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Studying home health care nurses and aides: research design and challenges

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Abstract Home health care (HHC) is growing rapidly and yet health and safety conditions of HHC clinicians are poorly understood. Study of this workforce presents unique challenges because it is decentralised, often part-time and mobile. As part of a larger project on sharps injuries and blood exposures in HHC, this paper addresses the challenges of recruiting a large cohort of HHC nurses and aides and describes novel cross-sectional survey methodology. Recruitment was conducted with cooperation from eight HHC agencies and two labour unions. Intensive personal contacts and a financial incentive ($25) were employed. Some groups of HHC clinicians could be contacted only by mail, while others were contacted during a promotional "mini-fair" at their agency. A total of 1772, 18-page health and safety surveys were distributed and 1225 usable surveys were collected. This 69% overall response rate is better than that in many recent health surveys. Survey returns were highest (67–91%) where promotional events were held. The mailing-only strategy generated lower response rates (53–55%), despite the same financial incentive. Despite the challenges of reaching out to the decentralised HHC workforce, adequate response to a detailed health survey is possible, using appropriate techniques and with the close cooperation of employers and labour unions.

Key words home health care; occupational safety and health; response rates; study participant recruiting; survey research

Introduction

Significance of the home health care industry

Home health care (HHC) represents 6.9% of all U.S. health care employment and continues to grow rapidly (U.S. Department of Labour, 2008a). This reflects the needs of an aging population, reduced stays in hospitals and nursing facilities driven by cost containment, consumer preference for home care and greater use of medical technologies for in-home treatment (U.S. Department of Labour, 2008b). At present, the demand for HHC services exceeds availability and the gap is predicted to widen. Henton, *et al.* (2002) report that 20% of the U.S. adult population is expected to be 60 years or older by 2030. In addition, 65-year-old adults have an average life expectancy of 18 additional years, therefore, increasing the number of patients to be cared for in the home setting (Henton, *et al.*, 2002). Stone (2004) raised the high turnover and long vacancy periods among home health aides, home care workers and personal care attendants and reported that 37 U.S. states had identified worker recruitment and retention as priority issues in 2002.

In the U.S., HHC jobs range from highly skilled nursing jobs to jobs with lower educational requirements such as home health aides and personal care attendants. Immigrant HHC clinicians increased by 114% from 1990 to 2000, compared with a 31% growth of US-born clinicians (Paral, 2004). Half of the home health aides

were non-white (Wright, 2005; Smith and Baughman, 2007) and 89% of them were females (Wright, 2005). The Bureau of Labour Statistics projects 49% growth in the home health aide occupation between 2006 and 2016 (U.S. Department of Labour, 2008b). Janiszewski Goodin (2003) concluded that facilitation of the immigration of foreign health care professionals is a critical factor to change the severe nursing shortage trend ; otherwise, the US is forecasting a 20% deficit in the registered nurses by 2020. The global shortage of health care professionals has created particular challenges. Maybud and Wiskow (2006) reported that the lack of health care providers has encouraged a fierce international competition, which is sometimes deployed with aggressive recruitment campaigns. The current extent of global migration of health care professionals is rapidly weakening the health care infrastructure of developing countries. Cooper and Aiken (2006) describe how the US dependency on foreign health care professionals has a significant impact: even emigration from industrialised countries – like the UK – adversely affects developing countries as it generates recruitment from developing countries to replace the emigration.

Despite the rapid growth of HHC, little is known about the work life and occupational health and safety conditions of these health care professionals. It is, in many ways, a working population hidden from view because the workplaces are private homes and not traditional health care settings, the workforce is highly mobile and travel for a large part of each day, and the types of health care delivered at home are often thought of as fairly basic when in fact highly sophisticated procedures are increasingly performed at home (Markkanen, *et al.*, 2007). In the US, an additional reason that working conditions of HHC clinicians are poorly understood is that clinicians are employed, often part-time or on an hourly as-needed basis, by a complex web of different types of non-profit and for-profit agencies. Nurses and aides may collaborate with or be employed by entirely different agencies.

The current research was conducted as a part of a larger effort to characterise the health and safety risks to HHC clinicians, particularly from sharps injuries and blood exposures. This paper addresses the challenges of locating and recruiting a large cohort of HHC clinicians and describes novel cross-sectional survey methodology appropriate to the study of a highly mobile, autonomous and often over-worked study population. Recruitment of study populations for epidemiologic research is becoming increasingly difficult, even under the best of circumstances, and low levels of participation are a serious threat to study validity, hence the need for careful attention to recruitment and survey administration methods (Hartge, 2006; Morton, *et al.*, 2005).

Sharps injuries and other bloodborne pathogen exposures in HHC: Project SHARRP

Globally, injuries from needles and other sharp medical devices (collectively called sharps) are the most common source of occupational bloodborne pathogen exposures among health care workers (Wilburn and Eijkemans, 2004). The World Health Organisation (WHO) estimates that health care workers worldwide sustain at least two million sharps injuries annually, which result in hepatitis B and C as well as HIV infections (Wilburn and Eijkemans, 2004). Risk of infection from bloodborne pathogens is a serious problem in all branches of health care, but very little is known about this risk in HHC; most data on sharps injuries come from studies of hospitals, where working conditions are likely to be quite different from those encountered in patients' homes. Work safety and health improvements have been associated with

improved recruitment and retention of nurses in hospitals (Perry, *et al.*, 2004), and while the same may be true in case of HHC, data are lacking.

In 2004, Project SHARRP (Safe Homecare and Risk Reduction for Providers) was initiated at the University of Massachusetts Lowell to investigate sharps injuries and blood exposures in HHC. The research team members consisted of nurses, epidemiologists, occupational hygienists, ergonomists and policy analysts. The aims of Project SHARRP were four-fold: i) identify the magnitude and nature of sharps injuries and other blood contacts in the home setting; ii) develop a sharps injury surveillance system for HHC, based at the State health department; iii) identify the availability and effectiveness of medical devices or sharps with engineered safety features; and iv) assess non-reporting of injuries and exposures. To achieve the project's aims, a formal research partnership was established with eight private HHC agencies and two health care labour unions. A qualitative study by Markkanen, *et al.* (2007) documented that HHC clinicians regularly face several serious occupational hazards, including violence, ergonomic risk factors and bloodborne pathogen exposures. We hypothesised that despite the importance of the HHC industry, hazardous job exposures remain poorly characterised because of the social context of the caregivers and their invisible work setting. This cross-sectional survey of HHC providers was undertaken to quantify occupational hazards, in particular sharps injuries, blood and body fluid exposures and their contributing factors.

Methodology

The survey took place in five phases: i) recruitment of agency and union partners; ii) development of survey instrument; iii) recruitment of the study population; iv) survey administration; and v) post-administration survey management. All methods and survey materials were approved by the authors' Institutional Review Board of the University of Massachusetts Lowell (UMass Lowell). The survey administration lasted from October 2006 until May 2007.

Recruitment of agency and union partners

SHARRP investigators sought the collaboration of HHC agencies and health care unions to facilitate the research. Because of the complex system of provider agencies in the US, it was necessary to use both agency and union partners to reach HHC clinicians. Some agencies' employees are in unions, while some are not. Another reason to use both these approaches was that anecdotal evidence suggested that there might be differences in some aspects of working conditions between unionised and non-unionised employers. Potential collaborators were identified and prioritised through web searches and networking with industry groups and colleagues. Candidate organisations were then contacted and recruited as "Partners" to endorse the SHARRP research in a well-defined manner that supported the research and protected all parties. A formal working agreement was established with each agency or union management and was approved by the Institutional Review Board of UMass Lowell.

Development of survey instrument

A qualitative phase formed the foundation for a self-administered survey questionnaire design (Markkanen, *et al.*, 2007). In addition, two sources were instrumental in designing the questionnaire: *Home Health care Bloodborne Pathogen Exposure Incident Recording Form* of the Massachusetts Department of Public Health (2006) and *Survey of Health care*

Personnel on Occupational Exposure to Blood and Body Fluids by the Division of Health care Quality and Prevention of US Centers for Disease Control and Prevention (US Department of Health and Human Services, 2004). The final 18-page instrument was developed by SHARRP research team members after conducting at least 10 iterations and two pilots. The final questionnaire comprised 12 sections (Table 1).

Most questionnaire items required closed-ended responses using a 5-point Likert scale (e.g. "how frequently," "agree/disagree," "check all that apply," "check one item only" types) or asking the respondent to identify relevant medical procedures or conditions from a list including an "other" option as an open-ended narrative. A few open-ended qualitative narratives were gathered in particular for capturing circumstances regarding sharps injuries, blood exposures and their near-misses, for example: "*What were you doing immediately before the injury/ exposure?*"; "*Please describe how injury/exposure occurred?*"; "*What prevented this near-miss from being an accident?*".

Piloting the survey instrument

The survey questionnaire pilot consisted of two stages: (i) the pilot phase 1, conducted during May 2006, in five sessions, and (ii) the final pilot, carried out in August 2006, in nine sessions. For each stage, the survey instrument and pilot methods were approved in advance by the UMass Lowell Institutional Review Board. The recruitment of pilotees in both stages was organised via snowball sampling using email and verbal communication. Members of partner agencies or unions were specifically excluded, to ensure that they could be unbiased participants in the formal survey.

Meeting times were set up with qualified volunteers; most sessions took place in a private room at the participant's health care agency. Compensation of $20 (twenty

Table 1 Summary of Project SHARRP survey instrument

Questionnaire domain	Content
Personal characteristics	Basic demographic data: age, gender, ethnicity, race
Job experience	Current occupation, hours of work and years of work experience in HHC
Sharps injuries	Number of sharps injuries ever as well as in the past 12 months Details on the latest injury event and reporting behaviour
Sharps injury near-misses	Number of sharps injury near-misses ever as well as in the past 12 months Details on the latest near-miss event
Blood and body fluid exposures	Number of blood and body fluid contacts ever as well as in the past 12 months. Details on the latest exposure event and reporting behaviour
Blood and body fluid exposure near-misses	Number of blood and body fluid near-miss contacts ever as well as in the past 12 months. Details on the latest near-miss event
Reporting and training	Use of sharp medical devices and training. General reasons for not reporting sharps injuries and blood contact exposures
Personal protective equipment	Use of gloves, masks and eye protection
Work environment/ organisation	Frequency statements on hazardous conditions encountered in HHC
Safety at work	Agree/disagree Likert scale for items on safety culture in HHC
Being a home health care provider	Agree/disagree Likert scale for items on job satisfaction in HHC
"Nurses only" section	Nursing specialisation data and items on the use of sharp medical devices with safety features

dollars)[1] was paid at the beginning of the pilot session. The session began by introducing Project SHARRP, the pilot activity and informed consent procedure. After signing the informed consent form, the pilotee filled out the questionnaire. Upon completion, a SHARRP researcher interviewed the participant about the clarity and content of the questionnaire. At the end, the pilotees were provided an anonymous evaluation form with a pre-paid business return envelope. A flow diagram of the survey development is shown in Figure 1.

In the first phase, five participants (three nurses and two home health aides) tested the clarity of a rudimentary draft questionnaire and length of time required to complete it. During this first pilot, the aide participants exceeded the maximum completion time target (30 min), prompting a streamlining and reorganisation of questions about medical devices into a "Nurses Only" section. Formatting of questionnaires to ensure cognitive consistency (e.g. similar scales for responses, scales running in the same direction) and graphic design of the questionnaire were also carried out in preparation for a second pilot.

A second pilot re-assessed the questionnaire completion time, readability and answerability of questions and confirmed the ease of handling of the completed surveys for record-keeping and data-entry purposes. Nine pilotees (five nurses and four home health aides/nurse assistants) completed the final questionnaire in 20–30 min and exit-interviews confirmed the perceived clarity of the instruments. This was reinforced by a review of the nine completed questionnaires. Minor revisions were applied before the final printing (e.g. ensuring uniform visibility of items, adding 2–4 new variables). At this point, the questionnaire was judged to be sufficiently refined and no additional pilot assessments were warranted.

Recruitment of the study population

Following satisfactory completion of the pilot assessments, Project SHARRP called upon its HHC partners for promotion and distribution of the SHARRP survey for recruitment of research participants. The respective partners designated a facilitator at each site (i.e. each agency or union office) to coordinate distribution of recruiting materials to eligible participants by worksite mailbox or by US mail. There were three key recruitment elements: i) a pre-survey postcard alerting workers to the upcoming survey; ii) the survey package; and iii) a friendly reminder/thank you card. The survey package included the following items: 1) a cover letter co-signed by an agency/union manager and the Project SHARRP director ; 2) the survey instrument, printed as an 8½″ × 11″ booklet; 3) the informed consent form; 4) a "compensation card" to record the participant's contact information and request payment of the stipend; 5) a postage-paid return envelope and 6) a $1 coffee shop gift certificate as a token of appreciation. Wherever possible, voicemail broadcast messages by the site facilitator on behalf of the agency management and flyers posted at the agency were used to complement the written recruitment materials and to encourage participation.

Survey administration

Survey participation required that HHC clinicians complete and return three items in the survey package: i) signed informed consent form, ii) questionnaire and

[1] If pilotees drove to the study site, they were given $40 (forty dollars) as compensation .

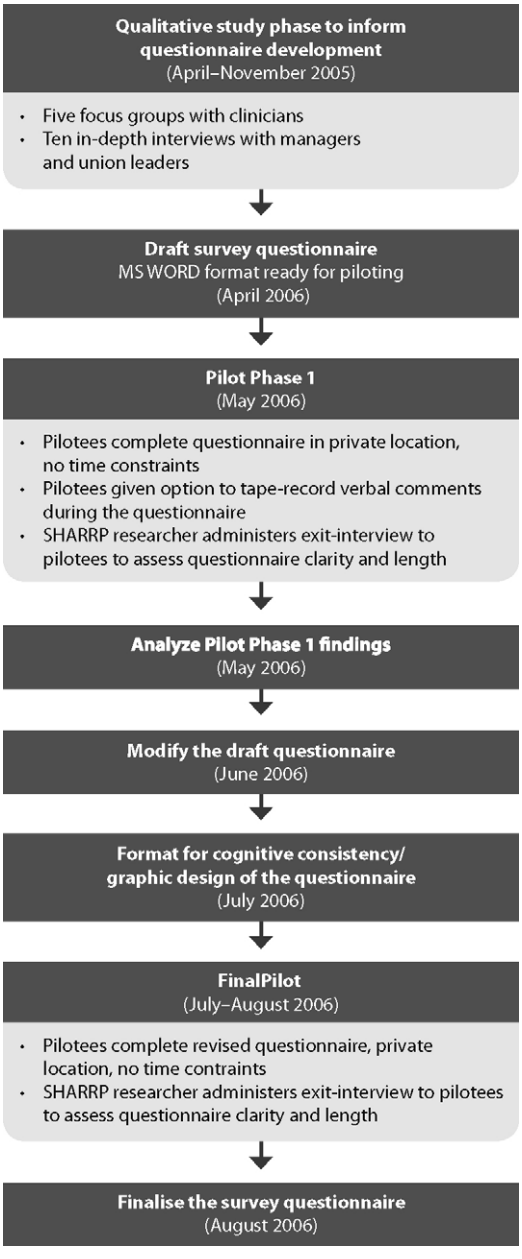

Figure 1 Development of Project SHARRP survey methods and questionnaire.

iii) compensation request card. The monetary compensation for completing and returning the survey package was $25, paid by cheque if returned by mail or in cash if returned to an on-site promotional event (described below).

Union members had the sole option of returning the survey by US mail in a prepaid envelope and receiving their compensation by cheque. More personalised

outreach to this group was precluded by the fact that the individuals work for many different agencies across Massachusetts and there was no central location frequented by all potential participants. Because on-site outreach to the individuals was not possible, union members who had not returned a survey packet in a timely manner received up to two additional mailings of the survey materials. A friendly reminder/thank you card was the final correspondence with this group of potential participants.

Survey participants at partner agencies could return the survey packet in one of three ways (Figure 2): i) in person to the on-site Project SHARRP survey promotional event ("mini-fair"), ii) by delivery at other times to a secure on-site collection box or iii) through US mail in a postage-paid return envelope. When the survey was returned at a SHARRP promotion mini-fair, the participant received the compensation in cash. If it was returned in the mail or collection box, the compensation was issued by cheque and mailed to the address provided on the compensation card. Agency participants received a single survey mailing, followed by a thank you/reminder card and complemented by reminder voice broadcasts and flyers at the agency.

Mini-fairs

Project SHARRP organised promotional events, "mini-fairs", at the offices of each partner agency to raise awareness about the survey, offer the incentive of immediate compensation for participants and to provide a personal connection between the clinicians and research team members. Refreshments were provided and clinicians received $25 in cash if they returned their questionnaires at the SHARRP mini-fair. The worksite fairs normally lasted 1–2 h and consisted of a table with a descriptive poster, the SHARRP banner, colourful directional reminder signs posted strategically throughout the agency, refreshments, travel mugs with the SHARRP logo and additional survey packets just in case clinicians had not received it yet or had misplaced the original. After the mini-fair, a secure collection box was left at the worksite as an option for clinicians to return their surveys at a later time and to serve as a visual reminder about participating in the survey. The collection box and its contents were picked up 1–2 weeks after the mini-fair. A total of 26 mini-fairs were held in eight partner HHC agencies.

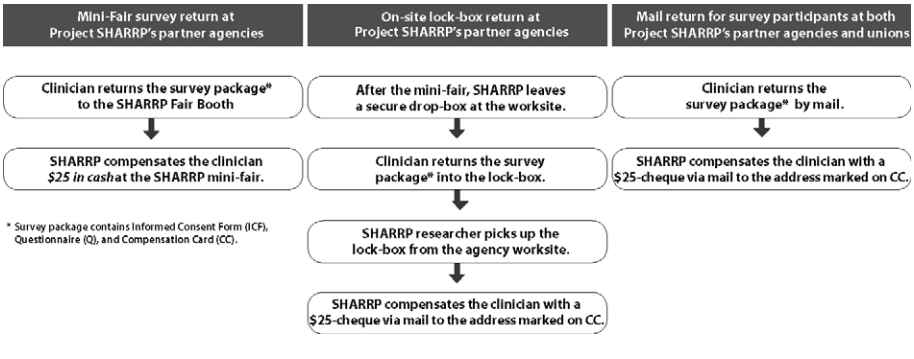

Figure 2 Three ways to return the survey to Project SHARRP.

Post-administration survey management

Registering returned surveys

Upon receipt of a returned survey package, it was first verified as to whether it contains all three required items: a signed informed consent form, a completed questionnaire and a clearly filled-out compensation card. Furthermore, the survey questionnaire was reviewed for its completeness. If any of the three required components were missing or a if a questionnaire survey section was incomplete, the participant was contacted by mail (or in person at a mini-fair) and asked to complete the missing survey items or questionnaire data. All returned surveys were registered and coded with an individual number that identified the agency/union through which the participant was reached, the outreach and return methods, and a unique identifier. The coded surveys were then photocopied and delivered for data entry. Separately, the participant's name and address, date survey received and additional information on completeness of the survey return were entered into the database, in order to record the total number of received surveys and to process the $25 compensation. At the end of each month, original compensation cards, along with a database address list, were submitted to the university finance department for payment. Original questionnaires were separated from the informed consent forms and the compensation cards to ensure confidentiality. We hypothesised that those with different experiences with sharps injuries and blood/body fluid exposures would have different reporting behaviour and that this would be reflected in the preference for the method of returning the survey. Respondents perhaps perceived some methods of return more confidential (mail) than others (mini-fair). Chi-squared tests for differences of proportions were used to investigate this hypothesis. Questionnaire data were analysed with Statistical Analysis Software (SAS, 2003).

Results: study population characteristics and response rates

A total of 1772 HHC providers were contacted, and 1229 surveys were returned. After four unusable surveys were dropped, the final sample for data analysis was 1225. The survey population was predominantly female, largely white and English speaking, reflecting the HHC workforce in Massachusetts (Table 2). The overall survey response rate was 69%. While HHC nurses and home health aides formed the target survey population, a small number of other HHC clinicians and providers also participated (Table 2). The response rates were lower in the unions, where personal contact was absent and surveys were returned solely by mail, than in the agencies where there was opportunity for personalised outreach and multiple return options. Average return rates were approximately 54 per cent for unions (range 52.6–54.5%) and approximately 75 Per cent for agencies (range 69–91%) (Table 3).

The participants who reported sharps injuries were more likely to return their surveys by mail ($P < 0.01$). The same behaviour was observed with reported other blood/body fluid exposures as well ($P < 0.01$).

Discussion

What influenced response rates?

A high response rate is an essential aspect of data quality in any population study. Occupational health research has traditionally relied upon "captive audiences" in

Table 2 Socio-demographic characteristics and professional background of the SHARRP study population

Socio-demographic characteristics and professional background	Total *N* = 1225	
	N	%[a]
Gender		
Female	1173	95.8
Male	48	3.9
Not reported	4	0.3
Age		
Less than 40	276	22.5
40–49	382	31.2
50–59	410	33.5
60 and older	146	11.9
Race		
White	1119	91.3
Black	43	3.5
American Indian/Alaskan native	1	0.1
Asian	7	0.6
Mixed	17	1.4
Not reported	38	3.1
Hispanics/Latinos	77	6.4
Occupations		
Nurses	787	64
Certified home health aides	193	16
Certified nurses aides	44	4
Personal care attendants	42	3
Home makers	45	4
Other		
Phlebotomists	2	0.2
Physical therapists	47	4
Physical therapy assistants	12	1
Occupational therapists	19	2
Occupational therapy assistants	3	0.2
Other aides	3	0.2
Miscellaneous	26	2
Health care experience		
Less than 2 years	49	4.0
2–4 years	75	6.1
5–9 years	127	10.4
10–14 years	175	14.3
15–19 years	174	14.2
More than 20 years	535	43.7
Home health care experience		
Less than 2 years	137	12.0
2–4 years	169	14.8
5–9 years	215	18.9
10–14 years	229	20.1
15–19 years	196	17.2
More than 20 years	194	17.0

[a]Percentages may not add to 100% due to missing responses within a particular category.

Table 3 Survey returns and response rates by different agencies and unions

Research partner	Number of surveys returned	Number of surveys distributed	Response rate	Number of mini-fairs held
Union 1	102	194	53%	—
Union 2	177	325	55%	—
Unions (total)	279	519	54%	
Agency 1	251	366	69%	6
Agency 2	125	150	83%	1
Agency 3	55	74	74%	1
Agency 4	51	56	91%	1
Agency 5	64	92	70%	2
Agency 6	298	370	81%	13
Agency 7	57	85	67%	1
Agency 8	43	60	72%	1
Agencies total	944	1253	75%	26
Other	2			
Overall total	1225	1772	69%	26

large, centralised workplaces like a factory or a hospital to insure large numbers of subjects and direct contact with potential recruits. This is not possible when studying HHC, and so considerable effort was expended to reach out both to the employers and unions as well as to individual recruits.

Survey strengths

Project SHARRP received positive feedback on the questionnaire's content and its design from both managers and front-line clinicians. Although literature has suggested that a questionnaire should not be longer than 12 pages, preferably 4–12 pages (Bourque and Fielder, 2003), many anecdotal reports from the SHARRP study population indicated that that the 18-page questionnaire was both useful and easy to complete. A cover letter co-signed by the agency management or union leadership indicated to clinicians that their agency or union valued the SHARRP study and its ultimate goal of protecting HHC workers. We printed the pre-survey promotion and friendly reminder cards on brightly coloured paper to draw attention to the project.

As anticipated, on-site outreach contributed to higher survey response rates than did the mailing-only strategy. Literature shows that both personal contact and monetary incentives tend to increase response rates (Bourque and Fielder, 2003; Doody, *et al.*, 2003; Nieuwenhuijsen, 2003; Rosoff, *et al.*, 2005). Perhaps the biggest motivational factor at the mini-fairs was $25 cash compensation awarded immediately upon returning the questionnaire package. Also, many mini-fair attendees were pleased to receive a SHARRP travel mug as well as enjoy coffee and refreshments. A brightly labelled secure collection box, placed in each agency office following the mini-fair, served as a SHARRP advertisement and reminder. Many agencies delivered voice mail broadcasts, thanking participants on behalf of Project SHARRP or reminding their employees that it was not too late to complete or return the survey. Feedback also suggested that when clinicians learned that their colleagues had received $25 (cash or cheque), this encouraged others to complete the questionnaire and return the package to SHARRP. An unconditional token of appreciation in the survey package has been found by others to improve response rates considerably. Rosoff and colleagues (2005) conducted a mail survey among childhood cancer survivors and

their parents to determine how immediate and delayed incentives influenced response rates. The group that received a $10 US bill as an unconditional incentive with their blank survey yielded higher response rates than the other group receiving a conditional incentive upon receipt of their completed survey (63–65% versus 42–49%) (Rosoff, *et al.*, 2005). In the SHARRP survey, a $1 coffee shop coupon was added as an unconditional incentive in the packet. When follow-up mail was sent to request further information, a coffee shop coupon was included in the correspondence. We believe that informative and aesthetically pleasing details in the survey package design may have enhanced the user-friendliness of the thick survey package and resulted in reduction of the number of incomplete survey returns to us. These details included strategically placed, multi-coloured labels with graphics, including "*SHARRP survey packet has arrived…*," "*sign here,*" "*return this,*" and "*Please make sure you have enclosed the following….*" In addition, highlighting applied to the titles of the three key items made it clear that these were the components to be returned. Out of 1225 returns, less than 10 (<1%) were missing a required component (questionnaire, signed informed consent form or compensation card). Although the mailing-only survey distribution and collection strategy resulted in significantly lower returns than did the mini-fair approach, the response rates of 52 per cent and 54 per cent indicated that our mailing-only strategy was reasonable: literature suggests adequate mail-survey response rates at 50 per cent (Dillman, 1991; IAR, 2007).

Limitations of the survey

As in any survey, information in this study was lost because of non-participation at both the partner and individual levels. A number of agencies that were contacted declined to participate in the study and did not explain their decision. It seems possible that the agencies which agreed to participate may be more committed to employee health and safety than those which refused, although we have no evidence for this. We can only speculate on the motivations of individuals who chose not to respond, based on our observations and feedback from partner organisations and clinicians who spoke with us by phone or at mini-fairs. Some clinicians informed us that the reason for not participating was that they were no longer directly involved in patient care or HHC. It is possible that delays in cheque payments, associated with an unavoidable conversion of the university's financial software, may have deterred "word of mouth" advertising among colleagues and adversely affected participation. At two of the agency sites, major snowstorms occurred within a day of the scheduled mini-fairs. In both cases, the snowstorm appeared to neutralise the benefits of the mini-fair, as work schedules were juggled and compressed to cover the clinical demands and clinicians were not inclined to take advantage of the mini-fair offerings. It is possible that more frequent and varied opportunities for completing the survey could have increased the response rate. These might include an online survey or multiple on-site mini-fairs. The online strategy was initially considered and rejected because of the confidentiality concerns and difficulties in obtaining signed informed consent statement in a user-friendly manner. While more on-site visits were possible, it is unclear if the results would be commensurate with the additional resource expenditure that would have been required.

Conclusion

Despite the challenges of reaching the decentralised HHC workforce, adequate response to a detailed health survey is possible, using techniques and materials

customised to this workforce and with the close cooperation of employers and labour unions. Regular personal contacts with agencies and unions, participation incentives and worksite survey promotion events are key features in achieving high response rates.

Key points

- The potential job hazards in home health care (HHC) have been obscured by the tendency to not view the home as a work environment; for example, most bloodborne pathogen exposure data come from hospitals and little is known about the situation in HHC.
- Research on HHC clinicians is challenging because they are highly mobile, work largely independently and have highly variable schedules.
- Surveys of this population must adapt to this complex work organisation and use methods of recruitment and administration customised for nurses and other health care professionals.
- Direct personal contacts and repeated reminders coupled with immediate financial incentives were essential to good survey response rates.
- Clinicians who reported bloodborne pathogen exposures preferred to return the survey by mail rather than in person.

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