# Final Report for Grant Number 5-R01-OH-008237-04
# *Blood Exposure and Primary Prevention in the Home Care Workplace*

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Table of Contents

List of Terms and Abbreviations

Addus Health Care – Home health care agency that employs personal care assistants

Bethel New Life – Home health care agency that employs personal care assistants

Blood and body fluid contact – includes both sharps and non-sharps-related exposure to blood and/or body fluids

DCW – direct care worker(s)

Exposure control plan – procedures for dealing with an exposure to bloodborne pathogens that includes communication of hazards to employees, reporting of exposure incidents, and post-exposure evaluation.

FTE – full-time equivalent; a way to measure a worker's involvement in a project; an FTE of 0.5 signals that the worker is only half-time while an FTE of 1.0 means that the person is equivalent to a full-time worker

MCHHA - Medicare certified home health agencies

Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard – regulation issued in 1991 to protect workers from the risk of being exposed to bloodborne pathogens

Organization of work - refers to the work process and the organizational practices that influence job design, including how jobs are and human resource policies are structured.

PCA – personal care assistant

PPE – personal protective equipment

RN – registered nurse

SEIU – Service Employees International Union

Sharps disposal container – puncture and leak-resistant containers to be used for the disposal of sharps such as needles

Abstract

Background: Non-licensed Direct Care Workers (DCW), also known as Personal Care Assistants ( PCAs), as well as RNs and other health care professionals providing care to clients in the home need protection from work related exposures that may lead to injuries or illnesses, just as their counterparts who work in institutional settings do. Because the home care environment does not include features of an institutional work setting such as security, housekeeping, standard room configurations and bed types, as well as standard healthcare environmental hazard controls including needle disposal systems and safety-engineered needles and sharps, they may be at greater risk when exposed to blood or body fluids. In addition, ready access to post-exposure treatment or prophylaxis may be lacking.

Methods: To understand more about the risk of blood exposure and injury in home care work, we conducted a five year mixed methods research study that included a series of focus groups and cross sectional surveys (at two points in time) as well as an intervention effectiveness evaluation. Three home care populations were the subject of the descriptive survey work: urban Illinois (IL) Personal Care Assistants (PCAs), Maryland (MD) Registered Nurses (RNs) and MD home care agency directors. The community based PCA intervention consisted of small group trainings, with a shorter training refresher one year later. The employer intervention consisted of a training workshop and materials.

Results: Findings are summarized from 1) the baseline PCA and RN surveys, 2) the employer survey and 3) the intervention effectiveness evaluation. 1) Findings from the baseline surveys of 980 PCAs ( 74% response) and 794 RNs (65% response) found a rate of 8.1 blood and body fluid contacts per 100 FTE reported among PCAs compared with an RN reported rate of 26.7 contacts per 100 FTE. As expected, the majority of PCAs did not report using needles or lancets on the job. However, for those PCAs who performed work activities such as handling needles or lancets, they were five times as likely to be exposed as the RNs. We did not find any significant associations between the organization of work, available hazard controls and blood exposure in either populations, although further analyses are underway. 2) Phone interviews with administrators of 30 MD home care agency (47.6% response), found that twelve agencies reported 18 sharps related incidents within the past 12 months, with three of these incidents resulting in practice/procedure changes. Only 23.3% of the agencies reported extensive staff involvement in evaluation of their risk exposure plan and they reported that 73.3% of patient generated sharps are discarded in impermeable containers in household garbage. 3) A process evaluation of the PCA intervention program found home care aides were able to effectively articulate facts that they learned from a training session with less than 2% providing inaccurate information. Participation in the intervention lead to a statistically significant increase in the reported usage of proper sharps containers among the home care aides (P=.033) one year later.

Conclusions and Implication: PCAs and RNs reported exposures to sharps, blood, and body fluids in the home setting at rates that are unacceptable and indicate the need for additional training, prevention, and protection. PCAs appear to be at increased risk of injury when performing nursing-related activities for which they are inexperienced and/or lack training. Further efforts such as the small group interactive training evaluated in this study and found to be effective in changing PCA behavior related to sharps disposal are needed to protect all home care workers from blood exposure, namely by assuring coverage and enforcement of the revised OSHA Bloodborne Pathogen Standard. Occupational health and long term care experts and policy makers must collaborate on strategies to provide further protection from blood and other hazards facing professional and non-professional direct care workers and the public they serve.

The most significant project highlights/findings include the following. On average 8 in 100 PCAs reported that they had contact with their client's blood and body fluid in the course of providing care for home-based clients. By comparison RNs providing home care reported 27 exposures per 100 workers care (8.1 and 26.7 per 100 FTE, respectively). As expected, the majority of PCAs did not report having contact with needles or lancets on the job. However, for those PCAs who performed work activities such as handling needles or lancets, they were five times as likely to be exposed as the RNs. Those who reported changing wound dressings were at two to three times the risk of exposure to blood compared with RNs.

The training intervention was associated with PCAs taking action and performing tasks to prevent occupational exposure to blood and body fluids. Participation in the intervention lead to statistically significant increases in the usage of proper sharps containers among the home care aides who could be directly matched between the pre- and post-intervention questionnaire (P=.033). The intervention also resulted in a statistically significant increase in the usage of proper sharps containers when comparing the results from intervention and control groups (P=.041) among the home care aides who could be directly matched.

Translation of Findinas

The study findings have been shared with the union, workers and the home care agencies participating in the study. The findings have been published in professional journals and presented at public health meetings and conferences. The research team has met with Illinois policy makers throughout the project to share the findings from this work and make recommendations for increased work training and policy change. To future translate the importance of this workforce and the hazards they face, Earl Dotter, photo journalist, spent two days in Chicago in late 2006 shadowing two SEIU Personal Care Assistance (PCAs) through the course of their work day. Mr. Dotter reduced the two days of photos (hundreds of photos) to a twelve minute slide show which is housed on the UIC website with linkages from other websites (http://www.uic.edu/sph/glakes/homecareo.

Outcomes/Relevance/Impact

Both PCAs and RNs reported exposures to sharps, blood, and body fluids in the home setting at rates that are unacceptable and indicate the need for additional training, prevention, and protection. PCAs appear to be at increased risk of injury when performing nursing-related activities for which they are inexperienced and/or lack training. Further efforts are needed to protect all home care workers from blood exposure, namely by assuring coverage and enforcement of the OSHA Bloodborne Pathogen Standard [OSHA, 1993] (ref. AJIM). Non-licensed direct care workers providing care in the home received little if any training in health and safety. This study documented risk factors for exposure among this population and demonstrated the impact of a training intervention on the use of prevention strategies such as requesting and obtaining a sharps disposal container for clients who need them.

Section 2

Scientific Report

Backaround on the Problem/Need for this Research

This research was funded in response to RFA-OH-04-003 "Incidence of Needlestick and Sharps Injuries and Medical Safety Device Availability/Use among Non-Hospital Health Care Workers". This research addressed the NORA priority areas: Infectious Diseases, Organization of Work, Intervention Evaluation, and Special Populations at Risk. The research was designed to not only contribute to the understanding of risks of exposure to blood among health care workers employed in the home health care setting, but to develop, implement and evaluate effective intervention strategies.

The University of Maryland (UMD) and the University of Illinois at Chicago (UIC) in partnership with SEIU Health Care Illinois and Indiana (formerly Local 880) as well as two large home care employers in Illinois, conducted the Illinois-based PCA-focused research. The UMD conducted the MD home care RN work as well as the MD employer surveys and intervention. Wisconsin (WI), SEIU local 150 union members participated in the focus group portion of the project but were not included in later phases of the project. This change in the proposed work was necessitated because 1) we expanded the scope of the work performed in IL, 2) leadership changes at SEIU Local 150 early in the project and 3) challenges to the feasibility of including Local 150 members in the intervention training. However, all findings from the project have been and continue to be shared with Local 150.

Approximately 7.6 million Americans receive home care services for an estimated cost of $47.5 billion (NAHC, 2007). In Medicare Certified Home Health Agencies (MCHHA) nurses provide intermittent skilled care to individuals following an acute illness (CMS, 2005). Nurses have the highest job related injury rates of any occupation (Foley, 2004) of which one risk is bloodborne pathogen exposure. Despite mandated protections, blood contacts still occur posing a serious occupational risk.

Despite the limited amount of research quantifying the risk of blood exposure among home health professionals who have exposure to needles and other sharps, some of what is known about exposure to sharps in the acute care setting can be extrapolated to the home care environment. Exposure to needles and other sharps in the absence of an OSHA-proscribed Exposure Control Plan will result in frequent needlestick injuries and subsequent disease transmission. Fortunately, a comprehensive standard is in place to prevent or reduce needlestick injuries. This research has attempted to address the extent to which Exposure Control Plans are in place in the home care work environment and where they are not, a more complete understanding of the barriers to implementing such a plan. Therefore, we conducted a series of eight focus groups (6 among PCAs and 2 among RNs to understand the context in which care is provided and workers protected. We then conducted a baseline survey of both populations to quantify the risk and protective measures in place in home care. These data were then used to inform the development of feasible interventions that were implemented and evaluated among IL PCAs and MD employers to promote hazard control measures.

In the home health industry, skilled nursing care (e.g. wound care, intravenous medications and phlebotomy) is provided by licensed personnel, usually a RN [Levinson, 2006]. By contrast, PCAs generally assist with activities such as bathing and toileting, along with light housework, cooking and laundry [CMS, 2005; Levinson, 2006]. Some home care services are provided under Medicare regulations and cover skilled care to people with acute care needs, or through Medicaid-funded programs providing chronic care to the frail elderly, disabled and chronically ill [CMS, 2005; Levinson, 2006]. Despite the variation in services and providers in home care, certain features of home care are similar for all workers, i.e. workers travel to and provide care in clients' homes creating significant

limitations on their ability to control the work environment. The usual features of an institutional work setting are absent; such as security, housekeeping, standard room configurations and bed types, and on-site colleagues and supervisors [Zanoni et al., 2007]. Also, standard healthcare environmental hazard controls such as needle disposal systems, safety-engineered needles and sharps may not be available; and ready access to post exposure prophylaxis may be lacking. Furthermore, employers of home care workers have little control over the presence or condition of supplies in the home. Human Subjects Protection approval for all aspects of the study protocol was obtained from both universities' institutional review boards.

To understand more about the risk of blood exposure and injury in home care work, we conducted a five year mixed methods research study that included a series of cross sectional surveys (at two points in time) as well as an intervention effectiveness evaluation. Three populations were the subject of the descriptive survey work: urban Illinois (IL) Personal Care Assistants (PCAs), Maryland ( MD) Registered Nurses (RNs) working in home care and MD home care agency directors. The community based PCA intervention consisted of a small group training, with a shorter training refresher one year later. The employer intervention consisted of a training workshop and materials. The *specific alms* of this project are as follows:

1) To compare and contrast blood exposure and available hazard controls among Registered Nurses ( RN), Certified Nurse Assistants (CNA), and non-licensed, medical home care workers (HCW) working in the home.

2) To assess the relationship between organization of work (DOW) factors, blood exposure, and available hazard controls in the home care.

3) To describe home care agency Exposure Control Plans (as required by the 2000 federal Needlestick Safety and Prevention Act) in Maryland and Illinois home care agencies.

4) To evaluate changes in home care agency Exposure Control Plans following receipt of bloodborne pathogen standard compliance assistance materials.

5) To implement a primary prevention intervention for the reduction of blood exposure among HCWs.

6) To evaluate the feasibility and impact of implementing a primary prevention strategy for the reduction of blood exposure among HCWs.

A description of the methods and findings related to each specific aim follow.

*Specific Aims 1) To compare and* contrast *blood exposure and available hazard controls among Registered Nurses (RN), Certified Nurse* Assistants *(CNA), and non-licensed, medical* home care workers (HC W) *working in the home.* 2) To assess *the relationship between organization of work* ( DOI49 factors, *blood exposure, and available hazard* controls *in* the home *care*

Focus groups

In year one of the project, we conducted 6 focus groups among IL and Wisconsin PCAs. In June 2005, preliminary findings from focus groups were presented to participants to validate focus group findings and interpretation, namely, "did we get it all and did we get it right?" Findings from this series of focus groups were published (Zanoni, 2007), presented to project partners and presented at the annual meeting of the American Public Health Association in Philadelphia, PA in December 2005. Dr. Lipscomb presented findings at a UIC Educational Research Center seminar in April 2006. Results from

the focus groups have shown that workers are exposed to blood when changing client dressing, bed linens and when exposed to lancets and insulin syringes. Also, many workers are unaware of any exposure control plan. Those who were aware of employer sponsored exposure control plans reported a wide range of protections. According to the homecare workers and personal assistants, hazard controls are lacking or are hard to obtain. Gloves are either not supplied or travel to obtain them is a barrier to the workers. Also lacking is a sharps disposal container. Furthermore, workers report bringing their own soap, disinfectant, hand sanitizer, bleach, and mops, (paid for by themselves) into the home workplace. Also, the lack of training that some workers have reported is of great concern given the self-reported exposures to blood.

The University of Maryland (UMD) also conducted two focus groups with Maryland RNs in year 2. Findings revealed that RNs carry their own sharp box, which is a danger to themselves and their family if a needle falls out of the box and into their car for example. RNs worry about needlesticks because they are in a less controlled environment. Potential for exposures are vast; some of the RNs have needles with safety devices and others do not. For some, gloves are supposed to be in the patient's home but they are not always there and they continue working without needed supplies. Sometimes the RNs have to take patients on which they have not been given report, and may not have the correct supplies to care for those individuals. Nurses are aware of exposure control plans at their work but not specifics, and all were offered hepatitis B vaccinations. RN responses were analyzed for themes and incorporated into an RN survey that was pilot tested. Pilot test responses were evaluated, and incorporated into the RN survey which was mailed to all MD RNs working in home care (n=2,689) in April 2006. These focus group data then informed the further development of the baseline surveys.

Baseline Surveys

Baseline staff-level data were collected via a self-administered survey of IL unionized PCAs and a mailed survey of MD RNs in home care. The PCA population consisted of employees of two home health agencies; one large not-for-profit home care agency (intervention group) and one urban, faith-based home care agency (comparison group). PCAs were invited to particulate in the survey which was self-administered during the first hour of an 8 hour mandatory training session required by the State Department of Aging; those who chose not to complete the survey were required to remain in the training hall. PCA supervisors were not present in the hall when surveys were completed but researchers were available on-site to answer questions regarding the survey. All PCAs were paid an hourly wage for participating in the training, regardless of whether they chose to complete the survey or not. Five separate survey administration sessions and trainings were conducted in the summer of 2006; four in English and one in Russian (the survey was translated and then back translated into Russian by a university-based translator). After detecting no differences between the Russian or English responses, all data was combined resulting in useable data from 980 of the 1324 PCAs attending the training sessions ( response rate of 74%).

The RN sampling frame consisted of 2,689 actively licensed RNs who, according to the State Board of Registered nurses, reported practicing in home care in MD at the time of their most recent license renewal. A survey was mailed to the entire list of RNs; 69 were undeliverable due to incorrect addresses. The mid-2006 mailing consisted of an introductory letter, up to 3 questionnaire mailings and two reminder postcards, if needed [Dillman, 2000]. In addition, $2 and $5 incentives were included in the first and third questionnaire packet, respectively. Of the 2,620 presumed to have been contacted, 1698 surveys (65%) were returned. The eligibility criteria for this study stipulated that the RN had to have worked in home care within the past two years. Those who did not work in home care at the time of the survey were instructed to complete the survey based on their most recent home care experience. Using this criterion, our sample consisted of 794 (47%) RNs

Measures

The survey was a modified version of the blood and body fluid questionnaire developed by Trinkoff [ Trinkoff et al., 2007). Both PCA and RN surveys were 8-page machine readable surveys that assessed work history and work characteristics, the organization of their work, daily work activities, and past year needle/sharp and mucous membrane blood exposure.

Past year blood and body fluid contact was assessed as 1) self report of having been stuck with a needle or sharp contaminated with BBF, 2) self report of contact between a client's BBF (containing visible blood) and their own mucous membrane or open wound, and 3) any contact to either type of exposure. If respondents answered affirmatively to having experienced a sharp injury or non-sharp contact in the past year, they were then asked additional questions about their most recent injury. Both PCAs and RNs were asked what they were doing at the time of the injury/contact and whether they reported the injury. Both groups were also asked about the availability of personal protective equipment including "correct size gloves" and "needle disposal boxes".

Blood and body fluid exposure: PCAs and RNs were asked whether they performed a list of activities on a typical day that could put them at risk of exposure to BBF. Activities included handling sharps, changing wound dressings, emptying wound drainage, providing care or inserting urinary catheters, and colostomy and tracheotomy care. To estimate and compare the risk of injury between the two occupational groups, the number of reported sharp injuries and non-sharps contacts per 100 full time equivalents (FTEs) per year was calculated. To calculate these rates, Jagger's 2002 model was adapted to home care because the number of occupied beds is not an appropriate denominator for home care [ Haiduven et al., 2004]. Adapted for the home care environment, the total number of FTEs per group was defined as the average number of field hours worked per week (PCA=28.2 hours; RN=28.5 hours) multiplied by 50 weeks per year divided by 2000 hours [Jagger, 2002]. Then after basic contingency tables analyses, we proceeded to logistic regression models to explore differences in the association between each work activity and exposure to blood or body fluids.

PCAs participating in this study worked for two home care agencies in urban IL; the RN sample was obtained from MD RN licensure lists. Eight focus groups were conducted early in the project as a well as a baseline survey among 980 home care Personal Care Assistants (PCAs) and 794 home care Registered Nurses (RNs). At baseline, on average 8 in 100 PCAs reported that they had contact with their client's blood and body fluid in the course of providing care for home-based clients. By comparison RNs providing home care reported 27 exposures per 100 workers care (8.1 and 26.7 per 100 FTE, respectively). As expected, the majority of PCAs did not report having contact with needles or lancets on the job. However, for those PCAs who performed work activities such as handling needles or lancets, they were five times as likely to be exposed as the RNs. Those who reported changing wound dressings were at two to three times the risk of exposure to blood compared with RNs. Both PCAs and RNs reported exposures to sharps, blood, and body fluids in the home setting at rates that are unacceptable and indicate the need for additional training, prevention, and protection. PCAs appear to be at increased risk of injury when performing nursing-related activities for which they are inexperienced and/or lack training. Further efforts are needed to protect all home care workers from blood exposure, namely by assuring coverage and enforcement of the OSHA Bloodborne Pathogen Standard [OSHA, 1993] (ref. AJIM).

*Specific Aim 2)* To assess the *relationship between organization of work* (OOM *factors, blood exposure, and available hazard controls in the home* care

To address Aim2, the relationship between organization of work (OOW) factors, available hazard controls, and blood exposure among Personal Care Assistants (PCAs) in home care, we first conducted

descriptive analyses to summarize the organization of work factors and available hazard controls. The organization of work factors included work status (e.g. years in home care, number of jobs, the number of cases visited per day) and work schedule. Available hazard controls represented work supplies (e.g. correct size gloves, sharps containers, surgical masks, bandage changing supplies, bleach, hand-sanitizer, mops, liquid hand soap, and waterproof gowns). Then we conducted a series of bivariate analysis screening by cross-tabbed to blood exposure (needles stick in the past year, yes/no). At baseline, a number of variables measuring the amount of overtime caring and the availability of personal protective equipment (PPE ) were significantly associated with sharps and/or non-sharp related exposure in the past year. Future analysis is underway to evaluate whether these associations are related to these factors or if they are indicators of the opportunity for blood exposure, namely that these workers cared for clients who have medical conditions requiring the use of needles.

In order to examine Aim 2 among the RN home care population, the relationship between organization of work (COW) factors, blood exposure, and available hazard controls in the home care, we first conducted descriptive analyses to summarize the organization of work factors and available hazard controls. The organization of work factors included work status (e.g. years as RN, years in home care, the number of jobs, the number of cases visited per day) and work schedule. Available hazard controls represented work supplies (e.g. latex-free gloves, powderless gloves, correct size gloves, impermeable gowns, eye protection, sharps container, surgical masks, self-capping/retractable needles, needless IV tubing, needless medlock, blunt cannula syringes, and safety-lock needles). Then we conducted a series of bivariate analysis by cross-tabbed to blood exposure (needles stick in the past year yes/no). We could not find any significant associations between the organization of work, available hazard controls and blood exposure.

A Day in the Life a Personal Care Assistant as Photographed Earl D tter

To enhance the qualitative aspects of this project, Earl Dotter, photo journalist, spent two days in Chicago in late 2006 shadowing two SEIU Personal Care Assistance (PCAs) through the course of their work day. Mr. Dotter reduced the two days of photos (hundreds of photos) to a twelve minute slide show. A "voice over" was then added to the 12 minute slide show with the PCA featured providing the narrative and voice. The slide show was presented to a joint labor management group and at the 2007 API-IA Annual Meeting as part of a NIOSH sponsored panel on the overall project. The slideshow is h o u s e d o n t h e U I C w e b s i t e w i t h l i n k a g e s f r o m o t h e r w e b s i t e s (http://www.uic.edu/sph/glakes/homecare/).

In addition to the Chicago photo shoot, a photo shoot was completed in the University of Maryland home simulation lab to capture sharps procedures commonly encountered in the home care setting. Donning of personal protective equipment, blood glucose monitoring, demonstration of different types of safety needles and sharps disposal methods were photographed. The second MD based session involved a home care nurse visiting two patients in their home. Phlebotomy, blood glucose monitoring and wound care procedures were photographed as well as use of personal protective equipment and red sharps disposal containers. The photos were used for educational materials and slide and poster presentations at professional meetings. Subsequently Mr. Dotter photographed two Maryland home care nurses in the course of making home visits. The photos were used for educational programs and written materials.

*Specific Aims 3) To describe* home *care agency Exposure Control Plans (as required by the 2000 federal Needlestick Safety and Prevention* Act) *in Maryland and Illinois* home care *agencies. 4) To evaluate changes in* home care *agency Exposure Control Plans following receipt of bloodborne pathogen standard compliance assistance materials.*

The University of Maryland contacted 63 regulated MD home health agencies up to three times and completed interviews for 30 agencies. An introductory letter describing the project was first mailed to the directors of all home health agencies in Maryland. The close-ended interview questions focused on the agencies blood-borne hazard exposure control plan, needle management and the use of gloves, the procedures surrounding glove use and procurement, training availability and description, hepatitis B availability, post-exposure prophylaxis procedures and reported needlestick injuries.

Thirty interviews were completed (47.6% response rate) with administrative staff. Twelve agencies reported 18 sharps related incidents within the past 12 months with three of these incidents resulting in practice/procedure changes. 23.3% of the agencies reported extensive staff involvement in evaluation of their risk exposure plan. Responsibility for conducting education was delegated to people with no particular expertise in BBP safety. 73.3% of patient generated sharps are discarded in impermeable containers in household garbage. Administrative confidence (scale 0 to 10) in staff use of PPE varied from 9.4 (gloves) to 6.0 (goggles). Among the 30 participating agencies, compliance in one or more of the nine essential components of the OSHA blood safety standard was lacking (Scharf 2009).

In February 2007, the Maryland Project Advisory Panel met and provided recommendations for the education intervention for Maryland home care agencies. The content of the Maryland intervention workshop, held in June 2007, was based on information gleaned from the year one agency surveys, the Advisory Panel, and the research team's prior work with home care agencies. The workshop was attended by HCA representatives and addressed the primary elements of an Exposure Control Plan, Exposure Determination, Exposure Incidents & Reporting, and Sharps Selection Process including but not limited to methods of exposure control, hepatitis B vaccinations, post-exposure evaluation and follow-up, hazard communication and recordkeeping.

To address Aim 4 a follow-up phone interview was conducted with 42 Maryland home care agencies. We then compared the elements of the agencies' Exposure Control Plan as reported at baseline and one year later. Preliminary findings evaluating changes in home care agency Exposure Control Plan compliance index following participation in a bloodborne pathogen standard compliance workshop and/or receipt of a bloodborne pathogen standard compliance manual demonstrated a statistically significant improvement in compliance score, with the average score increasing from 5.3 elements at baseline to 6.0 elements at follow-up ($p<0.001$)

In order to further assess the magnitude of the problem of blood contacts and organizational risk factors for exposure among MD home health care RNs, a secondary data analysis was conducted using the RN survey data and an annual state home health agency report (Maryland Health Care Commission, 2004). Home health care nurses (n=355) and MCHHA and hospice employers (n=30) in one mid-Atlantic state were evaluated regarding their bloodborne pathogens programs, practices, and blood and sharps contact experience. An index was developed to evaluate home care employer compliance with the OSHA bloodborne pathogens standard. Nurse and employer policy and practice of the OSHA bloodborne pathogens standard did not meet all requirements despite identified risk. Thirty-eight home health care nurses from 12 of the 30 employers reported needlestick (NSI) injuries within the past year, yet employers reported only 18 nurse NSI within the same year. Using our blood borne pathogen compliance index, employers can review their exposure control plans and make revisions to ensure compliance.

Generalized Estimating Equations was used to examine ratios of nurse staffing to average monthly census, visits and administrative staff; ownership status and managed care income to total income as independent predictors of blood contact while controlling for nurse characteristics (education, years experience as a nurse and home care nurse, age, job strain, sharps and non-sharps exposure intensity, employment status, and safety device and PPE availability). 461 home care nurses working

for 37 MCHHAs were included in this analysis. Managed care >10% to total reimbursement compared to no managed care (X2 =6.776, p=.009, OR=.375 [.179-.785]) was a statistically significant independent predictor. Nurses working for agencies with >10% managed care were 62.5% less likely to be associated with any type of blood contact. For profit ownership status (X2 =8.896, p=.003, OR=2.019 [1. 275-3.197]) was a statistically significant independent predictor. Nurses working with "for profit" agencies were twice as likely to have a sharps injury. This study supported the contribution of organization characteristics as independent predictors of occupational risk for blood contact while controlling for individual home care nurse characteristics. For profit ownership may be a business model adaptation in home care organizations that place nurses at risk for occupational injury while and managed care penetration may have a protective effect. Participatory research may inform policy change that may ultimately decrease risk for occupational injury.

*Specific Aims 5) To implement a primary prevention intervention for the reduction of blood exposure among HCWs. 6) To evaluate the feasibility and impact of implementing a primary prevention strategy for the reduction of blood exposure among HCWs.*

The PCA targeted intervention was implemented through the Addus/880 labor management workgroup. In the summer of 2006, over 1000 SEIU local 880 members employed by Addus as personal care assistant (PCA) participated in a six-hour training on blood borne pathogen. The survey and training was conducted by UMD, University of Illinois at Chicago (UIC) and AED at four separate mandatory trainings held by Addus. The training employed small group methods and was evaluated and revised following each training. 715 English-speaking and 131 Russian-speaking PCAs completed the survey (74% response rate). In order to allow for a comparison between blood exposure/prevention activities among PCAs working for Addus Home Care and a second agency; a group of 150 PCAs working for Bethel New Life Home Care, Chicago IL was conducted in May 2007 but with training on respiratory disease transmission instead.

In December 2006, the research team met with the existing Addus/880 Joint Labor Management committee to present preliminary findings from the PCA survey and to preview a 12- minute synopsis of the Nov. 2006 Chicago-based Earl Dotter photo shoot. Both the survey findings and the photos were extremely well received by the approximately 30 individuals present at the meeting. In response to the presentation, the committee proposed to form a bloodborne pathogen prevention workgroup within the IL based Addus/Local 880 Labor Management Committee to specifically work on the enhancement of the project intervention. The UIC research team was invited to be part of this workgroup and they have been meeting with the group on a bimonthly basis. Activities undertaken by this group include developing a pocket-sized fact sheet on blood exposure prevention, a survey of local pharmacies regarding needle disposal container procurement and disposal and changes to the care plan process to involved greater PCA input.

In order to adapt the small group training program used in this research for large group settings, participants were organized into small groups. All of the employee trainings for the home care agency participating in this research were conducted in an auditorium-style setting, with movable tables and chairs. The home care aides were placed in groups of ten to fifteen individuals within the large auditorium. A trainer was then assigned to two groups of home care aides and led them through the training and group discussion, while a facilitator at the front of the auditorium helped guide everyone though the training program. Trained volunteers from the UIC SPH, UMD, SEIU Healthcare IL & IN, and the participating home care agency were recruited to help fill the role of trainers. The involvement of the train-the-trainer volunteers included extensive acquisition of knowledge on the program as well as the application and distribution of tools.

A process evaluation of the intervention program found home care aides were able to effectively articulate facts that they learned from a training session with less than 2% providing inaccurate information. Also, both intervention tools were well received by the home care aides with 91.5% finding the information card useful and 90.1% finding the sharps safety magnet useful. The findings in this process evaluation also illustrate the usefulness and effectiveness of the interactive training program and intervention tools. This process evaluation demonstrates that interactive educational training programs can be applied to, and are effective in, large group settings.

In order to adapt the small group training program used in this research, for large group settings, participants were organized into small groups. All of the employee trainings for the home care agency participating in this research were conducted in an auditorium-style setting, with movable tables and chairs. The home care aides were placed in groups of ten to fifteen individuals within the large auditorium. A trainer was then assigned to two groups of home care aides and led them through the training and group discussion, while a facilitator at the front of the auditorium helped guide everyone though the training program. Trained volunteers from the UIC SPH, UMSN, SEIU Healthcare IL & IN, and the participating home care agency were recruited to help fill the role of trainers. The involvement of the train-the-trainer volunteers included extensive acquisition of knowledge on the program as well as the application and distribution of tools.

The intervention program developed as part of this research was found to be effective in getting home care aides to take action and perform tasks to prevent occupational exposure to blood and body fluids among home care aides. Participation in the intervention lead to statistically significant increases in the usage of proper sharps containers among the home care aides who could be directly matched between the pre- and post-intervention questionnaire (P=.033). The intervention also resulted in a statistically significant increase in the usage of proper sharps containers when comparing the result from intervention and control groups (P=.041) among the home care aides who could be directly matched. Results for the matched, and trends in the grouped data both show that the intervention was effective in helping to increase the usage of proper sharps containers in home care.

Future analysis and translation of research findings

The research team continues to analyze data from the two PCA surveys, as well as the qualitative data collected as "optional comments" in the PCA and RN surveys. One additional University of Maryland PhD student is conducting her dissertation research on these data. Fact sheets describing the study findings are being prepared for use by our home care and union partners. Additional manuscripts are in preparation.

Publications:
Journal Articles

Lipscomb J, Sokas R, McPhaul K, Scharf B, Barker P, Trinkoff A, Storr C. Occupational blood exposure among unlicensed home care workers and home care registered nurses: Are they protected? American Journal of Industrial Medicine, Volume 52 Issue 7, Pages 563-570 Published Online: 28 May 2009.
*This manuscript compares the findings from the baseline PCA and RN surveys and compares* past *year PCA and RN reported blood and body fluid contacts* rates. *This paper is the first* to *document blood exposures among* PCAs *and raises a number of policy* issues *discussed in the paper. The manuscript addresses Aims 1 and 2.*

Scharf BB, McPhaul KM, Trinkoff A, Lipscomb J. Evaluation of home health care nurses practice and their employers' policies related to bloodborne pathogens. AAOHN J. 2009 Jul;57(7):275-80. *This manuscript describes the findings from* the *baseline employer survey and an analysis comparing* past *year RN reported and employer reported* blood *and body fluid contacts. This* semi *quantitative analysis addresses Aims 3. This paper is part of Dr.* Scharf's *dissertation research.*

Zanoni J, Kauffman K, McPhaul K, Nickels L, Hayden M, Glassman M, Vega L, Sokas R, Lipscomb J. Personal Care Assistants in the Home Environment: Focus Group Findings. Progress in Community Health Partnerships. 2007; 2:125-32.
*This manuscript describes the findings from the qualitative* analysis *of the PCA* focus *groups and in part, addresses Aims 1 and 2.*

Baron, S., McPhaul, K., Phillips, S., Gershon, R., Lipscomb, J., (2009). Low Wage workers and Pandemic Influenza: The Importance of Protecting Homecare workers. American Journal of Public Health.
*This manuscript* does *not directly relate* to *any* of the *study aims but* was an *outgrowth of this work and that of other* grantees.

Amuwo, S; Lipscomb, J; Sokas, R. Occupational Risk Factors for Blood and Body Exposure Among Home Care Aides. In Progress.
*This manuscript summarizes the baseline PCA survey* data, *examining risk* factors *for blood exposure among PCAs. This manuscript directly addresses Aims 1 and 2.* This is one *of three manuscripts that compose* S. Amuwo's *dissertation* research.

Amuwo, S; Sokas, R; Zanoni, J; Nickels, L; Lipscomb, J. Implementation and Evaluation of Interventions for Home Care Aides on Blood and Body Fluid Exposure in Large Group Settings. In Progress.
*This manuscript describes the intervention designed* to *reduce PCA risk factors for blood* exposure. It *provides a description of the small group training methods employed in this study. This manuscript directly addresses Aims 5. This is one of three manuscripts that* compose S. *Amuwo's dissertation* research.

Amuwo, S; Lipscomb, J; Sokas, R. Effectiveness of an Intervention in Reducing Occupational Risk for Blood and Body Fluid Exposure Among Home Care. In Progress.
*This manuscript* describes *the evaluation of the impact* of the *intervention designed* to *reduce PCA risk* factors *for blood exposure. It compares pre and post-survey data. This manuscript directly* addresses *Aims 6.* This is *one of three manuscripts that* compose S. Amuwo's *dissertation r*esearch.

Lipscomb, J. A. McPhaul, K, Choi, JiSun, Sokas, Amuwo, S; R, Nickels L, Zanoni, J; Myra Glassman " Job demands among personal care assistants caring for family members", In review.
*This manuscript compares the job demands of PCAs who care for family and non-family members. The paper relates to Aim 2 and addresses an important current policy question.*

Proceedings

Lipscomb J.A. "Direct Care Workers and Potential Exposure to H1N1 Flu", invited presentation at the NAS Workshop on Personal Protective Equipment for Healthcare Workers in the Workplace Against Novel H1N1 Influenza A, National Academy of Sciences, Washington, DC August 13, 2009.

Lipscomb J.A. "Older Healthcare Workers: Addressing Health & Safety Challenges on the Job" invited keynote address at the Health and Medicine Policy Research Group and University of Illinois School of Public Health workshop, Chicago, IL, Sept. 29, 2009.

Lipscomb, J., Amuwo, S., McPhaul, K., Barker, P., Sokas, R., "Personal Care Assistants: Should they be *covered* by the Blood Borne Pathogen (BBP) standard?" American Public Health Association Annual Meeting, San Diego, CA, 2008.

Lipscomb, J. A. "Preventing Blood Exposure in the Home Care Work Environment", American Public Health Association Annual Meeting, Washington DC, 2007.

Jeanne *Geiger*-Brown, J., Muntaner, C., Lipscomb, J., Trinkoff, A. "Musculoskeletal disorders and demanding work among home care workers", American Public Health Association Annual Meeting, Boston, MA, 2006.

Amuwo, S; Nickels, L; Zanoni, J; Sokas, R; Lipscomb, J. (June 2009) Intervention Outcomes for Blood and Body Fluid in Home Care Workers. American Industrial Hygiene Conference and Expo (AIHce). Toronto, On.

Amuwo, S; Nickels, L; Zanoni, J; Pritchett, J; Sokas, R; Lipscomb, J. (November 2007) Reducing *exposure* to bloodborne pathogens in home care: Small group activity training sessions for classes exceeding 200 participants. American Public Health Association (APE-IA) National Conference. Washington D.C.

Lipscomb, J. A. McPhaul, K, Choi, JiSun, Sokas, R, Nickels L, Zanoni, J. "Job demands among personal care assistants caring for family members", American Public Health Association Annual Meeting, Philadelphia, PA 2009.

Dissertation/Thesis

Scharf BS: [2009], Organizational Predictors of Blood Contact and Injury in Home Care Nurses. Dissertation, Ph.D. Thesis, University of Maryland Baltimore.
*Doctoral dissertation research addressing study aims* 3 and 4.

Amuwo S: [2009] Occupational Exposure Among to Blood and Body Fluids Home Care Aides, Ph.D. Thesis, University of Illinois at Chicago.
*Doctoral dissertation research addressing study aims* 5 and 6.

# Inclusion Enrollment Report

This report format should NOT be used for data collection from study participants.

Study Title: Blood Exposure and Primary Prevention in the Home Care Workplace

Total Enrollment: 2804 Protocol Number: RFA-OH-04-003

Grant Number: R01 OH008237

PART A. TOTAL ENROLLMENT REPORT: Number of Subjects Enrolled to Date (Cumulative)

| Ethnic Category | Females | Males | Sex/Gender Unknown or Not Reported | Total |
|---|---|---|---|---|
| Hispanic or Latino | 48 | 7 | 0 | 55 * |
| Not Hispanic or Latino | 1,650 | 132 | 14 | 1,796 |
| Unknown (individuals not reporting ethnicity) | 654 | 39 | 260 | 953 |
| Ethnic Category: Total of All Subjects* | 2,352 | 178 | 274 | 2,804 * |
| Racial Categories | | | | |
| American IndiawAlaska Native | 15 | 0 | 1 0 | 15 |
| Asian | 10 | 4 | 0 | 14 |
| Native Hawaiian or Other Pacific Islander | 2 | 1 | 0 | 3 |
| Black or African American | 1,402 | 67 | 20 | 1,489 |
| White | 815 | 97 | 15 | 927 |
| More Than One Race | 30 | 3 | 0 | 33 |
| Unknown or Not Reported | 78 | 6 | 239 | 323 |
| Racial Categories: Total of All Subjects* | 2,352 | 178 | 274 | 2,804 |

PART B. HISPANIC ENROLLMENT REPORT: Number of Hispanics or Latinos Enrolled to Date (Cumulative)

| Racial Categories | Females | Males | SexlGender Unknown or Not Reported | Total |
|---|---|---|---|---|
| American Indian or Alaska Native | 0 | 0 | 0 | 0 |
| Asian | 0 | 0 | 0 | 0 |
| Native Hawaiian or Other Pacific Islander | 2 | 1 | 0 | 3 |
| Black or African American | 8 | 0 | 0 | 8 |
| White | 15 | 3 | 0 | 18 |
| More Than One Race | 2 | 3 | 0 | 5 |
| Unknown or Not Reported | 21 | 0 | 0 | 21 |
| Racial Categories: Total of Hispanics or Latinos** | 48 | 7 | 0 | 55 *** |

* These totals must agree. •* These totals must agree.

Inclusion of Children
Not applicable.

Materials Available for Other Investigators
Data analysis and manuscript preparation continues. Other investigators interested in using these data may contact the PI in writing stating the data set they would like to access and for what research purpose. If the request is legitimate and does not involve data analysis underway by the research team, the PI will provide access to de-identified data via CD.