evaluated for meaningful outcomes and this evaluation should include the perceptions of the beneficiaries.

Ultimately, while interventions aimed at diminishing health inequities in those that are suffering from housing and employment insecurity are of great importance for individuals and communities, more attention needs to be paid to preventing these adverse experiences and inequities before they have escalated to this level. Research and policy efforts to address these issues at a primary prevention level would likely provide the most benefit, even if it is harder to adequately capture and measure the impacts of these initiatives.

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APPENDICES

APPENDIX A
UIC IRB APPROVAL PROTOCOL #2008-0060
UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
 Office of the Vice Chancellor for Research (MC 672)
 203 Administrative Office Building
 1737 West Polk Street
 Chicago, Illinois 60612-7227

Approval Notice
Continuing Review

March 14, 2017

Linda Forst, MD, MPH
 Environmental and Occupational Health
 2121 W. Taylor Street
 508 SPH, M/C 922
 Chicago, IL 60612
 Phone: (312) 355-3826 / Fax: (312) 413-8485

RE: Protocol # 2008-0060
“Illinois Occupational Surveillance Program 2 ((IOSP2))”

Dear Dr. Forst:

Your Continuing Review was reviewed and approved by the Expedited review process on March 14, 2017. You may now continue your research.

Please note the following information about your approved research protocol:

Please note that Investigator training credits have lapsed for David Swedler (expired 12/16/2016) and Liza Topete (expired 02/24/2017). These individuals must complete a minimum of two hours each of continuing education on human subject protection prior to further participation as a member of the research team. For further information, please see the OPRS website: <http://research.uic.edu/compliance/irb/education-training>.

Protocol Approval Period:
Approved Subject Enrollment #:
Performance Sites:
Sponsor:

March 20, 2017 - March 20, 2018
 0 (0 enrolled; closed to enrollment)
 UIC
 a) CDC/National Institute for Occupational Safety and Health, b) National Institute for Occupational Safety and Health (NIOSH), c) Center for Construction Research and Training (CPWR), d) Cook County Department of Public Health

APPENDIX A (continued)

(CCDPH), e) National Institute for Occupational Safety and Health (NIOSH)

PAF#: a) 00008533, b) 00017871, c) 00027233, d) 00013895, e) 00006957

Grant/Contract No: a) Not available, b) Not available, c) 10-1-PS, d) Not applicable, e) 1-U60 OH010905-01

Grant/Contract Title: a) Illinois Occupational Surveillance Program, b) Data Linkage for Occupational Surveillance, c) Data Linkage of State Registries for Assessment of Construction Injuries (PI of grant: Lee Friedman, PhD), d) Needs Assessment with Recommendations for Trauma Services in Southern Cook County (PI of grant: Lee Friedman, PhD), e) Illinois Occupational Surveillance Program 2

Research Protocol(s):

- a) Research Protocol for IRB, Illinois Occupational Surveillance Program, Version 6, Re-submitted: May 4, 2016

Recruitment Material(s):

- a) N/A- Closed to enrollment

Informed Consent(s):

- a) N/A- Closed to enrollment

Additional Determinations for Research Involving Minors:

The Board determined that this research satisfies 45CFR46.404, research not involving greater than minimal risk.

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category:

- (5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
03/13/2017	Continuing Review	Expedited	03/14/2017	Approved

Please remember to:

→ Use your **research protocol number** (2008-0060) on any documents or correspondence with the IRB concerning your research protocol.

APPENDIX A (continued)

→ Review and comply with all requirements on the guidance,

"UIC Investigator Responsibilities, Protection of Human Research Subjects"

(<http://research.uic.edu/irb/investigators-research-staff/investigator-responsibilities>)

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 413-0241. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,
Ibraheem Oguntade
IRB Coordinator, IRB #1
Office for the Protection of Research

Subjects

Enclosure(s): None

cc: Samuel Dorevitch, Environmental and Occupational Health
OVCR Administration, M/C 672

APPENDIX B
UIC IRB EXEMPTION PROTOCOL #2016-0213
UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
 Office of the Vice Chancellor for Research (MC 672)
 203 Administrative Office Building
 1737 West Polk Street
 Chicago, Illinois 60612-7227

Exemption Granted

March 3, 2016

Dana Madigan, MPH
 Environmental and Occupational Health
 2121 W. Taylor Street
 M/C 922
 Chicago, IL 60612
 Phone: (773) 680-9955 / Fax: (312) 413-9898

RE: Research Protocol # 2016-0213
“Occupational history taking attitudes and behaviors of chiropractic interns”

Sponsor(s): None

Dear Dana Madigan:

Your Claim of Exemption was reviewed on March 3, 2016 and it was determined that your research protocol meets the criteria for exemption as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.101(b))]. You may now begin your research.

<u>Exemption Period:</u>	March 3, 2016 – March 3, 2019
Lead Performance Site:	National University of Health Sciences (Lombard, IL)
Other Performance Site(s):	UIC
Subject Population:	Adult (18+ years) subjects only
Number of Subjects:	NUHS: 30; UIC: 0; Total = 30

The specific exemption category under 45 CFR 46.101(b) is:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly

APPENDIX B (continued)

or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects'

responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy. Please be aware of the following UIC policies and responsibilities for investigators:

Amendments You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.

Record Keeping You are responsible for maintaining a copy all research related records in a secure location in the event future verification is necessary, at a minimum these documents include: the research protocol, the claim of exemption application, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to subjects, or any other pertinent documents.

Final Report When you have completed work on your research protocol, you should submit a final report to the Office for Protection of Research Subjects (OPRS).

Information for Human Subjects UIC Policy requires investigators to provide information about the research protocol to subjects and to obtain their permission prior to their participating in the research. The information about the research protocol should be presented to subjects as detailed in your application utilizing the approved scripts and documents.

Please be sure to use your research protocol number (listed above) on any documents or correspondence with the IRB concerning your research protocol.

OPRS does not send hard copies via campus mail of protocol-related correspondence to investigators, research staff and Department Heads. For more information, please refer to the following: <http://research.uic.edu/node/4117>

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 355-2908 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Charles W. Hoehne

Assistant Director, IRB #7

Office for the Protection of Research Subjects

cc: Lee Friedman (faculty sponsor), Environmental and Occupational Health, M/C 922

APPENDIX C
NUHS IRB EXEMPTION PROTOCOL #H-1504



Approval# 201601

INSTITUTIONAL REVIEW BOARD
REVIEW OF RESEARCH INVOLVING HUMAN SUBJECTS

Statement of Policy: The National University of Health Sciences (NUHS) has an approved policy for the protection of human subjects from research risk as set forth in Title 45, Part 46, of the Code of Federal Regulations (45 CFR 46). It is the policy of NUHS that, except for those categories specifically exempted by 45 CFR 46, all research covered by this assurance will be reviewed and approved by the Institutional Review Board (IRB) established under the policy, regardless of the source of funding of the research. It is also the policy that projects be re-reviewed annually. According to the NUHS approved policy for the protection of human subjects, the following decision has been made regarding the project identified below:

PROJECT

Title of Project: Occupational history taking attitudes and behaviors of chiropractic interns

NUHS Contact Person: Jerrilyn Cambren (Madigan) **IRB #** H-1504

Duration of Approval: From 1/13/2016 Until 1/12/2017
 *approval is contingent upon annual reviews provided to IRB on or before anniversary of approval date

TYPE OF PROJECT

☒ New proposal ☐ Annual review ☐ Amended proposal

TYPE OF REVIEW

☐ Full IRB ☐ Expedited review ☒ Exempt

ACTION TAKEN

☒ Approved ☐ Not Approved
☐ Approved contingent upon attached revisions.
☐ This project requires Clinical Trial Registration prior to recruiting. Approval is contingent upon registration (contact Research Coordinator).
☐ Project has been closed. It is no longer reviewed by IRB and there will be no further data collection or data analysis for this project.

Ezra Cohen, Chair IRB 1-13-16
 Date

REVISIONS

APPENDIX D

CLINICIAN BEHAVIOR TRACKING TOOL

[illegible]

APPENDIX E
INTERN OCCUPATIONAL HISTORY TAKING QUESTIONNAIRE

National University of Health Sciences

Questionnaire on Occupational History Taking Attitudes and Behaviors

The purpose of this survey is to assess any changes in attitudes and behaviors of occupational history taking over time. Specific answers and overall results will not affect your course grade in any way. Thus, we ask that you answer each question honestly and to the best of your ability.

Your survey responses will be de-identified and results will be analyzed without any personal identification in order to assess occupational history taking attitudes and behaviors among chiropractic interns. Your clinician will not see your answers and the researchers will not see your name. Every reasonable effort will be made to maintain confidentiality of your responses.

Please complete the entire questionnaire in one sitting. Please do not consult with colleagues or use notes or other resources.

Because completion of this questionnaire is required, your printed name is recorded below solely to verify whether or not you completed the assessment. This page will be separated from the answer sheets and results immediately.

If you have any questions about this study please contact the Principal Investigator, Dr. Dana Madigan, at dmadigan@nuhs.edu. If you have any questions about your involvement in this study, please contact the IRB Chair, Dr. Ezra Cohen, at ecohen@nuhs.edu.

Please print your name:

By signing below, I agree to allow the information from this questionnaire to be used for analysis and possible publication. I understand there will not be any personal or individual identification.

Signature:

When you finish, submit this to the clinician who will assign a research ID and then separate this first page from the rest of the booklet.

APPENDIX E (continued)

This page is to be completed by your clinician.

Please remove the signed informed consent page so that the researcher signature will not be included with the survey data and complete the questions below. Once all surveys have been collected, please return them to the PI.

1. What is the intern ID? _____
2. Did the intern consent for their responses to be included in data analysis?
 - a. Yes
 - b. No

APPENDIX E (continued)

This first section will ask questions about your attitudes and perceptions about occupational health in relationship to your clinical training and practice. Please either write your answers in the space provided or circle the answer choice that best represents your opinions.

1. How much do you believe work affects health and why?

2. How interested are you in occupational health?

- a. Very interested
- b. Somewhat interested
- c. Neither interested or uninterested
- d. Somewhat uninterested
- e. Very uninterested

3. How much emphasis was placed on occupation as a determinant of health in your clinical training?

- a. A great amount of emphasis
- b. A fair amount of emphasis
- c. Some emphasis
- d. Very little emphasis
- e. No emphasis

4. How important is occupational history taking?

- a. Very important
- b. Somewhat important
- c. Unimportant

5. Why do you take an occupational history on your patients?

- a. It is a required space on the intake forms.
- b. The patient mentions their work during the visit.
- c. I ask about occupation because it can impact patients' health.
- d. Other, please explain:

APPENDIX E (continued)

This next section asks questions regarding your occupational history taking habits.

6. Do you take occupational histories?
 - a. Yes
 - b. No
7. How often do you take an occupational history on a new patient encounter?
 - a. Every new patient
 - b. Most new patients
 - c. Some new patients
 - d. Few new patients
 - e. Never
8. How often do you take an occupational history on re-exams?
 - a. Every patient
 - b. Most patients
 - c. Some patients
 - d. Few patients
 - e. Never
9. Do patient demographics influence your decision to actively take an occupational history?
 - a. Yes, I consider (please select all that apply)
 - a. Age
 - b. Gender
 - c. Other; please specify _____
 - b. No
10. What information do you collect in terms of occupational history?

11. How often do you record a **patient's current occupation** on a new patient encounter?
 - a. Every patient
 - b. Most patients
 - c. Some patients
 - d. Few patients
 - e. Never

APPENDIX E (continued)

12. How often do you record a **patient's current occupation** on re-exams?
- a. Every patient
 - b. Most patients
 - c. Some patients
 - d. Few patients
 - e. Never
13. How often do you record a **patient's past occupation(s)** on a new patient encounter?
- a. Every patient
 - b. Most patients
 - c. Some patients
 - d. Few patients
 - e. Never
14. How often do you record a **patient's past occupation(s)** on re-exams?
- a. Every patient
 - b. Most patients
 - c. Some patients
 - d. Few patients
 - e. Never
15. Please share any comments you have on your occupational history taking practices that have not been described above.
-
-
-
-
-
-
-
16. Have you used resources to learn more about potential occupational exposures and work-related conditions?
- a. Yes, please specify: _____
 - b. No

APPENDIX E (continued)

Please read the following case scenario and answer the following questions:

A 58-year-old women presents with a complaint of right hand pain and numbness that has been getting worse over the past month. She feels like her hand is swollen but admits it does not look swollen. She is a current smoker and has a family history of diabetes.

17. Is this condition possibly related to their occupation?

- a. Yes
- b. No

18. What other information would you want to know? [Open-ended]

19. What would your next steps or recommendations be? [Open-ended]

APPENDIX E (continued)

This last section asks your demographics.

20. What is your gender?

- a. Male
- b. Female

21. What is your age? _____

22. Briefly describe what type of practice you see yourself working in after graduation.

23. What was your GPA at NUHS?

- a. 3.5 and above
- b. 3.0 to 3.49
- c. 2.5 to 2.99
- d. Below 2.5

24. How many trimesters did you take to complete the program? _____

25. Do you feel you have a greater appreciation for occupational history taking compared to other students and why?

26. Please list your other degrees before coming to NUHS.

27. Please list any degrees or diplomate programs you are currently enrolled in.

APPENDIX F
OCCUPATIONAL HISTORY TAKING TRAINING MODULE

Learning Objectives

Through this activity, interns will

1. Describe important components of occupational histories.
2. Take an occupational history from case presentations that may have an occupational component.
3. Become familiar with the categories of occupational hazards.
4. Recognize that every occupation exposes workers to hazards.
5. Know what resources are available to them in relation to occupation and health.

APPENDIX F (continued)

Activities

1. Introduction
 - a. Ask the group
 - i. If they have ever taken an occupational history?
 - ii. How much does one's work influence their health?
 1. Occupation as a determinant of health
 2. Prevalence of injuries and illnesses due to work
 - iii. What types of things do they want to ask and why?
2. Occupational history taking discussion with a sample form
 - a. Could break into small groups to go through specific sections.
 - b. Group should also discuss what information would be important from each category, how to prompt to get the information you want, and why questions are asked the way they are (exposures from all jobs, time off, etc).
 - c. Other questions that would be important to ask include how they protect themselves at work and their perceptions of what is dangerous/impacts their health.
3. Case study as a group (see activity)
4. Hazard categories
 - a. Students will work in pairs to identify the hazards associated with a job their partner held to focus on appropriate prompts. Can do their current work in clinical practice if they can't identify previous employment or use work that was not paid or formal.
 - b. Students will share 1 example with the most hazards identified with the group. If nobody presents on their clinical work, can use that as a group activity.
 - c. Discussion
 - i. How does this relate to the history form?
 - ii. Could these categories of hazards interact?
 - iii. Are there categories or jobs without hazards?
 - iv. What categories do you find the most hazards in? Which categories were you most familiar with from your training?
5. Resources
 - a. If technology allows, let students pick a hazard and search OSHA/resources for information.
6. Conclusion
 - a. Discuss continuum of disease progression and controls
 - i. Disease: Exposure \leftrightarrow Sensitizations/Pain \leftrightarrow Disease \leftrightarrow Disability
 - ii. Protections: Remove Exposure > Engineering > Administrative > PPE > Behavior
 - b. Importance of working with a patient to improve health and maintain employment
 - i. Occupational history taking is a great way to decrease the power differential in the doctor-patient encounter (they are the experts at what they do and often find their work meaningful/source of pride).
 - c. Ask students to summarize
 - i. Why this may be important and how it may be of use in practice?
 - ii. What is something they did not previously get in their education?

APPENDIX F (continued)Occupational History Form

Name: _____ DOB: _____ Gender: ☐ M ☐ F

The following questions refer to your current or most recent job:

Job title: _____

Type of industry: _____

Name of employer: _____

Date job began: _____

Describe this job: _____

Are you still working in this job? ☐ Yes ☐ No, this job ended _____ [date]

Fill in the table below, listing all jobs you have worked including short-term, seasonal, part-time employment, and military service. Begin with your most recent job. Use additional paper, if necessary.

Dates of Employment	Job Title and Description of Work	Hazards*	Controls

*List the chemicals, dusts, fibers, fumes, radiation, biologic agents, physical agents (extreme heat, vibration, noise, etc), trauma hazards (lifting, repetitive motion, work at heights, driving, operating machinery, etc.), and psychological hazards.

APPENDIX F (continued)

Have you ever worked at a job in which you came into contact with any of the following by breathing or touching them? Think of all the jobs you've ever had. [Put a check mark for any reported hazards]

- | | | | |
|---|--|--------------------------------------|--|
| <input type="checkbox"/> Acids | <input type="checkbox"/> Mercury | <input type="checkbox"/> Asbestos | Use this space to specify
or list additional
chemical exposures:

_____ |
| <input type="checkbox"/> Alkalies | <input type="checkbox"/> Lead | <input type="checkbox"/> Coal Dust | |
| <input type="checkbox"/> Ammonia | <input type="checkbox"/> Arsenic | <input type="checkbox"/> Saw Dust | |
| <input type="checkbox"/> Solvents | <input type="checkbox"/> Cyanide | <input type="checkbox"/> Silica Sand | |
| <input type="checkbox"/> Alcohols | <input type="checkbox"/> Liquid Metals | <input type="checkbox"/> Diesel | |
| <input type="checkbox"/> Benzene | <input type="checkbox"/> Other Metals | | |
| <input type="checkbox"/> Toluene | <input type="checkbox"/> Pesticides | | |
| <input type="checkbox"/> Other solvents | | | |

Have you ever worked at a job with exposure to:

- | | | | |
|---|--|--|---|
| <input type="checkbox"/> Noise | <input type="checkbox"/> Operating Machinery | <input type="checkbox"/> Confined Space | Use this space to list
other exposures:

_____ |
| <input type="checkbox"/> Vibration | <input type="checkbox"/> Work at Heights | <input type="checkbox"/> Mandatory Overtime | |
| <input type="checkbox"/> Extreme Heat | <input type="checkbox"/> Electrical Work | <input type="checkbox"/> Evening/Night Shifts | |
| <input type="checkbox"/> Extreme Cold | <input type="checkbox"/> Driving | <input type="checkbox"/> Rotating Shifts | |
| <input type="checkbox"/> Infrared Radiation | <input type="checkbox"/> Repetitive or Forceful
Tasks | <input type="checkbox"/> Trauma | |
| <input type="checkbox"/> UV Radiation | <input type="checkbox"/> Lifting | <input type="checkbox"/> Harassment or
Bullying | |
| <input type="checkbox"/> Microwaves | <input type="checkbox"/> Infectious Diseases | <input type="checkbox"/> Robbery | |
| <input type="checkbox"/> Lasers | <input type="checkbox"/> Work with Animals | | |

1. Have you ever been off work for more than one day because of an illness or injury related to work? ☐ Yes ☐ No
2. Have you ever been advised to change jobs or work assignments because of a health problem or injury? ☐ Yes ☐ No
3. Has your work routine changed recently? ☐ Yes ☐ No
4. Is there poor ventilation in your workplace? ☐ Yes ☐ No

If you answered Yes to any of the questions, please explain here:

APPENDIX F (continued)

Case Study

A 42 year old male presents with pain in the left paralumbar area that radiates to the left knee.

- What else might you want to know from the history?
 - Injury occurred lifting a box from the ground yesterday. Box was not heavy but had been doing a lot of activity that day so maybe they were fatigued or did not lift properly.
 - He did have this problem a few years ago (while doing things around the house) but it resolved after a few weeks of self-care.
 - Works in construction. (If they do not ask about occupation or where the injury occurred, prompt students by asking if they think this could be occupationally related).
- How would you proceed?
 - Could discuss possible exam findings (pain but no red flags/positive exam findings), treatment, and expected outcome.
 - When to do imaging, referral, etc.
 - Work restrictions, adjunctive therapies (meds pros and cons), RTW milestones
 - Understanding how reporting works (what the workplace does surrounding injury), how worker compensation works, etc
- What other information about occupation maybe helpful for the continued care?
 - Job activities
 - Possible hazards/exposures
- Choosing cadmium as a possible exposure, what would be important to know about cadmium? Where would you find this information (link to ICSC and resource list)?
 - Routes of exposure and ascertainment of exposure
 - Health effects at different levels of exposure (organ systems affected and symptoms expected)
 - Other sources of cadmium that may contribute to dose
- How would this information inform your interaction with this patient?
 - Encourage smoking cessation
 - Assessments- such kidney function regularly
 - Watch for signs and symptoms of these exposures
 - What are other exposure prevention measures
 - What do you communicate with your worker-patient?

APPENDIX F (continued)

Hazard Categorization

Job/Occupation	Chemical (pesticides, solvents, metals, etc)	Biological (bacteria, mosquitoes, fungus, viruses, etc)	Physical (noise, UV light, vibration, radiation, etc)	Biomechanical (heavy lifting, awkward postures, repetitive work, work with hand tools and machines, etc)	Psychosocial (long hours, shift work, deadlines, piece work, angry boss, low wages, more than one job, etc)

APPENDIX F (continued)

Resources

Agency for Toxic Substances and Disease Registry (ATSDR)

<http://www.atsdr.cdc.gov/>

The Agency for Toxic Substances and Disease Registry (ATSDR), based in Atlanta, Georgia, is a federal public health agency of the U.S. Department of Health and Human Services. ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. Among the many resources available, there are specific resources for health professionals which can be found at

http://www.atsdr.cdc.gov/emes/health_professionals/index.html.

American College of Occupational and Environmental Medicine (ACOEM)

<http://www.acoem.org/>

The American College of Occupational and Environmental Medicine (ACOEM) represents more than 4,500 physicians and other health care professionals specializing in the field of occupational and environmental medicine (OEM).

Association of Occupational and Environmental Clinics (AOEC)

<http://www.aoec.org/>

Established in 1987 the Association of Occupational and Environmental Clinics, a non-profit organization, is committed to improving the practice of occupational and environmental health through information sharing and collaborative research.

National Institute for Occupational Safety and Health (NIOSH)

<https://www.cdc.gov/niosh/>

The Occupational Safety and Health Act of 1970 established NIOSH. NIOSH is part of the U.S. Centers for Disease Control and Prevention, in the U.S. Department of Health and Human Services. It has the mandate to assure “every man and woman in the Nation safe and healthful working conditions and to preserve our human resources.” NIOSH has more than 1,300 employees from a diverse set of fields including epidemiology, medicine, nursing, industrial hygiene, safety, psychology, chemistry, statistics, economics, and many branches of engineering. NIOSH works closely with the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration in the U.S. Department of Labor to protect American workers and miners. International Chemical Safety Cards can be found at <http://www.cdc.gov/niosh/ipcsneng/nengnamea.html>.

Occupational Safety and Health Administration (OSHA)

<https://www.osha.gov/>

With the Occupational Safety and Health Act of 1970, Congress created the Occupational Safety and Health Administration (OSHA)* to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA is part of the United States Department of Labor. The OSH Act covers most private sector employers and their workers, in addition to some public sector employers and workers in the 50 states and certain territories and jurisdictions under federal authority. Information specifically for clinicians can be found at

<https://www.osha.gov/dts/oom/clinicians/> and information on state plans can be found at <https://www.osha.gov/dcsp/osp/index.html>.

APPENDIX G
UIC IRB APPROVAL PROTOCOL #2016-0278
UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
 Office of the Vice Chancellor for Research (MC 672)
 203 Administrative Office Building
 1737 West Polk Street
 Chicago, Illinois 60612-7227

Approval Notice
Initial Review (Response To Modifications)

May 12, 2016

Dana Madigan, MPH
 Environmental and Occupational Health
 2121 W. Taylor Street
 M/C 922
 Chicago, IL 60612
 Phone: (773) 680-9955 / Fax: (312) 413-9898

RE: Protocol # 2016-0278
“Needs assessment for a return to work program”

Please note that only Phase 1 has been approved at this time. Kindly remember to submit a subsequent Phases, including Phase 2, via an amendment form prior to its implementation in the study.

Dear Ms. Madigan:

Your Initial Review (Response To Modifications) was reviewed and approved by the Expedited review process on May 6, 2016. You may now begin your research

Please note the following information about your approved research protocol:

<u>Protocol Approval Period:</u>	May 6, 2016 - May 6, 2017
<u>Approved Subject Enrollment #:</u>	20 – Limited to Phase 1 Only
<u>Additional Determinations for Research Involving Minors:</u>	These determinations have not been made for this study since it has not been approved for enrollment of minors.
<u>Performance Sites:</u>	UIC, Salvation Army Adult Rehabilitation Center
<u>Sponsor:</u>	None
<u>PAF#:</u>	Not Applicable
<u>Grant/Contract No:</u>	Not Applicable
<u>Grant/Contract Title:</u>	Not Applicable
<u>Research Protocol:</u>	

APPENDIX G (continued)

a) Needs Assessment for a Return to Work Program, Version 1, 03/08/2016

Please note that stamped and approved .pdfs of all recruitment and consent documents will be forwarded as an attachment to a separate email. OPRS/IRB no longer issues paper letters and stamped/approved documents, so it will be necessary to retain the emailed documents for your files for auditing purposes.

Recruitment Materials:

- b) Needs assessment for return to work, Eligibility, Version 1, 04/04/2016
- c) Needs assessment for return to work, Script, Version 1, 04/22/2016

Informed Consents:

- b) Needs assessment for return to work, Version 1.3, 04/22/2016
- c) Waiver of informed consent granted [45 CFR 46.116(d)] for the identification of potential subjects
- d) Waiver of Documentation of Informed Consent [45 CFR 46.117] and Alteration of Consent [45 CFR 46.116] granted for the screening

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific categories:

- (6) Collection of data from voice, video, digital, or image recordings made for research purposes.,
- (7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
03/09/2016	Initial Review	Expedited	03/23/2016	Modifications Required
04/08/2016	Response To Modifications	Expedited	04/21/2016	Modifications Required
04/25/2016	Response To Modifications	Expedited	05/06/2016	Approved

Please remember to:

→ Use your **research protocol number** (2016-0278) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the guidance:

APPENDIX G (continued)

APPENDIX G (continued)

"UIC Investigator Responsibilities, Protection of Human Research Subjects"

(<http://research.uic.edu/irb/investigators-research-staff/investigator-responsibilities>)

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 413-8457. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Barbara Corpus
Associate Director, IRB # 2
Office for the Protection of Research

Subjects

Enclosures - *Please note that stamped and approved .pdfs of all recruitment and consent documents will be forwarded as an attachment to a separate email. OPRS/IRB no longer issues paper letters and stamped/approved documents, so it will be necessary to retain the emailed documents for your files for auditing purposes.*

1. Informed Consent Document:

- a) Needs assessment for return to work, Version 1.3, 04/22/2016

2. Recruiting Materials:

- a) Needs assessment for return to work, Eligibility, Version 1, 04/04/2016
- b) Needs assessment for return to work, Script, Version 1, 04/22/2016

cc: Linda S. Forst, Environmental and Occupational Health, M/C 922
Lee Friedman, Environmental and Occupational Health, M/C 922

APPENDIX G (continued)

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Amendment to Research Protocol and/or Consent Document – Expedited Review
UIC Amendment # 2

October 14, 2016

Dana Madigan, MPH
Environmental and Occupational Health
2121 W. Taylor Street
M/C 922
Chicago, IL 60612
Phone: (773) 680-9955 / Fax: (312) 413-9898

RE: **Protocol # 2016-0278**
“Needs Assessment for a Return to Work Program”

Dear Ms. Madigan:

Members of Institutional Review Board (IRB) #2 have reviewed this amendment to your research and/or consent form under expedited procedures for minor changes to previously approved research allowed by Federal regulations [45 CFR 46.110(b)(2)]. The amendment to your research was determined to be acceptable and may now be implemented.

Please note the following information about your approved amendment:

Amendment Approval Date: October 14, 2016

Amendment:

Summary: UIC Amendment #2 (response to modifications), dated 10 October 2016, and submitted and accepted via OPRSLive 11 October 2016, is an investigator-initiated amendment regarding the following:

- (1) Seek approval to begin phase II of the research. Phase II consists of using the questionnaire that was developed in phase I and conducting a one-time, 30-minute audio-recorded interview with adults who have reached a level two status with the Salvation Army (revised initial review application, v5, 8/31/16; revised protocol, v2, 8/31/16);
- (2) Submit the finalized version of the questionnaire (no footer);
- (3) Submit the recruitment and consent materials for phase II of the research (Needs Assessment for Return to Work, v2, 8/31/16; Eligibility, v2, 8/31/16; Script, v2, 8/31/16).

APPENDIX G (continued)

Approved Subject Enrollment #: 20
Performance Sites: UIC, Salvation Army Adult Rehabilitation Center
Sponsor: None
PAF#: Not Applicable
 a) Needs Assessment for a Return to Work Program, Version 2; 08/31/2016
Recruiting Material(s):
 a) Needs assessment for return to work, Script, Version 2, 08/31/2016
 b) Needs assessment for return to work, Eligibility, Version 2, 08/31/2016
Informed Consent(s):
 a) Needs assessment for return to work, Version 2; 08/31/2016

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
09/07/2016	Amendment	Expedited	09/29/2016	Modifications Required
10/11/2016	Response To Modifications	Expedited	10/14/2016	Approved

Please be sure to:

→ Use only the IRB-approved and stamped consent document(s) and/or HIPAA Authorization form(s) enclosed with this letter when enrolling subjects.

→ Use your research protocol number (**2016-0278**) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the guidance:

"UIC Investigator Responsibilities, Protection of Human Research Subjects"

(<http://research.uic.edu/irb/investigators-research-staff/investigator-responsibilities>)

Please note that the UIC IRB #2 has the right to ask further questions, seek additional information, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact the OPRS at (312) 996-1711 or me at (312) 996-9299. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Allison A. Brown, PhD

APPENDIX G (continued)

IRB Coordinator, IRB # 2
Office for the Protection of Research Subjects

Enclosure(s): None

Please note that stamped and approved *.pdf files of all recruitment and consent documents will be forwarded as an attachment to a separate email. OPRS/IRB no longer issues paper letters and stamped/approved documents, so it will be necessary to retain these emailed documents for your files for auditing purposes.

1. Informed Consent Document(s):

a) Needs assessment for return to work, Version 2; 08/31/2016

2. Recruiting Material(s):

a) Needs assessment for return to work, Script, Version 2, 08/31/2016

b) Needs assessment for return to work, Eligibility, Version 2, 08/31/2016

cc: Lee Friedman (Faculty Sponsor), Environmental and Occupational Health, M/C 922
Samuel Dorevitch, Environmental and Occupational Health, M/C 922

APPENDIX H
ORIGINAL REEMPLOYMENT NEEDS QUESTIONNAIRE

Hello, my name is Dana and I'm from the University of Illinois at Chicago. I am here today to conduct a survey to identify needs for reemployment for people in this program. Thank you for agreeing to participate in this study. I am going to ask you a series of questions. Please answer the questions to the best of your ability. Your participation is completely voluntary and you are able to decline answering any questions. Additionally, your responses will be kept confidential. This survey should take about 25 minutes to complete.

This first section contains questions regarding finding a new job.

1. How prepared do you feel to get a job?

Extremely prepared
Very prepared
Somewhat prepared
Not very prepared
Not at all prepared
CHOOSE NOT TO ANSWER

2. What kind of job do you feel you are best prepared to get right now? *[Probe for specifics]*

CHOOSE NOT TO ANSWER

3. What is the best job you would like to get someday? *[Probe for realistic job expectations]*

CHOOSE NOT TO ANSWER

4. Right now, how much of a priority is finding a new job?

An extreme priority
An important priority
Somewhat of a priority
Not an important priority
Not at all a priority
CHOOSE NOT TO ANSWER

APPENDIX H (continued)

5. How important is having a job for your future?

Extremely important
Very important
Somewhat important
Not very important
Not at all important
CHOOSE NOT TO ANSWER

6. How confident are you that you will get a job in the next year?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
CHOOSE NOT TO ANSWER

Now I am going to ask you questions about previous jobs you may have had.

7. Since you turned 18, how many jobs have you had that you would put on your resume?

_____ jobs (IF 0, SKIP TO QUESTION 16)
CHOOSE NOT TO ANSWER

8. How long has it been since you last held a job that you would put on your resume?

_____ days/months/years
I HAVE NEVER HELD A JOB I WOULD PUT ON MY RESUME
CHOOSE NOT TO ANSWER

APPENDIX H (continued)

9. Can you please describe your five (*or the number of jobs in question 7 if less than 5*) most recent jobs that you would put on a resume?

10. For each job listed, can you tell me if it was full-time or part-time?

11. For each job listed, how long did you work at that job?

12. For each job listed, were you ever physically hurt enough on the job to seek medical care? IF NO, SKIP TO QUESTION 14.

13. If so, did you receive any disability or workers' compensation because of that injury?

14. For each job listed, did you receive any disciplinary action on the job?

15. For each job listed, did you leave on your own or were you let go?

9. Job Description	10. Full-Time or Part Time	11. Length of employment	12. Physical injury	13. Payment	14. Disciplinary action	15. Employment end
a.	Full-time Part-time	<u> </u> days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
b.	Full-time Part-time	<u> </u> days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
c.	Full-time Part-time	<u> </u> days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
d.	Full-time Part-time	<u> </u> days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
e.	Full-time Part-time	<u> </u> days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>

APPENDIX H (continued)

16. What positive experiences did you have on your past jobs? *[Probe to include job and work place characteristics]*

17. What negative experiences did you have on your past jobs? *[Probe to include job and work place characteristics]*

18. What factors do you feel led to your current unemployment?

19. Do you feel there are things outside of your control that contribute to your current unemployment?

Yes

No (SKIP TO QUESTION 21)

20. Can you tell me some of the important ones? *[Probe for elements that are systemic and not individual]*

APPENDIX H (continued)

This next section asks about stresses in your life that make it difficult to get a job.

21. To what degree does a physical health condition or illness that you have been treated for affect your ability to work?

A great degree
A moderate degree
A small degree
Not at all
CHOOSE NOT TO ANSWER

22. To what degree does a psychological or nervous condition that you have been treated for affect your ability to work?

A great degree
A moderate degree
A small degree
Not at all
CHOOSE NOT TO ANSWER

23. To what degree do past or present criminal or legal problems affect your ability to be hired?

A great degree
A moderate degree
A small degree
Not at all
CHOOSE NOT TO ANSWER

- A. *When you think of criminal or legal problems, what do you think of? Is legal problems enough?*

24. To what degree do past or present substance abuse problems affect your ability to be hired?

A great degree
A moderate degree
A small degree
Not at all
CHOOSE NOT TO ANSWER

APPENDIX H (continued)

25. To what degree do your responsibilities to care for a child or other family member affect your ability to work?

- A great degree
- A moderate degree
- A small degree
- Not at all
- CHOOSE NOT TO ANSWER

26. Do you feel you have ever been discriminated against in getting or keeping a job?

- Yes
- No (SKIP TO QUESTION 28)
- CHOOSE NOT TO ANSWER

27. Can you provide a specific example?

28. Are there reasons you would not want to get another job?

- Yes
- No (SKIP TO QUESTION 30)
- CHOOSE NOT TO ANSWER

29. What are the reasons you would not want to get another job?

APPENDIX H (continued)

Now I am going to ask you about what strengths and needs you have for getting another job.

30. What job skills do you have?

31. Do you feel underqualified for jobs you are applying for?

Yes

No (SKIP TO QUESTION 33)

CHOOSE NOT TO ANSWER

32. If so, what skills and qualifications do you need to get a job?

33. Do you feel overqualified for jobs you are applying for?

Yes

No (SKIP TO QUESTION 35)

CHOOSE NOT TO ANSWER

34. If so, what skills and qualifications do you feel hurt you in getting a job?

35. What do you think you need in a job training program?

APPENDIX H (continued)

I am now going to ask you a few more questions about specific types of skills, some of which you may have already mentioned.

36. How confident are you that you have enough math skills for the job you want?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 NOT APPLICABLE
 CHOOSE NOT TO ANSWER

B. What are you thinking about when I say math skills? Negotiate a new term if needed.

37. How confident are you that you have enough reading skills for the job you want?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 NOT APPLICABLE
 CHOOSE NOT TO ANSWER

38. How confident are you that you have enough computer skills for the job you want?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 NOT APPLICABLE
 CHOOSE NOT TO ANSWER

APPENDIX H (continued)

39. How confident are you that you have enough people skills for the job you want?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 CHOOSE NOT TO ANSWER

C. What are you thinking about when I say people skills? Negotiate a new term if needed.

40. How confident are you that you have enough writing skills for the job you want?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 CHOOSE NOT TO ANSWER

41. Have you ever participated in employment trainings that have been helpful?

Yes
 No (SKIP TO QUESTION 43)
 CHOOSE NOT TO ANSWER

42. What was helpful about these trainings?

APPENDIX H (continued)

43. Have you ever participated in other employment trainings that have not been helpful?

Yes

No (SKIP TO QUESTION 45)

CHOOSE NOT TO ANSWER

44. What were the things you did not like about the trainings?

45. In your past experiences with any instructors or social workers, what characteristics did you like about them that made them seem credible and helpful? *[not limited to job-related]*

D. What do you think of when I say credible and helpful? Negotiate a new term if needed.

APPENDIX H (continued)

46. What does networking mean to you? *Probe: How do you network?*

47. How often do you participate in these networking opportunities?

- Yearly
- Monthly
- Weekly
- Daily
- Less than yearly
- Never
- CHOOSE NOT TO ANSWER

I am going to finish by asking you some questions about yourself.

48. Are you male or female?

- Male
- Female
- CHOOSE NOT TO ANSWER

49. What year were you born?

CHOOSE NOT TO ANSWER

50. How do you identify your race and ethnicity?

- Non-Hispanic White
- Non-Hispanic Black/African American
- Non-Hispanic Native American/Alaskan Native
- Non-Hispanic Native Hawaiian/Other Pacific Islander
- Non-Hispanic Asian
- Non-Hispanic more than 1 race
- Hispanic
- CHOOSE NOT TO ANSWER

APPENDIX H (continued)

51. Are you currently married, separated, divorced, never been married, or widowed?

Married
Separated
Divorced
Never been married
Widowed
CHOOSE NOT TO ANSWER

52. How important are your religious beliefs in your life?

Extremely important
Very important
Somewhat important
Not very important
Not at all important
CHOOSE NOT TO ANSWER

53. How many close relatives do you have? These are people that you feel at ease with, can talk to about private matters, and can call on for help.

_____ close relatives
CHOOSE NOT TO ANSWER

54. And how many friends do you have that you feel really close to? These are friends that you feel at ease with, can talk to about private matters, and can call on for help.

_____ close friends
CHOOSE NOT TO ANSWER

55. What is the last grade of school you completed?

_____ grade
CHOOSE NOT TO ANSWER

56. How many dependents do you have?

_____ dependents
CHOOSE NOT TO ANSWER

APPENDIX H (continued)

57. How many different places have you lived in the past year?

_____ places

CHOOSE NOT TO ANSWER

58. Of these, at how many places did you pay rent or a mortgage?

_____ places (IF EQUAL TO ABOVE SKIP TO QUESTION 60)

CHOOSE NOT TO ANSWER

59. What were the places you stayed at without paying?

60. Have you ever been in the US Armed Forces?

Yes

No

CHOOSE NOT TO ANSWER

61. Were you born in the US or another country?

The US

Another country

CHOOSE NOT TO ANSWER

APPENDIX I

FINAL REEMPLOYMENT QUESTIONNAIRE

Thank you for agreeing to participate in this study. I am going to ask you a series of questions. Please answer the questions to the best of your ability. Remember, your participation is completely voluntary and you are able to decline answering any questions. Additionally, your responses will be kept confidential. This survey should take about 30 minutes to complete.

This first section contains questions regarding finding a new job.

1. How prepared do you feel to get a job?

Extremely prepared
Very prepared
Somewhat prepared
Not very prepared
Not at all prepared
CHOOSE NOT TO ANSWER

2. What kind of job do you feel you are best prepared to get right now? *[Probe for specifics]*

CHOOSE NOT TO ANSWER

3. What is the best job you would like to get someday? *[Probe for realistic job expectations]*

CHOOSE NOT TO ANSWER

4. Right now, how much of a priority is finding a new job?

An extreme priority
An important priority
Somewhat of a priority
Not an important priority
Not at all a priority
CHOOSE NOT TO ANSWER

APPENDIX I (continued)

5. How important is having a job for your future?

Extremely important
 Very important
 Somewhat important
 Not very important
 Not at all important
 CHOOSE NOT TO ANSWER

6. How confident are you that you will get a new job in the next year?

Extremely confident
 Very confident
 Somewhat confident
 Not very confident
 Not at all confident
 CHOOSE NOT TO ANSWER

7. How long do you think it will take you to get a job from today? *[Note if they indicate finishing the program first]*

_____ days/months/years
 NOT APPLICABLE
 CHOOSE NOT TO ANSWER

8. I would like to know what steps you may have taken in your current job search. Have you ____? (MARK ALL THAT APPLY)

Thought about getting a job
 Attended job training programs
 Prepared your resume
 Attended job fairs or other hiring resources
 Applied for jobs
 Attended interviews
 Other, please describe: _____
 CHOOSE NOT TO ANSWER

9. Do you have a job offer or an actual position waiting for you when you leave this program?

Yes; please describe: _____
 Possibly; please describe: _____
 No
 NOT APPLICABLE
 CHOOSE NOT TO ANSWER

APPENDIX I (continued)

Now I am going to ask you questions about previous jobs you may have had.

10. Since you turned 18, how many jobs have you had that you would put on your resume?

_____ jobs (IF 0, SKIP TO QUESTION 19)

CHOOSE NOT TO ANSWER

11. How long has it been since you last held a job that you would put on your resume? [*This would be before current employment if recently employed.*]

_____ days/months/years

I HAVE NEVER HELD A JOB I WOULD PUT ON MY RESUME

CHOOSE NOT TO ANSWER

APPENDIX I (continued)

12. Can you please describe your five (*or the number of jobs in question 7 if less than 5*) most recent jobs that you would put on a resume?
[Include current job if level 5 employed.]

13. For each job listed, can you tell me if it was full-time or part-time?

14. For each job listed, how long did you work at that job? *[Probe if any of the jobs were held at the same time]*

15. For each job listed, were you ever physically hurt enough on the job to seek medical care? IF NO, SKIP TO QUESTION 17.

16. If so, did you receive any disability or workers' compensation because of that injury?

17. For each job listed, did you receive any disciplinary action on the job?

18. For each job listed, did you leave on your own or were you let go?

12. Job Description	13. Full-Time or Part Time	14. Length of employment	15. Physical injury	16. Payment	17. Disciplinary action	18. Employment end
a.	Full-time Part-time	_____ days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
b.	Full-time Part-time	_____ days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
c.	Full-time Part-time	_____ days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
d.	Full-time Part-time	_____ days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>
e.	Full-time Part-time	_____ days/months/years	Yes No	Yes No NOT APPLICABLE	Yes No	Own accord Let go MUTUAL- <i>probe</i>

APPENDIX I (continued)

SKIP TO QUESTION 21 IF WORK THERAPY JOB LISTED ABOVE.

19. What is your current work therapy job and what tasks do you do as part of that job?

20. Would you put your work therapy job on your resume? Why or why not?

Yes; please describe:

No; please describe:

CHOOSE NOT TO ANSWER

21. What did you like about your past jobs? *[Probe to include job and work place characteristics]*

22. What did you dislike about your past jobs? *[Probe to include job and work place characteristics]*

APPENDIX I (continued)

23. What factors do you feel led to your recent unemployment?

24. Do you feel there were things outside of your control that contributed to your recent unemployment?

Yes

No (SKIP TO QUESTION 26)

25. Can you tell me some of the important ones? *[Probe for elements that are systemic and not individual]*

APPENDIX I (continued)

This next section asks about stresses in your life that may make it difficult to get a job or keep a job.

26. To what degree does a physical health condition or illness that you have been treated for currently affect your ability to be hired or keep a job?

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____
CHOOSE NOT TO ANSWER	

27. To what degree does a psychological or nervous condition that you have been treated for currently affect your ability to be hired or keep a job?

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____
CHOOSE NOT TO ANSWER	

28. To what degree do past or present legal problems currently affect your ability to be hired or keep a job? Legal problems include anything that employers may look at regarding debt, jail, court, or interactions with police.

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____
CHOOSE NOT TO ANSWER	

29. To what degree have past substance abuse problems previously affected your ability to be hired or keep a job?

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____
CHOOSE NOT TO ANSWER	

APPENDIX I (continued)

30. To what degree do past or present substance abuse problems currently affect your ability to be hired or keep a job?

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____

CHOOSE NOT TO ANSWER

31. To what degree do your responsibilities to care for a child or other family member currently affect your ability to be hired or keep a job?

A great degree	If you are willing, please describe: _____
A moderate degree	If you are willing, please describe: _____
A small degree	If you are willing, please describe: _____
Not at all	If you are willing, please describe: _____

CHOOSE NOT TO ANSWER

32. Do you feel you have ever been discriminated against in getting hired or keeping a job?

Yes
 No (SKIP TO QUESTION 34)
 CHOOSE NOT TO ANSWER

33. Can you provide a specific example?

34. Are there reasons you would not want to get another job?

Yes
 No (SKIP TO QUESTION 36)
 CHOOSE NOT TO ANSWER

35. What are the reasons you would not want to get another job?

APPENDIX I (continued)

Now I am going to ask you about what strengths you have and needs you have for getting another job.

36. What job skills do you have?

37. Do you feel underqualified for jobs you have been applying for?

Yes

No (SKIP TO QUESTION 39)

CHOOSE NOT TO ANSWER

38. What skills and qualifications do you need to get a job?

39. Do you feel overqualified for jobs you have been applying for?

Yes

No (SKIP TO QUESTION 42)

CHOOSE NOT TO ANSWER

40. How are you overqualified for the jobs you are applying for?

APPENDIX I (continued)

41. Does being overqualified prevent you from getting jobs you are applying for?

Yes; please describe:

No

DON'T KNOW

CHOOSE NOT TO ANSWER

42. What do you think you would benefit from in a job training program?

APPENDIX I (continued)

I am now going to ask you a few more questions about specific types of skills, some of which you may have already mentioned.

43. How confident are you that you have enough math skills, such as addition, subtraction, multiplication, division, measurement, and percentages for the job you want?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
NOT APPLICABLE
CHOOSE NOT TO ANSWER

44. How confident are you that you have enough reading skills, such as ability to read and comprehend what is written, for the job you want?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
NOT APPLICABLE
CHOOSE NOT TO ANSWER

45. How confident are you that you have enough computer skills, such as typing and using computer programs, for the job you want?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
NOT APPLICABLE
CHOOSE NOT TO ANSWER

APPENDIX I (continued)

46. How confident are you that you have enough people skills, such as customer service skills, ability to get along well with coworkers and customers, and speaking with others, for the job you want?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
CHOOSE NOT TO ANSWER

47. How confident are you that you have enough writing skills, such as spelling, grammar, and composition, for the job you want?

Extremely confident
Very confident
Somewhat confident
Not very confident
Not at all confident
CHOOSE NOT TO ANSWER

48. Have you ever participated in employment trainings or programs that have been helpful?
[This does not include job orientations]

Yes
No (SKIP TO QUESTION 50)
CHOOSE NOT TO ANSWER

49. What was helpful about these trainings?

50. Have you ever participated in other employment trainings or programs that have not been helpful?

Yes
No (SKIP TO QUESTION 52)
CHOOSE NOT TO ANSWER

APPENDIX I (continued)

51. What were the things you did not like about the trainings?

52. In your past experiences with any bosses, instructors, case workers, or counselors, what characteristics did you like about them that made them seem credible and helpful? *[not limited to job-related]*

APPENDIX I (continued)

53. Are the following services important for supporting **your** transition to being employed? Are there any others?

54. For each item listed, are you currently receiving or expect to receive that service in your current program?

55. For each item listed, is this item needed but unavailable in your current program?

Service	53. Important for transition (CHECK IF YES)	54. Available (CHECK IF YES)	55. Needed (CHECK IF YES)	Comments
a. Available transportation				
b. Funding for transportation				
c. Available housing				
d. Funding for housing/Deposit Assistance				
e. Ability to attend job fairs or hiring events				
f. Knowledge of companies that are hiring and relevant hiring restrictions				
g. Guidance for handling workplace interactions and expectations				
h. Financial management & banking				
i. Other: _____				
j. Other: _____				
k. Other: _____				

APPENDIX I (continued)

I am going to finish by asking you some questions about yourself.

56. Are you male or female?

Male

Female

CHOOSE NOT TO ANSWER

57. What year were you born?

CHOOSE NOT TO ANSWER

58. How do you identify your race and ethnicity?

Non-Hispanic White

Non-Hispanic Black/African American

Non-Hispanic Native American/Alaskan Native

Non-Hispanic Native Hawaiian/Other Pacific Islander

Non-Hispanic Asian

Non-Hispanic more than 1 race

Hispanic

CHOOSE NOT TO ANSWER

59. Are you currently married, separated, divorced, never been married, or widowed?

Married

Separated

Divorced

Never been married

Widowed

CHOOSE NOT TO ANSWER

60. How many dependents do you have? Dependents are reliant on you for financial support and are generally your children under 19 years of age.

_____ dependents
CHOOSE NOT TO ANSWER

APPENDIX I (continued)

61. Have you ever been in the US Armed Forces?

Yes

No

CHOOSE NOT TO ANSWER

62. Were you born in the US or another country?

The US

Another country

CHOOSE NOT TO ANSWER

63. How important are your religious or spiritual beliefs in your life?

Extremely important

Very important

Somewhat important

Not very important

Not at all important

CHOOSE NOT TO ANSWER

64. How many close relatives do you have? These are people that you feel at ease with, can talk to about private matters, and can call on for help.

_____ close relatives

CHOOSE NOT TO ANSWER

65. And how many friends do you have that you feel really close to? These are friends that you feel at ease with, can talk to about private matters, and can call on for help.

_____ close friends

CHOOSE NOT TO ANSWER

66. What is the last grade of school you completed?

_____ grade (IF 12th GRADE OR MORE SKIP TO QUESTION 68)

CHOOSE NOT TO ANSWER

67. Have you earned your GED?

Yes

No

CHOOSE NOT TO ANSWER

APPENDIX I (continued)

68. Do you have a place to live once you leave here?

Yes; please describe: _____

No

CHOOSE NOT TO ANSWER

69. Besides your current stay at this facility, have you ever had to live someplace, such as a shelter, car, outdoors, or other place that you did not own, pay rent, or were an invited guest?

Yes; please describe: _____

No (SKIP TO QUESTION 71)

CHOOSE NOT TO ANSWER (SKIP TO QUESTION 71)

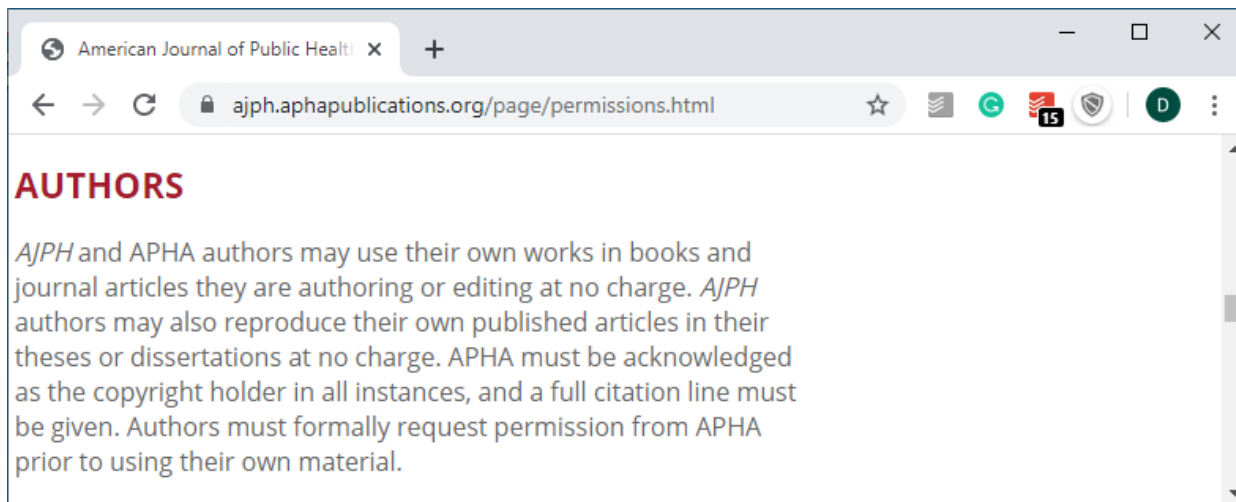
70. How long did you stay at these places?

_____ days/weeks/months/years; _____ times

CHOOSE NOT TO ANSWER

71. Do you have any comments for me regarding the survey?

APPENDIX J
AMERICAN JOURNAL OF PUBLIC HEALTH DISSERTATION REPRINT POLICY



APPENDIX K

JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE DISSERTATION REPRINT APPROVAL

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Needs Assessment for a Comprehensive Reemployment Program Among Residents of a Work Rehabilitation Program for Individuals With Unstable or Lack of Housing
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VITA

DANA MADIGAN

EDUCATION

- 2013-present PhD Candidate, University of Illinois at Chicago, School of Public Health, Division of Environmental and Occupational Health Sciences, *Work and Health Needs of Individuals with Unstable or Lack of Housing, Defended 12/12/2019. Expected graduation May 2020.*
- Occupational Safety Trainee, Illinois Education and Research Center, NIOSH
Grant Numbers: 5T42OH008672-12, 5T42OH008672-11, 5T42OH008672-10,
2T42OH008672-09, & 3T42OH008672-08S1
- 2013 MPH, University of Illinois at Chicago, School of Public Health, Division of Health Policy & Administration, *Inclusion of Doctors of Chiropractic in the National Health Service Corps*
- 2013 DC, National University of Health Sciences, Doctor of Chiropractic
- 2008 BS, University of Illinois at Urbana-Champaign, Psychology

RESEARCH EXPERIENCE

National University of Health Sciences

- | | |
|--|--------------|
| Assistant Professor, Departments of Research and Institutional Effectiveness | 2019-present |
| Lecturer, Master of Science in Advanced Clinical Practice Program | 2019-present |
| Instructor, Departments of Research and Institutional Effectiveness | 2017-2019 |
| Lecturer, Massage Therapy Program | 2017-2019 |
| Research Resident | 2013-2017 |
| Clinical Studies & Evidence Based Practice Research Assistant | 2009-2013 |

Palmer Center for Chiropractic Research

- | | |
|--------------------|------|
| Research Assistant | 2009 |
|--------------------|------|

University of Illinois at Urbana-Champaign

- | | |
|---|-----------|
| Research Assistant, Clinical/Community Psychology | 2007-2008 |
|---|-----------|

TEACHING EXPERIENCE

National University of Health Sciences (NUHS)

- | | |
|--|--------------|
| Evidence-Based Practice: Applied EBP | 2020-present |
| Evidence-Based Practice: Critical Appraisal of the Biomedical Literature | 2015-present |

Independent Research (Case Report Capstone Projects)	2019-present
Research Methods and Biostatistics	2019-present
Introduction to Massage	2017-2019
Assessment 2: Clinical Pathology/Microbiology/Medical Terminology	2017-2019
Wellness 2: Rehabilitation/Therapeutic Exercise/Hydrotherapy	2017-2019
Evidence-Based Practice: Journal Club (Chicago Location)	2013-2014
Guest Lectures	
Environmental Medicine/Toxicology/Detoxification	
"Vaccination"	2017
"Environmental Lead Exposures & Current Events"	2016
Evidence-Based Practice: Critical Appraisal of the Biomedical Literature	
"Study Design Review"	2014
"Cohort Studies"	2014
Evidence-Based Practice: Applied EBP	
"Sensitivity, Specificity, Likelihood Ratios, and Predictive Values"	2014
Fundamentals of Public Health	
"Injury"	2014
"Occupational Health"	2014
"Social Determinants of Health"	2014-2015

University of Illinois at Chicago (UIC) School of Public Health

Guest Lecture	
Environmental/Occupational Health Seminar	
"Needs Assessment for Reemployment: Survey Development"	2017
Occupational and Environmental Disease	
"Work-related Musculoskeletal Disorders & Chiropractic Care"	2017
Teaching Assistant, EPID400: Principles of Epidemiology	2012-2013

Grand Canyon University (GCU)

MPH Practicum Preceptor for James Morton	2018
--	------

Mentorship

Jessy Glaub, Research Assistant & Research Fellow (NUHS)	2019-present
Haley Doherty (Abessinio), Research Assistant & Research Fellow (NUHS)	2017-2019
Nandini Deb, Research Assistant (UIC)	2017-2018
Brandon German, MS in Diagnostic Imaging Thesis Committee Member	2018
Alli Totzke, Research Assistant (NUHS)	2018

GRANTS AWARDED

Madigan D, Cambron J, Friedman L. Massage therapy work-related musculoskeletal disorders (WRMSDs). Massage Therapy Foundation. February 2, 2018-February 2, 2020. \$38,000.

Madigan D, Bonney T, Friedman L. Needs assessment for reemployment. Occupational Safety and Health, ERC, University of Illinois at Chicago (T42/OH008672). National Institute for Occupational Safety and Health. July 1, 2017-June 30, 2018. \$12,677.

PUBLICATIONS

Peer-reviewed Papers

Madigan D, Forst L, Friedman LS. Comparison of State Hospital Visits with Housing and Urban Development Estimates of Homeless, 2011-2018. American Journal of Public Health. 2020 Mar;110(3):391-393.

Madigan D, Johnson TP, Forst L, Cambron JA, Zaroni J, Patil CL, Conroy LM, Friedman LS. Needs assessment for a comprehensive reemployment program among residents of a work rehabilitation program for individuals with unstable or lack of housing. Journal of Occupational and Environmental Medicine. 62(2):163-170, February 2020.

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Forst L, Friedman L, Chin B, **Madigan D**. Spatial clustering of occupational injuries in communities. American Journal of Public Health. 2015 Jul; 105 Suppl 3:S526-33.

Hodges B, Cambron J, Klein R, **Madigan D**. Prevalence of nonmusculoskeletal versus musculoskeletal cases in a chiropractic student clinic. Journal of Chiropractic Education. 2013 27(2): 123-127.

Other Professional Publications

Madigan D. Engaging the Community through Diversity in Research: An Introduction to Diverse Needs. ACA Blogs. August 29, 2018. Found at: <https://www.acatoday.org/News-Publications/ACA-Blogs/ArtMID/6925/ArticleID/383/Engaging-the-Community-Through-Diversity-in-Research>.

Report: 10th meeting of the global network of WHO collaborating centres for occupational health, 28–29 May 2015, Jeju Island, Republic of Korea. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO. [Contributing Author]

Holloway-Beth A, Friedman L, Rubin R, Joshi K, Murray LR, Williamson M, Seweryn S, Edwards C, **Madigan D**. Surveillance of Legal Interventions in Illinois: Development of a System to Track Acute and Long-term Effects. March 2017.

Madigan D. Preparing for Life after Graduation. SACA Tribune. Nov 2015. Found at: <https://www.smores.com/duq6a-saca-tribune>.

Madigan D. 5 Ways to Occupy Occupational Health. Dynamic Chiropractic. 2014 Nov 15; 32(22).

PRESENTATIONS

Conference Presentations

Madigan D, Glaub J, Foshee WK. Pain and substance use disorder comorbidity and considerations for doctors of chiropractic: a review of the literature. Association of Chiropractic Colleges Research Agenda Conference; 2020 March 19-21; San Diego, California.

Stites J, Maiers M, **Madigan D**. Leadership throughout the academic career. [Workshop]. Association of Chiropractic Colleges Research Agenda Conference; 2020 March 19-21; San Diego, California.

- Madigan D**, Foshee WK, Glaub J. Musculoskeletal pain and substance use disorder comorbidity and considerations for doctors of chiropractic: A review of the literature. American Public Health Association 2019 Annual Meeting & Expo; 2019 November 2-6; Philadelphia, PA.
- Madigan D**, Friedman L, Cambron JA. Work-related musculoskeletal disorders in massage therapists. American Public Health Association 2019 Annual Meeting & Expo; 2019 November 2-6; Philadelphia, PA.
- Madigan D**. Lift as You Climb: Excellence through Development. SACA 2019 Leadership Conference; 2019 September 6-8; Lombard, IL.
- Johnson C, Green B, Clay M, Haas M, Haneline M, Napuli J, **Madigan D**, Hyland J, Byrd L, Khauv K. Prioritizing Public Health Issues and Developing a Chiropractic Public Health Model: Results from a Delphi Process. 15th World Federation of Chiropractic Biennial Congress - 2019 European Chiropractors' Union Convention; 2019 March 20-23; Berlin, Germany.
- Madigan D**, Doherty H. Outcome measures in public health service programs. Association of Chiropractic Colleges Research Agenda Conference; 2019 Mar 14-16; Baltimore, MD.
- Bonney T, **Madigan D**. Assets, needs, and barriers to reemployment among users of workforce services programs. The Chicago Local Section of the American Industrial Hygiene Association Student Night 2019; 2019 February 27; Burr Ridge, IL.
- Madigan D**, Bonney T. Needs assessment for reemployment. American Public Health Association 2018 Annual Meeting & Expo; 2018 November 10-14; San Diego, CA.
- Madigan D**, Maiers M, Pfeifer J. Development of core public health competencies in Doctor of Chiropractic programs. American Public Health Association 2018 Annual Meeting & Expo; 2018 November 10-14; San Diego, CA.
- Madigan D**, Maiers M, Pfeifer J. Essential competencies in public health for chiropractors. World Federation of Chiropractic & Association of Chiropractic Colleges 10th Chiropractic Education Conference; 2018 October 24 – 27; London, UK.
- Long C, Stites JS, LeFebvre R, Maiers MJ, DeVries RM, **Madigan D**, Goldenberg JZ, Casello-Maddox PM. PIE for CIH educators: a conference on teaching and integrating evidence-informed practice into the curricula. World Federation of Chiropractic & Association of Chiropractic Colleges 10th Chiropractic Education Conference; 2018 October 24 – 27; London, UK.
- Madigan D**, Quinlan-Ruof E, Cambron J, Forst L, Zannoni J, Friedman L. Occupational health history taking of chiropractic interns. NUHS Homecoming. 2018 June 21-23. Lombard, Illinois.
- Madigan D**. Reemployment needs and barriers of individuals in a residential rehabilitation program. 13th Annual Research and Practice Awards Day at University of Illinois at Chicago School of Public Health; 2018 Apr 6; Chicago, IL.
- Madigan D**, Quinlan-Ruof E, Cambron J, Forst L, Zannoni J, Friedman L. 1489 Occupational health history taking of chiropractic interns. *Occup Environ Med* 2018;75(Suppl 2):A103-A104. Presented at the 32nd Triennial ICOH Congress; 2018 April 29- May 4; Dublin, Ireland.
- Madigan D**, Johnson T, Forst L, Friedman L. 1490 Reemployment needs and barriers of individuals in a residential rehabilitation program. *Occup Environ Med* 2018;75(Suppl 2):A514. Presented at the 32nd Triennial ICOH Congress; 2018 April 29- May 4; Dublin, Ireland.
- Madigan D**, Maiers M, Pfeifer J. Establishing Core Public Health Competencies in Doctor of Chiropractic Programs. Workshop presented at Association of Chiropractic Colleges Research Agenda Conference. 2018 Mar 8-10; Dallas, TX.

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DeVries R, LeFebvre R, **Madigan D**. Jump starting an EIP playground. Process of Integrating Evidence (PIE) for CIH Educators; 2017 July 13-15; Bloomington, MN.

Madigan D, Cambron JA. Quality assessment of case reports on a technique website. NUHS Homecoming; 2017 June 22-24. Lombard, Illinois.

Cramer GD, Budavich M, Bora P, Koo T, **Madigan D**, Braden A, Ross K. Reliability and validity of accelerometry methods used to assess facet joint crepitus and cavitation. *The FASEB Journal*: April 2017, Vol. 31, No.1 Supplement, pp. 1b1-1091.2. Presented at Experimental Biology; 2017 Apr 22-26; Chicago, IL.

Madigan D Quinlan-Ruof E, Cambron JA, Forst L, Zandoni J, Friedman L. Occupational health history taking of chiropractic interns. 12th Annual Research and Practice Awards Day at University of Illinois at Chicago School of Public Health; 2017 Apr 7; Chicago, IL.

Madigan D, Korvatko Y, Turyk M. Platform and poster presentation abstracts: Associations of blood lead and cadmium levels with bone mineral density in men aged 50 and older. *Journal of Chiropractic Education*: March 2017, Vol. 31, No. 1, pp. 29-83. Presented at DC 2017 (14th World Federation of Chiropractic Biennial Congress, 24th Association of Chiropractic Colleges Research Agenda Conference, and 2017 National Chiropractic Leadership Conference); 2017 Mar 15-18; Washington DC.

Madigan D, Cambron JA. Platform and poster presentation abstracts: Quality assessment of case reports on a technique website. *Journal of Chiropractic Education*: March 2017, Vol. 31, No. 1, pp. 29-83. Presented at DC 2017 (14th World Federation of Chiropractic Biennial Congress, 24th Association of Chiropractic Colleges Research Agenda Conference, and 2017 National Chiropractic Leadership Conference); 2017 Mar 15-18; Washington DC.

Madigan D, Cambron JA. Quality assessment of case reports on a technique website. National University of Health Sciences Faculty Development Session. 2017 Feb 22; Lombard, IL.

Swedler D, Simmons M, **Madigan D**, Mabila S. Levels of evidence for drug-involved truck crash fatalities in the United States. American Public Health Association 2016 Annual Meeting & Expo. 2016 October 29 - November 2; Denver, CO.

- Madigan D**, Cambron J, Kennedy A, Burns K, Dexheimer J. Volunteerism of massage therapists: A MassageNet study. *Int J Ther Massage Bodywork*. 2016 Jun; 9(2): 9–27. Presented at the International Massage Therapy Research Conference. 2016 May 12-15; Seattle, WA.
- Kohrman A, Kohrman C, Ahmad F, **Madigan D**, Man B. Finding your own path of service: Fellows for Life share their experiences and insights. Schweitzer 20th Anniversary Conference: Improving Community Health Together. 2016 Apr 29- May 1; Chicago, IL.
- Madigan D**, Friedman L. Illinois hospital discharge data for homeless individuals, 2010-2013. 11th Annual Research and Practice Awards Day at University of Illinois at Chicago School of Public Health. 2016 Apr 5; Chicago, IL.
- Madigan D**, Cambron J, Dexheimer J, Gudavalli MR, Cox J. Platform presentation abstracts: Dosage of treatment for cervical pain by field doctors using cervical flexion distraction. *Journal of Chiropractic Education*: March 2016, Vol. 30, No. 1, pp. 52-68. Presented at Association of Chiropractic Colleges Research Agenda Conference. 2016 Mar 17-19; Orlando, FL.
- Madigan D**. Experiences from the World Health Organization occupational health meeting in South Korea: Opportunities for CAM providers in primary care. National University of Health Sciences Faculty Development Session. 2016 Jan 28; Lombard, IL.
- Johnson C, Green B, Byrd L, Clay Jr. M, Khauv K, **Madigan D**, Haas M, Hyland J, Haneline M. Development of a public health model for the APHA Chiropractic Health Care Section. American Public Health Association 143rd Annual Meeting. 2015 October 31 - November 4; Chicago, IL.
- Johnson C, Guadagno AC, Hamm T, Konarski-Hart K, Anderson D, Clay Jr. M, Haas M, Kaeser M, Lewis E, **Madigan D**, Nab J. Evaluation of public health related policies from the American Chiropractic Association: Description of a quality improvement process. American Public Health Association 143rd Annual Meeting. 2015 October 31 - November 4; Chicago, IL.
- Budavich M, Cramer G, Bora P, Koo T, **Madigan D**, Ross K. 2015 Reliability and validity of accelerometry methods used to assess zygapophyseal joint vibrations during motion and spinal manipulation. American Association of Anatomists Regional Meeting. 2015 October 3; Milwaukee, WI.
- Madigan D**, Cambron JA, Dexheimer J, Jedlicka J, Cox J, Gudavalli R, Gudavalli S, Hawk C. Dosage of treatment for cervical pain by field doctors using cervical flexion distraction. NUHS Homecoming. 2015 June 25-27. Lombard, Illinois.
- Madigan D**, Forst L, Friedman L. Comparison of temporary worker Illinois Workers' Compensation Commission filings from 2007-2012 with direct hire employees. Proceedings of the National Occupational Injury Research Symposium (NOIRS). 2015 May 19-21; Kingwood, WV.
- Madigan D**, Forst L, Friedman L. Comparing temporary worker Illinois Workers' Compensation Commission filings from 2007-2012 with direct hire employees. 10th Annual Research and Practice Awards Day at University of Illinois at Chicago School of Public Health. 2015 April 7; Chicago, IL.
- Madigan D**, Forst L, Friedman L. Temporary and direct hire employee differences in Illinois Workers' Compensation Commission filings. American Public Health Association 142nd Annual Meeting. 2014 Nov 15-19; New Orleans, LA.
- Krajewski A, **Madigan D**, Forst L, Friedman L. Leveraging multiple data sources to assist OSHA in enforcement: examining Illinois Workers' Compensation data on amputations. *Occup Environ Med*. 2014 Jun; 71 Suppl 1:A69. Presented at the 24th International Epidemiology in Occupational Health (EPICOH) Conference. 2014 Jun 24-27; Chicago, IL.

Madigan D, Krajewski A, Forst L, Friedman L. Examining Illinois Worker's Compensation data to assist OSHA enforcement: the case of amputations in temporary workers. The American Society of Safety Engineers' Safety 2014 Professional Development Conference and Exposition (PDC). 2014 Jun 8-11; Orlando, FL.

Madigan D. Krajewski A, Forst L, Friedman L. Examining Illinois Worker's Compensation data to assist OSHA enforcement: the case of amputations in temporary workers. University of Illinois at Chicago School of Public Health's 9th Annual Student Research/Practice Awards Day. 2014 Apr 8; Chicago, IL.

Madigan D, Zanoni J. Occupational health and safety issues associated with wind energy. OSHA Safety Day. 2014 Mar 19; Sugar Grove, IL.

Cambron J, Dexheimer J, **Madigan DM**, Carroll J, Brod N. Challenges of developing MassageNet: A practice-based research network. American Massage Therapy Association National Convention. 2013 Sept 26-28; Fort Worth, TX.

Cambron J, **Madigan DM**, Dexheimer J, Brod N. Dissatisfaction and negative side effects post-massage: A MassageNet survey. American Massage Therapy Association National Convention. 2013 Sept 26-28; Fort Worth, TX.

Madigan DM, Cambron JA, Grieve T, Baltazar K. CAM students' areas of public health interest. American Public Health Association 140th Annual Meeting. Oct 27-31, 2012. San Francisco, CA.

Madigan DM, Sullivan BM, Peacock N. Platform Presentations: Attitudes towards chiropractic care among the healthcare community in Ghana, Africa. Journal of Chiropractic Education: Spring 2012, Vol. 26, No. 1, pp. 83-115. Presented at the Association of Chiropractic Colleges Research Agenda Conference (ACC RAC). 2012 Mar 15-17; Las Vegas NV.

Madigan DM, Sullivan BM. Attitudes towards chiropractic care among the healthcare community in Ghana, Africa. American Public Health Association 139th Annual Meeting. Oct 29-Nov 2, 2011. Washington DC.

Cambron J, Dexheimer J, **Madigan DM**, Brod N. Client perceptions of massage effects: A MassageNet study. American Massage Therapy Association National Convention. 2011 Oct 19-22. Portland, OR.

Cambron J, Dexheimer J, **Madigan DM**, Brod N, Walton T. Massage therapists' collection of health history and client conditions encountered: A MassageNet survey. American Massage Therapy Association National Convention. 2011 Oct 19-22. Portland, OR.

Other Presentations

Madigan D. Chiropractic Inclusion in Public Health Service Programs. ACA Learn Webinar; 2019 Nov 14.

Madigan D. Atypical career paths and post-graduate opportunities in chiropractic. University of Western States through SACA (Student American Chiropractic Association) Presents Speaker Bureau; 2019 October 30; Portland, OR.

Rothschild S, **Madigan D**. Speaker. Overcoming project boulders. Chicago Area Schweitzer Fellows' Midyear Retreat. 2016 Nov 12; Chicago, IL.

Madigan D, Powell S. Presentation. Alternative Medicine. Chicago Area Health Education Center Speakers' Bureau at Dunbar Career Academy High School; 2016 Jan 27; Chicago, IL.

Panelist, Ethics presentation sponsored by SACA. NUHS; 2015 April 3; Lombard, IL.

Madigan D, Powell S. Presentation. Alternative Medicine. Chicago Area Health Education Center Speakers' Bureau at South Shore International College Prep; 2014 December 16; Chicago, IL.

Panelist, Health Professions Recruitment & Exposure Program (HPREP) Panel. Loyola University; Fall 2013.

HONORS AND AWARDS

ACA Academician of the Year	2020
AIHA Fred Tremmel Presentation Award	2019
Certificate of Appreciation for Efforts Expanding Public Health Education, APHA CHC	2018
Special Recognition Award, APHA CHC	2016
Rising Star Award, American Public Health Association Chiropractic Health Care Section	2014
Albert Schweitzer Fellow for Life	2013-present
Student American Chiropractic Association Excellence in Leadership Award	2013
Albert Schweitzer Fellow, Chicago	2012-2013
NCMIC Scholarship Recipient	2012
Academic Consortium for Complementary and Alternative Health Care Scholar	2012
NUHS EBP Student Mentored Research Program with the UIC School of Public Health	2010
Presidential Scholarship Recipient, NUHS	2009-2010

PROFESSIONAL ACTIVITIES

Editorial Boards

Editorial Board Member. Journal of Contemporary Chiropractic. 2018-present

Conferences

Program Planning Committee Member. Process of Integrating Evidence (PIE) for CIH Educators; 2020; Dallas, TX.

Faculty Advisor. SACA 2019 Leadership Conference; 2019 September 6-8; Lombard, IL.

Program Planning Committee Member. Process of Integrating Evidence (PIE) for CIH Educators; 2017 July 13-15; Bloomington, MN.

Rapporteur. 10th Meeting of the Global Network of World Health Organization Collaborating Centres for Occupational Health; 2015 May 27-30; Jeju Island, Republic of Korea.

Peer Reviewer

American Public Health Association Annual Meeting

Association of Chiropractic Colleges Research Agenda Conference

Journal of Bodywork and Movement Therapies

Journal of Chiropractic Education

Journal of Chiropractic Medicine

Journal of Contemporary Chiropractic

Journal of Evidence-Based Complementary & Alternative Medicine

Memberships

2011-present American Chiropractic Association (ACA)

2011-present American Public Health Association (APHA)

2018-present	International Commission on Occupational Health (ICOH)
2013-present	World Federation of Chiropractic (WFC)
2013-2015	Illinois Public Health Association (IPHA)
2013-2015	American Society of Safety Engineers (ASSE)
2013-2014	American Council of Governmental Industrial Hygienists (ACGIH)
2011-2013	Illinois Chiropractic Society (ICS)

Elected and Appointed Positions

American Chiropractic Association	
Clinical Guideline Review Task Force Committee Member	2014-present
Diversity Commission Committee Member	2017-present
Editorial Review Advisory Board Committee Member	2018-present
SACA Presents Speaker Bureau Member	2019
Student ACA Committee Member	2018-present
NextGenACA (previously Millennial Think Tank) Member	2016-2018
Public Health Committee Member	2014-2016
American Public Health Association Chiropractic Health Care Section	
Chair-Elect	2019-present
Program Planner	2015-2020
Section Councilor	2017-2019
Secretary	2013-2017
Massage Therapy Foundation	
MTF Ergonomics Project Workgroup	2019-present
National University of Health Sciences	
MSACP Advisory Committee	2019-present
Research Committee Member	2017-present
Student American Chiropractic Association (SACA) Chapter Advisor	2017-present
Curriculum Committee Member	2017-2018
Public Health Club Advisor	2017-2018
Institutional Review Board Member	2013-2017
Institutional Animal Care and Use Committee Member	2013-2017
Public Health Club Mentor	2013-2017
University of Illinois at Chicago	
Student Alliance for Public Health and the Environment (SAPHE) Treasurer	2014-2015
ASSE Student Section Secretary	2014-2015

Community Service

Volunteer as Adult Basic Education Instructor for the Salvation Army (Des Plaines Street Location).

Program consists of literacy and mathematics courses two hours per week with homework to prepare participants for employment exams and GED courses. 2013-2016.

Judge for 6th Annual Local Health Occupations Students of America (HOSA) Competition for Chicago Public Schools High School Students in the CTE Health Sciences Cluster; 2016 Feb 12; Robert Morris University, Chicago, IL.

Judge for 5th Annual Local Health Occupations Students of America (HOSA) Competition for Chicago Public Schools High School Students in the CTE Health Sciences Cluster; 2015 April 24; Robert Morris University, Chicago, IL.
