A DESCRIPTIVE ANALYSIS OF

MONTANA NURSE VOLUNTEERS FOR THE

MONTANA NURSE ALERT SYSTEM

by

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Lianna M. Danielson

April, 2006

DEDICATION PAGE

To my husband, Greg, who has been a constant source of encouragement, love and self-sacrifice during my work on this project and throughout graduate school. To our unborn baby whom we are looking forward to greeting shortly after the completion of this project. To my family who have listened and encouraged continuously. Most significantly, to my Lord and Savior, Jesus Christ, who has guided and supported me in this thesis work and throughout graduate school.

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ABSTRACT

While nurse volunteers have long been an integral part of disaster response nationwide, their specific characteristics are not well understood. By understanding these characteristics, future recruiting efforts will enhance volunteerism and local disaster response capabilities.

In an attempt to recruit nurse volunteers for all hazard emergency events in Montana, and register these volunteers into a Nurse Alert System (NAS) database which could then be utilized by appropriate disaster relief agencies (i.e. American Red Cross, public health departments), a "Montana Nurse Alert System Volunteer Registration" form was sent out with the 2004 Montana State Board of Nursing nurse license renewal forms. Information from the nurse volunteers who returned the forms (8.7% of Montana's licensed nurses) was analyzed by performing a descriptive secondary data analysis to determine characteristics of NAS volunteers and identify gaps in nurse volunteerism across the state. Descriptive factors examined were nurse volunteer characteristics by location (county of residence and in/out of state residence), type of license, area of volunteer interest, retiree status, and CPR certification.

Results of the study indicated that advanced practice registered nurses (16% volunteerism) responded at higher rates than their registered nurse (8%) and licensed practical nurses (8%) counterparts. Retirees maintaining an active license represented 10% of the NAS cohort. Seventy-one percent of the NAS cohort indicated they possessed active CPR certification. In addition, response rates were slightly higher (12%) for all types of nurses in the smallest counties (<10,000 in the county) when compared with medium (10,000-20,000) (10%) and large (>20,000) counties (10%). Gaps were identified in five Montana counties where no NAS volunteers were found. Results suggested agreement with the Integrated Theory of Volunteer Work (Wilson & Musick, 1997) indicating volunteerism increases with human capital as described by higher education levels, income and functional health. Results also suggest agreement with characteristics of "innovators" and "early adopters" with NAS volunteers readily adopting the idea of the Nurse Alert System (Rogers, 2003).

CHAPTER 1

INTRODUCTION TO THE STUDY

Introduction

Experienced health care workers ready to respond in a disaster can drastically

change the physical and psychological outcomes of the survivors of a disaster. The need

for prepared health care volunteers in disaster events was evident during the September

11, 2001 (9/11) terrorist attacks and the recent hurricanes along the Gulf Coast in August-

September 2005. The threat of future terrorist attacks is growing quickly. Senate Foreign

Relations Committee chairman Richard Lugar (R-Ind) conducted a survey on Weapons

of Mass Destruction (WMD) attacks and subsequently reported that experts predict a

nearly 30% chance of a nuclear attack on United States' (US) soil in the next ten years.

"The estimated combined risk of a WMD attack over five years is as high as 50%. Over

ten years this risk expands to as much as 70%" (Lugar, 2005, p. 6). Since 9/11, the

awareness of man-made disasters has been heightened and has led to much energy and

financial effort being utilized to help communities prepare for disasters—at both the

national and local levels. An important part of this disaster preparation is organizing

health care professionals—especially nurses—for a timely disaster response (Executive

Session on Domestic Preparedness, 2001; Hodge, 2005; Ridge, 2004; Stanley, 2003).

Background

In Montana, multiple nuclear missile launch sites operated through Montana's one Air Force base makes the state vulnerable to nuclear accidents and a target for terrorism. In addition, possible natural disasters such as earthquakes, forest fires and the possibility of an avian flu pandemic or pertussis outbreaks across the state demonstrate the need for volunteer nurses ready first to help preserve the health of Montanans and second, to assist with national and international health needs as well. A major part of disaster preparedness involves mobilizing a volunteer health care work force that will be trained and ready when disaster strikes—whether man-made or natural (Department of Public Health and Human Services [DPHHS], 2005).

While working on this project, Hurricane Katrina hit the Gulf Coast of the United States on August 29, 2005, leaving many without adequate housing, food or water (DPHHS, 2005). Nurses across the nation desiring to help quickly sought opportunities for their skills to be used. In addition, nurses in Montana were also asking, "As a nurse, how can I best help and be ready to help in future disaster events" (personal communications, E. Nichols, November 8, 2005; S. Kuntz, September/November 2005). The Montana Nurse Alert System database provides an opportunity for nurses willing to volunteer to register and then be contacted for further preparation by disaster relief organizations so that these volunteer nurses *will* be ready to respond in a timely manner.

Montana Nurse Alert System (NAS) Project

In 2002, two nurses serving on the Public Health Subcommittee of the

Confederated Salish and Kootenai Tribe *Tribal Emergency Response Commission* and the

Lake County *Local Emergency Planning Committee* (TERC/LEPC) recognized the need

for a statewide system to recruit and organize all-hazard disaster volunteers. Ann Ross,

the American Red Cross state nurse liaison, worked with Sandy Kuntz from Montana

State University to create Montana's Nurse Alert System based on a model first

developed by two American Red Cross nurses from Georgia (A. Ross, personal

communication, March 10, 2006).

The NAS project was created in three phases: assessment, planning, and

implementation. During the *assessment phase* the nurses investigated details of systems

in place in Georgia, Alaska, and Colorado including recruitment strategies and database

management issues. Lessons learned from states that had implemented NAS projects

were applied to the Montana Project.

The *planning phase* involved a search for partners who could contribute to and

benefit from the development of a Nurse Alert System in Montana. Seven organizations

indicated interest in the development of a disaster nurse volunteer database including

Montana Department of Public Health and Human Services (DPHHS), Indian Health

Services, Billings Agency for Montana and Wyoming (IHS), Montana Hospital

Association (MHA), Montana Nurses Association (MNA), Montana Board of Nursing

(MT BON), and the American Red Cross of Montana (ARC). The Department of Public

Health and Human Services was working with the Montana Hospital Association to

create the Montana Healthcare Mutual Aid System (MHMAS), a system for pre-

screening, certifying, and sharing healthcare facility volunteers during a disaster. One

aspect of the MHMAS system, the development of an electronic database, was in the

early stage of development. The NAS Project was invited to join this effort in order to have an electronic home for the Nurse Alert database. However, since the MHMAS electronic database was still under development, the NAS Project team decided to solicit nurse volunteers through a paper/pencil registration process.

During the *implementation phase*, a registration form was included in the 2004 Montana Board of Nursing license renewal letters. Each nurse (LPN, RN, APRN) who qualified for re-licensure in 2004 (n=14,914) received a NAS registration form. A total of 8.7% (n=1297) completed the form and agreed to be included in the NAS database. Information received from volunteers was entered into a Microsoft Access database in order to (a) sort volunteers by area of expertise and interest and (b) notify volunteers once the electronic database became available (S. Kuntz, personal communication, May 19, 2005; A. Ross, personal communication, March 10, 2006).

The purpose of the Nurse Alert System (NAS), formed in collaboration among these organizations,

> …is to establish a network of volunteer nurses who hold an active RN or LPN license and would be willing and ready to respond to natural and manmade disasters, including bioterrorism, earthquakes, fires and other unforeseen emergency events in their community. In addition, the Nurse Alert will link nurses to opportunities for disaster-related education and training (Appendix 1).

Essentially, local disaster response agencies (such as local ARC chapters and local public health agencies) within each community will have access to the NAS database to recruit members for training and disaster readiness exercises appropriate to their agency's disaster preparation focus. For example, a local ARC chapter could recruit members who indicated an interest in helping with well shelters, train these members and have them ready when a disaster occurs. Or a local public health department may recruit NAS

nurses who are willing to help in mass immunization clinics. The department would train

these volunteer nurses, maintain ongoing contact with them and mobilize them to assist

with mass immunization clinics in a disaster event (S. Kuntz, personal communication,

March 7, 2006).

The American Red Cross and Disaster Nursing

The Montana NAS developed by two nurses, a Montana ARC volunteer and a

professor at Montana State University-Bozeman College of Nursing, saw a need to link

nurses with volunteer opportunities to help prepare for disasters in Montana. These two

individuals became the Montana NAS committee and worked to initiate a NAS in

Montana. Montana's own NAS was modeled most closely after Alaska's NAS, which

provides the database to other pertinent organizations (such as the Red Cross, the

Anchorage Medical Reserve Corps and the Public Health Department) who can then

contact and train nurses who have indicated willingness to volunteer in activities

associated with each organization (A. Ross, personal communication, March 10, 2005; C.

Soleil, personal communication, August 18, 2005).

The American Red Cross (ARC) has been a driving force for nurses as disaster

volunteers since its inception in 1881 by Clara Barton. The ARC has continued to serve

in both war and peace time through such events as WWI, the Mississippi River floods in

1927, the worldwide influenza epidemic of 1918, and the Depression in the 1930's by

providing education, food and medical relief. The ARC is no longer used for military

service but it has assisted the government in forming the Federal Emergency

Management Agency (FEMA) and is FEMA's largest provider of volunteer workers at

federally declared disaster sites. However, the ARC remains an independent, volunteer-led organization supported by volunteer contributions and reimbursement. Nursing as a profession is at the heart of the ARC which began with its nurse founder, Clara Barton, and continues today with over 40,000 nurses involved either through volunteer or paid service. Red Cross nurses are primarily used today in Disaster Health Services and Disaster Mental Health Services, both of which require special training in Disaster Relief to be adequately prepared to serve with the ARC during a disaster event (Red Cross History, 2006; Ross, 1999).

The long history of the ARC reveals its work in organizing nurses to help with disaster events. Recently, this desire has led to helping establish local state Nurse Alert Systems by which nurses can be organized through the use of a database based offered to nurses who are willing to volunteer for local disaster events.

Federal Directives for Disaster Preparedness

The National Response Plan (NRP), written and directed by the Department of Homeland Security for homeland preparedness, lists as one of its assumptions and considerations that "departments and agencies at all levels of government and certain NGOs [nongovernmental organizations], such as the American Red Cross, may be required to deploy to incidents of national significance on short notice to provide timely and effective mutual aid and/or intergovernmental assistance" (Ridge, 2004, p. 6). Additionally, the NRP, published in December 2004, lists the Emergency Support Functions that are essentially, "a grouping of governmental and certain private-sector capabilities into an organizational structure to provide support, resources, and services"

(Ridge, 2004, p.10). The NRP uses as an example of nongovernmental agencies such as the American Red Cross, whose function is to carry out Emergency Support Function #6, or carry out the functions of "mass care, housing and human services" (Ridge, 2004, p. 12). In order to fulfill the assumptions, plans and designs of the Federal National Response Plan, contact systems such as the Nurse Alert System are vital to the functionality of governmental and nongovernmental institutions and therefore the success of the Emergency Support Functions and our nation's ability to respond to a disaster in an effective manner.

Disaster events could be any hazardous event that results in widespread harm or potential harm to a community or to the public's health. This includes natural or manmade disasters. Manmade disasters, primarily through terrorism, have grown at exponential rates throughout the world, including the United States, due to the increasingly hostile and aggressive actions of terrorists and other political or religious groups reacting negatively to differing political or religious views. September 11, 2001, was a watershed event that changed the way the United States views public policy and planning related to disasters. Hurricane Katrina further propelled the nation's public health system into disaster preparedness. Disaster planning is now a high priority directive by the government through the Department of Homeland Security and the Department of Public Health and Human Services (DPHHS, 2006; Hodge, 2005). Preparation is crucial to protect the public's health against which terrorism is aimed. In order to be ready to assist our communities when in health crises, health care volunteers must be prepared and organized.

The mandate for disaster preparedness and desire to protect the people of

Montana has driven the health organizations in Montana to engage and maintain an active

Nurse Alert System. Montana is certainly not immune to terrorism events or other

disasters. The extensive international border, the potential for zoonotic diseases with

animals in the state outnumbering people, the missile sites near Great Falls, and recent

natural disasters (e.g. earthquakes, fires), create citizen vulnerability. Disaster planning,

including recruitment and training of nurse volunteers, is needed to help protect and

respond to the needs of Montana citizens.

Nurses as Volunteers

Nurses are seemingly the "perfect" fit as highly trained health professionals with a

high degree of altruism who make up a large percentage of trained health care workers

overall. In Montana alone, approximately 14,000 nurses—either LPN (Licensed Practical

Nurse), RN (Registered Nurse), or APRN (Advanced Practice Registered Nurse) nurses--

are actively licensed. In a state with a population of 900,000, this represents

approximately 15 out of every 1,000 people (Census, 2000; Stanley, 2003).

However, independent, altruistic volunteers responding to a disaster may

contribute to confusion and chaos rather than providing aid when volunteers are not

organized. This can lead to unnecessary pain and additional suffering by those affected

by the disaster—pain that could have been prevented with adequate preparation and

training (Argothy, 2003; Loue & Quill, 2001; Stanley, 2003).

Understanding the reasons for volunteering, characteristics of volunteers, and

areas where further nurse volunteerism is needed to "fill the gaps" across the state of

Montana will help us maximize our capacity to respond--especially in isolated frontier

counties. Ideally, NAS nurses should reside in each Montana county in adequate

proportions to the population size. Local individuals most familiar with conditions and

collaborating agencies in their own county provide a helpful "insider" response capacity

when emergent situations arise (Lee, 1998).

The sociological work of Wilson and Musick (1997) indicates volunteerism

increases with higher education levels which nurses are required to possess for their

licensure. Volunteerism and altruism noticed after recent hurricanes is also consistent

with current anecdotal literature that indicates nurses are a subgroup with a high degree

of altruism, willing to volunteer in situations where even their lives may be in danger.

APRN's, in particular, frequently command leadership positions within the nursing field

and are trained to lead and direct other nurses. Many APRN's also have prescriptive

authority and training in assessment and diagnosis of disease allowing them to become

medical providers during a health crisis. By recruiting and training APRN's for disaster

nursing involvement, a stronger disaster response system within Montana will be possible

(Guillon, 2004; Holland, 2001; Lander, 2004Guillon, 2004; Holland, 2001; Lander, 2004;

Mark, Conklin & Wolfe, 2001; Sullivan & Decker, 1997; Wells, 2004; Wilson & Musick,

1997).

Additionally, nursing as a profession has agreed to abide by the Code of Ethics

for Nurses. The Code of Ethics describes the commitment of nurses in their unique health

care role: "The nurse collaborates with other health professionals and the public in

promoting community, national, and international efforts to meet health needs" (Code of

Ethics for Nurses ANA, 2001, Provision 8). As Montana nurses choose to participate in

disaster volunteerism, they demonstrate an element of professional nursing as described in the Code of Ethics for Nurses. The formation of a system for nurse volunteerism will help enable nurses to act according to their commitment to nursing as a profession as described in the Code of Ethics for Nurses.

Study Aims

The aims of this study were to (a) describe Montana nurse volunteers by specific descriptive data including county of residence, licensure level (indicating type of nurse license—LPN, RN, or APRN), area of volunteer willingness, retiree status, and CPR certification and (b) to determine "gaps" (differences) in volunteerism among Montana nurses based on county of residence, license classification and areas of volunteer willingness. This information can then be used to determine where additional volunteers are needed, the types of volunteers likely to be available and subsequential training needed to best prepare these nurses to be ready to respond in a disaster event---whether manmade or natural. A disaster event in Montana may include all-hazard events such as terrorism, fires, earthquakes, floods, epidemics, or other unforeseen widespread emergencies.

Research Questions

1. What are the characteristics of NAS volunteers by licensure level including:

    a. Percentage of LPN nurses who returned the registration form

    b. Percentage of RN nurses who returned the registration form

    c. Percentage of APRN nurses who returned the registration form

d. What difference exists in the above level nurse licensure levels for in-state only

versus in and out-of-state NAS volunteers?

2.   What are the characteristics of NAS volunteers by location?

a. What percentage of nurses responded based on their county size?

b. Did licensure level of NAS volunteer vary by county size?

3.   What are the areas of volunteer interest as indicated by the NAS volunteers?

4.   What are the characteristics of NAS volunteers based on retiree status?

5.   What percentage of NAS volunteers primarily reside out of state?

6.   What percentage of NAS volunteers are CPR trained?

Rationale

Essential Public Health Services describe the public health activities that should

be a framework for functions of public health departments. Essential Service #4 includes

the mandate to "mobilize partnerships to identify and solve health problems" (Center for

Disease Control [CDC], 2006, p.1). Since disasters are local events, it is essential for the

local workforce to be prepared—in coordination with local public health departments and

disaster relief organizations--well in advance of an event.

Many nurses want to volunteer but do not know how or where to do so. After the

September 2005 hurricanes, over 33,000 health professionals volunteered through the

Department of Health and Human Services registry. However, few were ready for

deployment. Similarly, Montana also does not currently have an avenue or organized

database for nurses to communicate their desires to volunteer in an organized and

efficient manner (DPHHS, 2005).

Hurricane Katrina punctuated reports from prior disasters: training and coordination among volunteers prior to a disaster is mandatory for a timely response. While the volunteerism that facilitated shelter relief that followed Hurricane Katrina was important, the volunteers prepared prior to the disaster were able to immediately help victims. Alexander and Wynia (2003) found that physicians, a critical part of the healthcare workforce during and after disasters, are largely willing to volunteer (80%) but only a few (21%) feel prepared to volunteer (Alexander & Wynia, 2003).

Similar to reactions of untrained volunteers after other disaster events, there was confusion among volunteers as to what they should or could do to help after Hurricane Katrina (Argothy, 2003; Woodward, 2005). Response requests and needs are overwhelming and confusing for many who are not sure where their skills can best be used. For example, one popular health professions website, http://www.medscape.com, wrote extensively of the need for volunteers and provided links to other organizations for those wanting to help. There was no guidance provided but each volunteer was responsible to determine what organization to contact to offer help. Their links included reputable organizations such as the American Red Cross, local Red Cross Chapters, the American Hospital Association, the American Nurses Association, the American Academy of Family Physicians, the American College of Physicians, the American Academy of Physician Assistants, the American College of Surgeons, the American Society of Health Professionals, the System Pharmacists, the National Association of Boards of Pharmacy, and the Association of American Medical Colleges (Medscape, 2005). Were each of these organizations prepared to accept and deploy volunteers?

Hurricane Katrina demonstrated shortcomings in our disaster relief capabilities for major disasters but also prompted increased interest in volunteerism for this disaster and future disasters (Hodge & Gable, 2005; Woodward, 2005). The need for a better understanding of the "early adopter" volunteer, the individual who is eager and willing to volunteer, is underscored by recent disasters. A description of the characteristics of this volunteer group is needed. By determining what the characteristics of an "early adopter" are, we can begin to know how to recruit and sustain a prepared and voluntary workforce. With improved coordination, through such efforts as the Nurse Alert System, future disasters—manmade or natural—should have more efficient response capabilities (Ridge, 2004; Woodward, 2005).

In summary, characteristics of nurse volunteers are unknown, thereby making it difficult to recognize strengths and weaknesses in the current volunteer system. Through discovering existing gaps, by location, nurse licensure level, and volunteer willingness areas, recruitment efforts can be best directed to fill the system "gaps" and improve all-hazard preparedness.

<div align="center">Definition of Terms</div>

1. Altruism is a regard for others, both natural and moral; devotion to the interests of others; brotherly kindness; opposed to egoism or selfishness (Center for Cancer Education, 2005).

2. All-hazard events are those events that could occur causing "all possible hazards whether natural, accidental, negligent or intentional" (Health Resource and Services Administration [HRSA] Glossary of Terms, 2006).

3. All-hazard preparedness is "preparedness for domestic terrorist attacks, major disasters and other emergencies" (HRSA Glossary of Terms, 2006).

4. CBRNE—Acronym used to describe the "types of Weapons of Mass Destruction: chemical, biological, radiological, nuclear and explosive" (HRSA Glossary of Terms, 2006).

5. Disaster, major (federal)—"'Major Disaster' means any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm or drought) or, regardless of cause, any fire, flood or explosion, in any part of the United States, which is the determination of the President, causes damage of sufficient severity or magnitude to warrant major disaster assistance under this [Stafford] Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby" (HRSA Glossary of Terms, 2006).

6. Emergency (federal)—"Any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lesson or avert the threat of a catastrophe in any part of the United States" (Stafford, R. T. in "Disaster Relief and Emergency Assistance Act", Oct. 2000, Sec. 102 in HRSA Glossary of Terms, 2006).

7. Epidemic is "the occurrence in a community or region of cases of an illness (or outbreak) with a frequency clearly in excess of normal expectancy" (HRSA Glossary of Terms, 2006).

8. "Frontier" is a geographical region with a population density of less than six people per square mile (Lee, 1998, p. 301).

9. National Response Plan (NRP) is "a concerted national effort to prevent terrorist attacks within the United States; reduce America's vulnerability to terrorism, major disasters, and other emergencies; and minimize the damage and recover from attacks, major disasters, and other emergencies that occur" (Ridge, 2004, p. 1).

10. National Incident Management System (NIMS) "provides a nationwide template enabling Federal, State, local and tribal governments and private-sector and nongovernmental organizations to work together effectively and efficiently to prevent, prepare for, respond to, and recover from domestic incidents regardless of cause, size or complexity" (Ridge, 2004, p.1).

11. Nurse volunteers are licensed practical nurses (LPN), registered nurses (RN) or advanced practice registered nurses (APRN) who have indicated willingness to response before, during and after a disaster event.

12. Preparedness refers to the "existence of plans, procedures, policies, training, and equipment necessary at the Federal, State, and local levels to maximize the ability to prevent, respond to, and recover from major events. 'Readiness' is used interchangeably with 'Preparedness'" (HSPD-8) (HRSA Glossary of Terms, 2006).

13. Public Health is an "organized efforts of society to protect, promote, and restore people's health. It is the combination of science, skills, and beliefs that is directed to the maintenance and improvement of the health of all the people through collective or social actions. The programs, services and institutions involved emphasize the prevention of disease and the health needs of the population as a whole. Public health activities change with variations in technology and social values but the goals remain the same: to reduce the amount of disease, premature death, and disease-produced discomfort and disability in the population. Public health is thus a social institution, a discipline and a practice" (HRSA Glossary of Terms, 2006).

14. Public health emergency is the "occurrence or imminent threat of exposure to an extremely dangerous condition or a highly infectious or toxic agent, including a communicable disease, that poses in imminent threat of substantial harm to the population, or any portion thereof. In general, a public health emergency is one that requires a population-based approach. Examples of public health emergencies may include a natural outbreak of an infectious disease, i.e., influenza, Hantavirus, meningitis, salmonella, etc., intentionally caused biological threats such as smallpox, anthrax, and some accidents involving hazardous materials that threaten the health of the population. Public health emergencies can also be or evolve into medical emergencies. Likewise, medical emergencies can develop to an extent that they affect the population's health, and by definition, become public health emergencies. Response to public health emergencies will be led by the Department of

Health with assistance by local and State emergency management" (HRSA

Glossary of Terms, 2006).

15. "Rural" is a geographical region with a population density of less than 100 but

more than six people per square mile (Lee, 1998, p. 301).

16. "Urban" is a geographical region referring to a centralized population density

of at least 1,000 people per square mile comprising a residential population of

at least 50,000 individuals (Census 2000 Urban & Rural, 2000).

Organization of the Remainder of the Study

The remainder of this study is organized into four chapters: literature review,

methods, results, and conclusions. The next chapter, the current review of the literature,

describes the literature search, examines current Nurse Alert Systems in other states,

nurses as volunteers and disaster events. The chapter also describes the conceptual

framework this study was built around and used for interpretation of findings. The

conceptual framework includes a description of the Theory of Volunteer Work (Wilson &

Musick, 1997), Diffusion of Innovations Theory (Rogers, 2003), and Rural Nursing

Theory (Lee, 1998).

Chapter 3 describes the descriptive methods and the two de-identified data sets

utilized in this study, the NAS Access database and the 2004 Montana Board of Nursing

statistics.

The findings of the study are described in chapter 4 based on the descriptive

analysis conducted utilizing the non-randomized sample and the NAS database of 1,297

NAS volunteers. Six research questions relating to the characteristics of the Nurse Alert

System volunteers and findings are described.

Finally, a discussion of the findings, limitations, and recommendations are

described in chapter 5. The review of literature, analysis of data, and conceptual

frameworks contributed to the study findings.

CHAPTER 2

LITERATURE REVIEW

Introduction

While nurse volunteers have long been an integral part of disaster response nationwide, their specific characteristics are not well understood. By understanding these characteristics, future recruiting efforts will be better directed to encourage more nurse volunteerism thereby enhancing local disaster response capabilities. An important component of this study was a review of literature related to disaster nursing and volunteerism. This review revealed a deficiency in scientific and academic literature describing characteristics of nurse volunteers although anecdotal articles abound related to nurse volunteerism. Nurse volunteerism and altruism, disaster events, Nurse Alert Systems, Rural Nursing Theory (Lee, 1998), Diffusion of Innovations Theory (Rogers, 2003) and the Integrated Theory of Volunteer Work (Wilson & Musick, 1997) were examined in an attempt to better understand nurse volunteer characteristics.

Description of Literature Search

Searches using academic journal search engines, Montana State University library search engines and expert opinion indicate an absence of research literature describing current Nurse Alert Systems and characteristics of nurse volunteers. The literature review was conducted using a variety of methods. The university's online library system

(CINAHL, PubMED, and Online Journal Database) was utilized primarily through
library database searches using key words including "nurse alert system,"
"volunteerism," "nurse volunteers," "disaster events," "volunteering in a disaster,"
"emergency volunteers," and "disaster nursing." Articles were then obtained primarily
through online requests through the library although some articles were available in their
entirety online. Due to the absence of academic research on Nurse Alert Systems in
available literature, world wide web search engines were also used including Google,
Yahoo, PubMed, and LexisNexis by typing in "Nurse Alert System" to explore the
current Nurse Alert Systems in use and to contact the directors of these systems to obtain
information on the demographics of their nurse volunteers. Endnote 5, a bibliographic
database, was also utilized to organize references for incorporation into this thesis.

Synthesis of Related Literature

Nurse Alert System

Nurse Alert Systems have been developed in at least three states in the United
States to aid in the identification (and subsequent training) of willing nurse volunteers for
disaster events. The states currently employing Nurse Alert Systems are Colorado,
Alaska and Georgia although many other states have similar systems in place either
through or independent of the Medical Reserve Corps or the state's nursing association
The purpose of the Nurse Alert System is to identify all willing nurse volunteers and
place them into one registration system that can be accessed by appropriate agencies for
disaster and public health emergency preparedness. Appropriate training can also be
given to these nurses beforehand so that they are prepared to both help the public and

protect themselves from hazardous pathogens encountered during disaster volunteer work (Appendix A).

In addition, the Montana paper registration system will be converted to an online (world wide web) form where nurses can access and update their contact information at any time. Updating descriptive factors of address, county of residence, licensure level, area of experience and area of volunteer willingness will be critical in helping with the organization and tracking of nurses appropriately within the system to best match them to disasters agencies for further training and mobilization. Advanced practice nurses will be especially important to recruit as many have prescriptive authority and can provide diagnosis, treatment and leadership in rural and frontier counties during a disaster event where other health professionals may not be qualified to volunteer. Their skills in management and collaboration with other health providers are essential in the acute and chronic phases of disaster relief (Steven, 1999; Sullivan & Decker, 1997).

To date, no analysis has been conducted of Nurse Alert Systems in the three states (Alaska, Colorado and Georgia) currently utilizing similar Nurse Alert Systems. The three key leaders of other state Nurse Alert Systems were contacted to investigate the type of NAS each state employed and if any analysis had been done on the characteristics of their nurse volunteers. A fourth state, Texas, has a "Ready Texas Nurse Emergency Response System" or "Ready Texas Nurse Alert System" which is similar to the other state Nurse Alert Systems. Therefore Texas' NAS director was also contacted (B. Richey, personal communication, August 24, 2005).

The Medical Reserve Corps (MRC) is another system similar to the Nurse Alert System although it recruits many types of health professionals, not only nurses, in an

effort to maintain an active database of prepared medical volunteers. The MRC was

initiated by the Federal government in 2002, partly in response to the terrorist attacks of

9/11. There is at least one MRC unit in each state across the nation but leaders of each

states' MRC units were not contacted (Medical Reserve Corps, 2006).

Since no studies were found in the current literature that address motivations and

characteristics of NAS volunteers, attempts were made to contact every current NAS

director in the United States including the states of Georgia, Colorado, Alaska, and

Texas. Nurse Alert System leaders who responded to communication include C. Grant

(Georgia NAS)   (personal communication, August 19, 2005); K. O'Brien (Colorado

NAS) (personal communication, August 17, 2005; August 19, 2005); B. Richey (Texas

NAS) (personal communication, August 24, 2005; C. Soleil (Alaska NAS) (personal

communication, August 8, 2005; August 15, 2005).

In personal communication with NAS directors, none indicated they had

conducted descriptive analyses of their state's NAS including location of volunteers,

licensure levels, area of specialty, retired status of licensee, and area of volunteer

willingness. All described their systems as a type of "work in progress" with none more

than five years old. Karen O'Brien, director of the Colorado Nurse Alert System, which

enrolls more than 7,000 nurses in its NAS, indicated the Colorado NAS had a nurse from

every county in the state, including frontier counties. While she was unsure of

percentages of nurse licensee types (RN vs. LPN), she believed the NAS had a variety of

types of nurses and the NAS sought to optimize each nurses' abilities by using local

coordinators to organize and mobilize the nurses accordingly (personal communication,

August 19, 2005).

<u>Nurses as Volunteers</u>

Only one study was found in the literature search describing specific characteristics of nurse volunteers although anecdotal literature is rich with reports of nurses as altruistic volunteers in general. Fothergill, Palumbo, Rambur, Reinier and McIntosh (2005) examined inactive nurses' interest in volunteering for emergency preparedness in Vermont. Their findings indicate that nurse volunteerism is high among inactive nurses (27%) and could be an important target pool for volunteerism in disaster events due to their high degree of altruism, skill, and population size since approximately one-third of the nation's nurses are over age 50.

The United States national nursing shortage has now become a "national security concern" upgraded from "health crisis" status according to the Institute for Public Policy and Social Research and Institute for Health Care Studies (Nelson, 2002). One reason for this "health crisis" is because of the critical need for nurses during and after a disaster event. Nurses would be called on in a bioterrorism event to educate, screen and triage, immunize, and treat individuals in hospital and non-hospital settings (Nelson, 2002). Nurses are critical in this regard not only because of their skills but also because they represent a large subgroup that historically has had a high degree of altruism (Chan, 2003; Stanley, 2003).

All nurses are recognized as part of public health system at some level because they can help control nosocomial infection, identify health conditions important in the maintenance of public health, and educate communities regarding health promotion and disease prevention (Gebbie & Qureshi, 2002).

Large-scale Hepatitis B immunization programs in North Carolina have utilized nurses as volunteers thereby contributing greatly to the program's success and low cost. Over 60 nurses volunteered their time saving over $6,360 in cost of large-scale vaccination programs. Nurse volunteer recruitment was particularly successful from a local teaching hospital where community service fulfills a portion of the nurses' annual performance reviews. This immunization program provides an example of altruism in nursing as a profession and the extra motivation an employer can provide further encouraging motivation for volunteerism among nurses (Mark, Conklin, & Wolfe, 2001).

Not only do nurses provide invaluable health care skills during a disaster event, but they are also an altruistic subgroup, willing to serve during an emergency—even when it involves personal risk (Guillon, 2004). This altruistic nature is perhaps due in part to the belief that nursing is "based on the principle of serving others" (Fothergill, Palumbo, Rambur, Reinier & McIntosh, 2005, p. 418). Retired nurses are a rich group of nurses who have experience and availability to help and are often eager to do so (Holland, 2001). Inactive nurses in Vermont responded at a high rate (27%) indicating their interest in volunteering as part of a national homeland security effort. Those who responded were more likely to be younger in age (<65), identify themselves as "being a nurse," be employed versus retired and be currently volunteers. This rare research on nurse volunteerism indicates that the retired/inactive workforce is a potentially large pool for volunteerism in disaster events especially considering that 33% of the nation's nurses are currently over age 50 (Fothergill et al., 2005).

The two qualities of ability and willingness make nurses an ideal volunteer health care work force during a disaster. Numerous anecdotal stories, articles, and publications

testify to the altruistic nature of nurses. Stories come from experiences of nurses

volunteering after large disasters including 9/11, the Asian tsunami disaster in December

2004, and the September 2005 Hurricane Katrina disaster. Nurses are even eager to

volunteer in ongoing smaller-scale humanitarian relief trips to Asia, Africa, Central and

South America, volunteering their own vacation or personal unpaid leave time to

volunteer and paying for their own travel expenses. Closer to home, stories abound of

nurses helping in local hometown fire departments and local non-profit organization

(Gullion, 2004; Holland, 2001; Lander, 2004; Wells, 2004).

Issues of Liability in Disaster Events

We live in a litigious society where even well-meaning volunteers may be hesitant

to volunteer their skills and expertise due to fear of litigation should medical care not go

as planned. The liability inherent with medical and nursing care is not absent while

volunteering in disasters. When nurses volunteer with the American Red Cross (ARC),

they work under the ARC's liability insurance while performing activities according to

their training, protocols, Red Cross Code of Conduct and job description, according to the

Montana State Liaison for the ARC (A. Ross, personal communication, March 11, 2006).

However, no national system is currently in place to allow liability insurance or workers'

compensation coverage for volunteers at the local public health level (and to cross state

lines) who are not working directly under the ARC. Current liability waivers are

inconsistent from state to state and vary depending on the type of disaster or emergency.

For example, the current "Good Samaritan Law" only prevents liability for volunteers

who help at the "spur of a moment" such as at the scene of an automobile accident but

not for pre-disaster volunteer planning for a disaster event (Hodge & Gable, 2005). The

HRSA (Health Resources and Services Administration) is currently exploring this urgent

topic with the Georgetown Law Center to address this problem. This "gap" is being

addressed to ensure nurse volunteers have fully prepared themselves for volunteerism in a

disaster (personal communications, Kuntz & Ross, March 8-10, 2006; Hodge & Gable,

2005).

<div align="center">Conceptual Framework</div>

Three theories were utilized to form the conceptual framework for this study

because they each related to rural disaster nurse volunteers in a unique and significant

way. First, The Theory of Volunteer Work (Wilson & Musick, 1997), describes

characteristics typical of volunteers which include high levels of human capital, social

capital, and cultural capital. Second, The Diffusion of Innovations Theory (Rogers,

2003), describes five rates of individual acceptance to a "new idea, practice, or object"

called an "innovation" (p. 11). "Innovators" is the term used to describe those individuals

who are earliest to adopt the "innovation" (Rogers, 2003). Third, Rural Nursing Theory

(Lee, 1998), describes characteristics unique to individuals residing in sparsely populated

geographical areas. In particular, community-oriented sentiments and "insider" mentality

are of significance to this study (Lee, 1998). Since there is no single theory that relates to

rural disaster nurse volunteers, an expansion of the conceptual framework is needed.

Theory of Volunteer Work.

Wilson and Musick (1997) developed an Integrated Theory of Volunteer Work

describing determinants of volunteerism. Nurses fit into Wilson and Musick's volunteer

framework through their high levels of education, income, and functional health characteristics. Wilson and Musick's sociological research theory of formal and informal volunteer work is based on the premises that, "volunteer work is (a) productive work that requires human capital, (b) collective behavior that requires social capital, and (c) ethically guided work that requires cultural capital" (Wilson & Musick, 1997, p. 694). Human capital is measured by education, income, and functional health. Social capital is measured by number of children in the household and informal social interactions. Cultural capital is measured by religiosity. Wilson and Musick used data from the panel study *Americans' Changing Lives* and found formal volunteering increased in relationship to human capital, number of children in household, informal social interaction and religiosity (Egerton, 2002; Wilson & Musick, 1997).

Of the respondents in the Nurse Alert System volunteer survey, we are only able to measure one of the three components of human capital, education level. From the secondary data obtained, we are unable to measure social capital or cultural capital. Further data on the volunteer respondents would need to be obtained to determine whether our respondents have the other components of volunteer work determinants. However, we can surmise that being licensed nurses with at least average salaries, nurses possess at least human capital because of the education required to become a nurse and income received as a nurse. Social capital is also highly likely in at least the social interactions nurses have with one another in nursing as a profession.

Diffusion of Innovations Theory

Rogers (2003), in his Diffusion of Innovations Theory, describes the

characteristics of innovations and those individuals who adopt an innovation. An innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p.11). Rogers (2003) then divided individual responses to an innovation into five categories: innovators, early adopters, early majority, late majority, and laggards. Rogers found these five responder types were distributed along a bell curve. Each adopter's willingness and ability to adopt the innovation depends on their interest, knowledge, evaluation, trial, and motivation. The innovators are on the far left side of the bell curve, representing only 2.5% of individuals in a social system that are relatively early to adopt an innovation. These individuals are characterized by being venturesome, educated, having high socioeconomic status, are able to cope with uncertainty and may or may not be respected by peers. The early adopters are the next 13.5% of individuals who are also educated, are opinion/social leaders, are change agents, and are popular role models for other members of the social system. The early majority, late majority, and laggards, are more skeptical than the innovators and early adopters and all tend to eventually agree with the innovation but in successive degrees after the Innovators and early adopters (Rogers, 2003).

The nurses who returned their volunteer registration forms demonstrated some attributes of an "innovator" or "early adopter" as demonstrated by their immediate response and willingness to be contacted for training and to help in a future disaster event. These nurses demonstrated unusual motivation and commitment by indicating an interest to volunteer—knowing there may be personal risk and sacrifice involved with volunteering. They are also acting as social leaders by responding to an idea—the Nurse Alert Volunteer System in Montana—before their other nurse peers who did not respond.

Rural Nursing Theory.

Much of Montana is sparsely populated with 18% (n=10) of the 56 counties classified as rural, and 80% (n=45) classified as frontier and 2% (n=1) classified as urban. All seven Montana Native American reservations are classified as frontier and, in addition, are included in Montana's 56 county boundaries and population counts. In fact, many reservations in the state are a part of several counties. However, in the ten rural counties and one urban county, approximately half (54%) of individuals are in urbanized areas or clusters. Urbanized areas or clusters are defined as a densely settled core of people with a density of 500 people per square mile with a minimum of 50,000 people in that core (Montana County Health Profiles, 2004).

Rural Nursing Theory (Lee, 1998; Long & Weinert, 1989) was developed by nurse researchers in Montana who conducted research among residents of sparsely populated areas in Montana in an effort to describe characteristics unique to these isolated populations. Rural Nursing Theory includes rural counties and frontier counties in Montana. 'Rural' is defined as a geographical region with a "population density of less than 100 but more than six people per square mile" (Lee, 1998, p. 301). 'Frontier' is defined as a geographical region with a "population density of less than six people per square mile" (Lee, 1998, p. 301). In Montana, there is one county (Yellowstone) that has only recently qualified as an urban county, defined as a geographical area with a population density of 100 or more people per square mile (Census, 2000).

Since most of Montana's counties are frontier (80%), and there is only one urban county in Montana, the Montana Department of Health and Human Services has further

categorized its 56 counties into three new categories for counting purposes: small

(counties with less than 10,000 people per county), medium (10-20,000 people per

county) and large (more than 20,000 people per county) (Montana County Health

Profiles, 2004).

According to Rural Nursing Theory, the realities of rural living include greater

challenges to health care access due to weather, distance and isolation (Lee, 1998). The

low density of people contributes to lack of emergency support and local access to

general health care provision overall as well. In addition, rural peoples are often

suspicious of "outsiders" to the community and tend to prefer "insider" advice and

informal support systems rather than outside care. Rural communities are "community-

oriented" and tend to have greater access to "kinship support systems" where families are

close in proximity to help and other community members are eager to volunteer in time

of need (Long & Weinert, 1989).

Rural health care providers indicate that their rurality leads to closer interpersonal

relationships and a greater sense of commitment to one another. This characteristic will

be an asset in communities during a disaster event whether called on personally or

through an organized system such as the Nurse Alert System. Therefore, employing a

system that involves and incorporates community members and health care providers as

"insiders" will help ensure the success of the program in the community (Loue & Quill,

2001, p. 56). The Nurse Alert System will do this by involving local nurses to provide

local relief as well as act as liaisons for a community struck by a natural or man-made

disaster. The close interpersonal relationships demonstrated by rural health care providers

may also indicate that there would be a greater willingness to help in the event of a

disaster. Rural persons may be more likely to volunteer due to their greater sense of community commitment.

However, these same rural nurses may not be eager to be "innovators" or "early adopters" simply because a system such as the Nurse Alert System may be viewed cautiously as an "outsider" organization. Our responses from nurse volunteers, therefore, may not accurately represent rural nurses who are willing to volunteer. Using an "insider" nurse to facilitate support for the Nurse Alert System will prompt greater "formal" registration and support since the desire is present to help the community in time of need (Lee, 1998, p. 29). In addition, the routine informal care networks developed in rural communities that aids in serving the needs of the community throughout the year will be a great asset in times of disaster but by integrating an organized Nurse Alert System even rural communities will be better served in a disaster event (Lee, 1998, p.198).

CHAPTER 3

METHODS

Design of the Study

This secondary analysis was designed to investigate the characteristics of disaster nurse volunteers who registered for the Montana Nurse Alert System (NAS) during the 2004 Montana Board of Nursing re-licensure period. Each nurse (LPN, RN, APRN) who qualified for re-licensure in 2004 (n=14,914) received a NAS registration form. A total of 8.7% (n=1297) completed the form and agreed to be included in the NAS database. In addition, a second database from the Montana Board of Nursing was utilized to establish statewide counts of LPNs, RNs, and APRNs holding an active license in 2004.

Secondary analysis has been described as an unobtrusive, economical and efficient way to study unanswered research questions based on an existing qualitative or quantitative dataset (Norwood, 2000). Disadvantages with this approach to research include a lack of control over the way questions are posed or variables are incorporated into the original inquiry or survey (Polit & Hungler, 1999). During the implementation phase of the NAS, a paper/pencil registration form was created based on registration information collected by the Georgia, Alaska, and Colorado Nurse Alert Systems. The original purpose for creating the Microsoft Access database was to have a system in place for (a) sorting volunteers by area of expertise and (b) notifying volunteers once the Department of Public Health and Human Services (DPHHS) electronic database became

available (S. Kuntz, personal communication, May 19, 2005; A. Ross, personal

communication, March 10, 2006). Reliability and validity of the tool used for registering

the volunteers was not established.

For this study, names and identifiers were removed from the Microsoft Access

NAS database in order to assure participant anonymity while describing the specific

characteristics of the nurse volunteers. To answer the research questions, the de-

identified Access data were converted to Microsoft Excel for the descriptive secondary

analysis (counts and percentages). According to Polit and Hungler (1999) "description

and elucidation of phenomenon" (p. 16) provides insight into a variety of issues relevant

to nursing. Descriptive analysis is a "quantitative description [which] involves the

prevalence, incidence, size, and measurable attributes of a phenomenon" (p. 16).

Descriptive analysis was utilized with the NAS database to determine the

measurable descriptive attributes of the NAS nurse characteristics. The nurse volunteer

characteristics examined using this method of analysis were level of nurse licensure

(LPN, RN, and APRN), location (in and out of state and by Montana county of

residence), area of volunteer interest, retiree status, and CPR certification.

Tools

Two tools were used for this secondary analysis study. The primary tool used to

discover characteristics of NAS volunteers was the Montana Nurse Alert System

Registration Form (Appendix A). The secondary tool, which was used to evaluate and

compare data from the primary NAS registration form, was the Montana State Board of

Nursing Professional and Occupational Licensing Nursing Statistics for 2004 (SBON, 2005).

The Montana NAS Registration Form was comprised of two pages. The first page, entitled, "Montana Nurse Alert System Volunteer Registration Form," asked for the NAS volunteer's name, address, email, home, work and cell phone numbers, fax number, license number, certifications, area of experience and/or specialty, current employer, position, retiree status, CPR certification and date of expiration. A box on the first page asked the volunteer to check which volunteer opportunities the volunteer would be interested in helping with. Four major categories were included with seven subcategories. The categories were immunization/health department (with subcategories of screening, vaccinating and educating), shelters with the American Red Cross (subcategory of well populations), hospitals/hospital shelters (no subcategory) and specialty care (mental health, pediatrics and geriatrics). The bottom of the page included instructions to return the registration form to a specific address (a post office box in Polson, Montana). The statement, "This information will only be used for disaster/public health emergency preparedness and response" was also included at the bottom of page one (Appendix A).

The second page (copied on the back side of the form) of the NAS registration form was a "Fact Sheet for Nurses" that explained the purpose of the NAS, the agencies that need trained disaster volunteers and how to sign up for the NAS by filling out the registration form (Appendix A). This single fact sheet was the only information nurses were given regarding the registration form. The rate of return (8.7%) is remarkable considering the limited amount of information provided to the nurse influencing his or her decision to become a part of the Montana NAS.

The second tool (SBON nursing statistics) was a detailed document that included

nurse population census numbers for all licensed nurses in Montana from 2002-2005.

This tool contained counts of APRNs in the state by type of APRN and prescriptive

authority. It also contained counts of each type of APRN by Montana county (n=56). The

tool contained a summary of LPN and RN licenses by endorsement, examination,

residence in and out of state, active status, and employment status (full-time, part-time,

unemployed, or not employed in nursing). In addition, the number of LPN and RN nurses

in each Montana county (n=56) were detailed (SBON, 2005).

One difficulty with the data obtained from the SBON was that the 2004 counts

were included for all nurse license descriptors except for county of residence. For county

of residence (detailing the number of nurses in each of Montana's 56 counties), the only

data available from the SBON was for 2005 nurse county of residence. However, there

was less than a 1% variation between total nurses licensed in 2004 and 2005 in Montana

indicating very little variation likely exists in county of residence between 2004-2005,

although this cannot be verified.

Population Census

The unit of analysis for this study was each nurse who qualified for re-licensure in

2004. For the 2004 license year, the Montana Board of Nursing mailed license renewal

forms to every nurse in the state. A population census is defined as "a survey covering

the entire population" (Polit and Hungler, 1999, p. 697). Therefore, the "entire

population" of Montana nurses in all 56 counties in the state had an equal opportunity to

participate in responding to the NAS registration forms. The number of forms sent to the total number of Montana nurses was 14,914.

Those nurses among the census population who responded to the survey (n=1,297) became the disaster nurse cohort or NAS cohort. The information from the registration forms that were completed by the NAS cohort were entered into a Microsoft Access database. This dataset became the source of characteristics for the descriptive secondary analysis that was completed. Characteristics included license type, location of residence by county, location by out of state, area of volunteer interest, retiree status and CPR certification.

Data Collection and Analysis

In an attempt to obtain appropriate nurse volunteers for a possible emergency event in Montana, a "Montana Nurse Alert System Volunteer Registration Form" was sent out with the 2004 Montana Nurse License Renewal forms to every nurse licensed in the state. This was conducted through the Montana State Board of Nursing (SBON). The Montana SBON gave permission for the "paper and pencil" forms to be included with the license renewal forms thereby saving a great deal of money on postage. The Montana Department of Health and Human Services paid for the printing of the almost 15,000 registration forms. Registration forms were then to be returned to a specific post office box in Polson, Montana, where collection of the information could be entered into a single database for eventual online access (Appendix A). The data from these forms was then made available by the NAS committee, as de-identified data, so that further analysis (using counts, frequencies, summations and percentages in Microsoft Access and Excel)

could be performed using this data. The Montana State Board of Nursing (SBON) also

made available the licensing nursing statistics from 2002-2005 to be used for analysis

with the NAS database (SBON, 2005). Simple counts were done with the SBON

statistics to allow for comparison with state totals and the NAS dataset totals.

Human Subjects Considerations

The data for this study was analyzed after obtaining permission from the Montana

NAS committee to have access to the Montana NAS dataset. All identifying information,

including name, address, telephone number, and email address was removed prior to data

analysis. No further data was obtained from the NAS cohort for this study. Therefore,

confidentiality of NAS volunteers was maintained.

In addition, the study plan was submitted to the Institutional Review Board (IRB)

at Montana State University-Bozeman. The IRB determined that this study was exempt

since a de-identified data set was used for secondary data analysis.

CHAPTER 4

RESULTS

<u>Introduction</u>

A descriptive secondary analysis was conducted to explore the characteristics of

nurses in Montana who filled out the Nurse Alert System (NAS) registration form

indicating their willingness to volunteer in a disaster event. Data for the study were

generated from the "Montana Nurse Alert System Volunteer Registration Form" that was

included with each Montana State Board of Nursing (SBON) nurse license renewal form

letter (Appendix A). The survey was created in an initial effort to glean information from

Montana nurses who would be willing to participate in a volunteer disaster nurse

response system called the Montana Nurse Alert System. A hired and appropriately

trained data entry individual initially entered the respondent data into a Microsoft Access

database. In addition, a second database from the SBON was utilized to establish

statewide counts of LPNs, RNs, and APRNs by license type, county of residence, out of

state residence, and employment status (SBON, 2005).

Six types of descriptive data reports (using counts, frequencies, summations, and

percentages) were then generated to describe NAS cohort characteristics:

1)   NAS volunteer nurses by licensure level (type of license: LPN, RN, and

APRN) for the entire state of Montana, and in state versus out of state

volunteerism by license type

2) NAS volunteer nurses by location based on county of residence and licensure type

3) NAS volunteer nurses by area of volunteer interest

4) NAS volunteer nurse retiree status

5) NAS volunteer nurses who primarily reside out of state

6) NAS volunteers with CPR certification

Each data report, utilizing Microsoft Access, Excel, and Word programs was summarized using tables and one graph to report findings (Tables 1- Table 12; Figure 1).

Population Census Results

In 2004, a preliminary mailing was sent to all nurses currently holding a Montana nursing license, inviting them to volunteer to be a part of the Montana Nurse Alert System (NAS). All nurses who responded to this mailing (the disaster nurse cohort) were those included in this study of nurse volunteer characteristics.

Descriptive variables examined quantitatively included the nurse volunteers' county of residence, level (type) of nurse licensee, and area of volunteer interest. In November 2004, there were 14,914 registration forms sent out to all licensed nurses in Montana. Of these, 1,297 nurses returned their volunteer registration forms indicating a willingness to volunteer in the event of a public health emergency or disaster. This response was better than expected, representing an 8.7% rate of return overall.

Findings Using Descriptive Analysis

Characteristics of Volunteers by Licensure Level (Research Question 1):

1. What are the characteristics of NAS volunteers by licensure level including:
    a. Percentage of LPN nurses who returned the registration form
    b. Percentage of RN nurses who returned the registration form
    c. Percentage of APRN nurses who returned the registration form
    d. What percentage of NAS nurses (among LPN, RN, and APRNs) are in state versus out of state?

Volunteers by level of nurse licensure, location in and out of state and volunteerism rates (Table 1) were generated using the Montana NAS database in Access and Excel and the Montana State Board of Nursing Statistics (SBON) categorized by license level and Montana county of residence. The total NAS volunteers based on their licensure level (LPN, RN, and APRN) was divided by the total nurses in each license category. APRNs were considered separate from RNs for these counts (SBON, 2005).

Table 1 below indicates that NAS volunteer response increased with level (type) of licensure level. The dramatic increase in volunteerism is the APRN response rate. At 16% (n=90), APRNs responded to the request for volunteers at nearly twice the rate as LPNs at 8% (n=288) or RNs at 8% (n=918) (Table 1, Figure 1).

There are a large number of APRNs who are actively licensed in Montana but who do not reside in the state. Montana SBON statistics indicate 132 out of 572 APRNs reside out of state or 20% of those actively licensed. Therefore, in order to obtain more accurate volunteerism response, the nurses who reside in state were analyzed separately according to in and out of state residence (Table 1, Column 4; Figure 1). Therefore, when removing the out-of-state nurses from the calculation, APRN response climbs to 19%

Table 1

Nurses Licensed in Montana (2004) by Level of Licensure, Location In/Out of State, and NAS Volunteerism

Montana Licensed Nurses*						Nurse Alert System (NAS) Volunteers**					
All Licensed Nurses			Nurses Living In/Out of State			All NAS Volunteers			NAS Living In/Out of State		
	n	%		n	%		n	%		n	%
LPN	(3416)	23	In State	(3034)	89	**LPN** (288)		8	In State	(278)	9
			Out of State	(382)	11				Out of State	(10)	3
RN	(10926)	73	In State	(9342)	86	**RN** (918)		8	In State	(888)	10
			Out of State	(1584)	14				Out of State	(30)	2
APRN	(572)	4	In State	(440)	77	**APRN** (90)		16	In State	(85)	19
			Out of State	(132)	20				Out of State	(5)	4
TOTAL (14,914)			In State	(12611)	85	**TOTAL** (1297)		8.7	In State	(1257)	10
			Out of State	(2303)	15				Out of State	(45)	2

* Montana State Board of Nursing, Professional & Occupational Nursing Licensing Statistics, 2004
**Montana Nurse Alert System Database

(n=85), or almost one out of five APRNs responding versus only one out of ten for RNs

at 10% (n=888) and one out of 9 for LPNs at 9% (n=288) (Table 1; Figure 1).

Figure 1

NAS Volunteers by Licensure Level (Type of License)

Licensure Level

■ All NAS Volunteers ■ In-state NAS Volunteers only
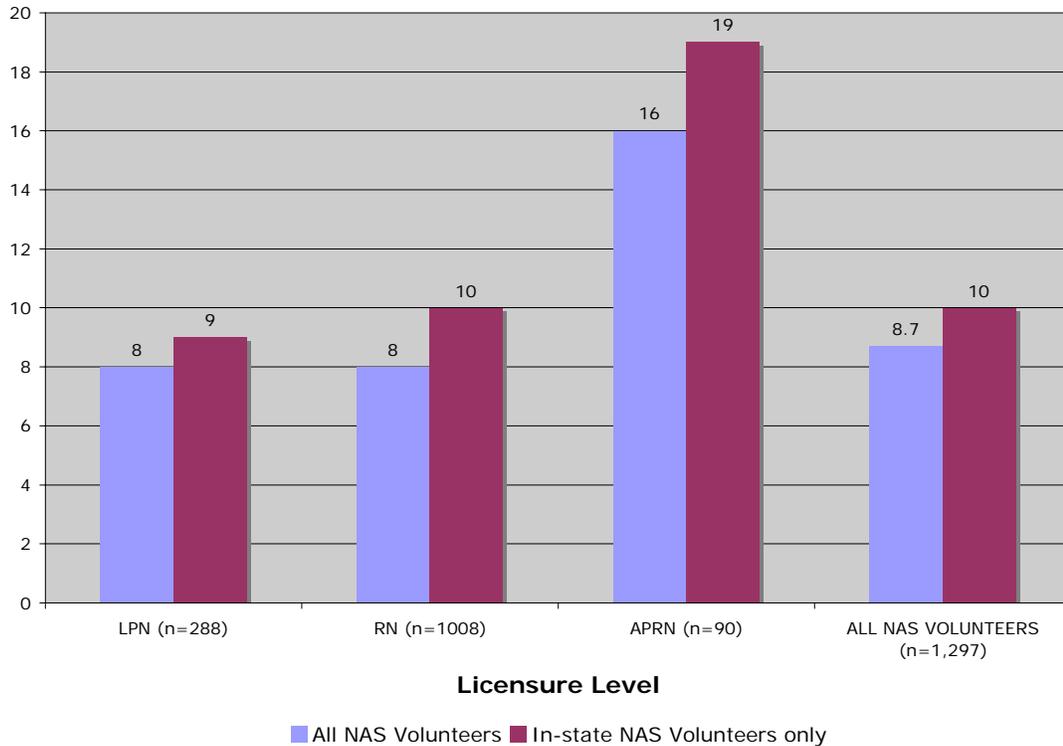
Characteristics of Volunteers by Location (Research Question 2):

2. What are the characteristics of NAS volunteers by location?

    a. What percentage of nurses responded based on their county size?
    b. Did licensure level of NAS volunteer vary by county size?

Volunteers by licensure level and county size for the entire NAS database totals

indicate that the vast majority (67-73%) of the total NAS volunteers are in large counties

in Montana among APRNs, RNs and LPNs (Table 2). Small counties have a much

smaller representation of NAS volunteers but are still higher than the medium sized

counties. However, the volunteers by county population are quite similar ranging from

0.12%-0.15% volunteers by total county population size, or 12-15 NAS volunteers for

every 10,000 people in a disaster or emergency event (Table 2).

Table 2

Volunteers by Licensure Level and County Size

Montana In State Totals*	APRN (n=86)	RN (n=893)	LPN (n=278)	NAS In State Volunteers (n=1,252) by Total County Population**
Large >20,000*	63 (73.3%)	611 (68.4%)	186 (66.9%)	860/628,937 (0.14%)
Medium 10,000-20,000*	9 (10.5%)	126 (14.1%)	29 (10.4%)	164/133,166 (0.12%)
Small <10,000*	14(16.3%)	156 (17.5%)	63 (22.6%)	233/158,310 (0.15%)

*Montana Nurse Alert System Database
**Population for Counties in Montana 2004 at http://ceic.mt.gov/Demog/estimate/pop/County/CO-EST2005-01-30.htm.

Volunteers by county based on size (Table 3) indicate that the least populated

county size (small) has the greatest percentage of nurses who are NAS volunteers,

indicated by their response to the NAS registration form. The small counties

demonstrated the greatest level of volunteer response when 11.5% (n=233) of their nurses

responded. The large (9.5%, n=860) and medium (9.8%, n=164) counties' overall

response rates are very similar (Table 3).

Table 3

Volunteers by County of Residence

County Size & total nurses in counties by size**	Large >20,000 (n=9,095)	Medium 10,000-20,000 (n=1,679)	Small <10,000 (n=2,042)
Total In-state Volunteers* (n=1,257)	860 (9.5%)	164 (9.8%)	233 (11.5%)

*Montana Nurse Alert System Database
** Montana State Board of Nursing, Professional & Occupational Nursing Licensing Statistics, 2004

Volunteers by licensure level based on county size (small, medium and large) (Tables 4-6) indicate the percentage of actively licensed nurses who responded to the call for volunteers. A description of nurses by licensure level and county size provides insight into the types of nurses possibly available as NAS volunteers in specific counties.

The tables below (Tables 4-6) show that the highest response rates of volunteerism in each license type came from small counties among LPNs (11%, n=63), RNs (12%, n=170), and APRNs (23%, n=14) (Table 6). In addition, APRNs responded at higher rates in all three counties than did RNs and LPNs. APRNs responded at the highest rates in large (20%, n=63), medium (10%, n=135), and small (23%, n=14) counties (Tables 4-6). This is essentially twice the rate of volunteerism in large and small counties when compared with volunteer rates of LPNs and RNs in large and small counties. Therefore, the greatest response for volunteerism came from nurses in small counties, regardless of licensure level and from APRNs in each county, regardless of size (Tables 4-6).

Table 4
Volunteers by Licensure Level in Large Counties

Total Nurses in Large Counties >20,000**	LPN (n=2,111)	RN (n=6,672)	APRN (n=312)	Total nurses (n=9,095)
NAS Volunteers in Large Counties*	186 (8.8%)	611 (9.2%)	63 (20.2%)	860 (9.5%)

*Montana Nurse Alert System Database
** Montana State Board of Nursing, Professional & Occupational Nursing Licensing Statistics, 2004

Table 5
Volunteers by Licensure Level in Medium Counties

Total Nurses in Medium Counties 10,000-20,000**	LPN (n=341)	RN (n=1,271)	APRN (n=67)	Total nurses (n=1,679)
NAS Volunteers in Medium Counties*	29 (8.5%)	126 (9.9%)	9 (13.4%)	164 (9.8%)

*Montana Nurse Alert System Database
** Montana State Board of Nursing, Professional & Occupational Nursing Licensing Statistics, 10-05

Table 6
Volunteers by Licensure Level in Small Counties

Total Nurses in Small Counties <10,000**	LPN (n=582)	RN (n=1,399)	APRN (n=61)	Total nurses (n=2,042)
NAS Volunteers in Small Counties*	63 (10.8%)	156 (11.2%)	14 (23.0%)	233 (11.4%)

*Montana Nurse Alert System Database
** Montana State Board of Nursing, Professional & Occupational Nursing Licensing Statistics, 2004

When examining individual counties by size, number of licensed nurses, number of nurse alert volunteers, and percentage of volunteerism (Table 7) the large counties range in volunteer rates of 7-13%, the medium counties range in volunteer rates of 5-12%, and the small counties range in volunteer rates of 0-23%. In fact, among Montana's small counties, five do not have any NAS volunteers in the entire county (Table 7).

Table 7

Individual Counties by Size[1], Number of Licensed Nurses[2], Nurse Alert Volunteers*, and Percentage of Nurse Volunteerism by County

County	Population Density #/sq mile	# Licensed Nurses	# NAS Volunteers	% Nurse Volunteerism by County	Total Population in County (2004)
Large Counties >20,000					
Cascade	29.5 (rural)	1259	90	7%	79,938
Flathead	15.2 (rural)	1048	111	11%	81,114
Gallatin	27.3 (rural)	726	98	13%	75,632
Lake	18.1 (rural)	316	32	10%	27,915
Lewis-Clark	16.3 (rural)	913	86	9%	57,932
Missoula	37.7 (rural)	1469	135	9%	99,063
Ravalli	15.8 (rural)	524	48	9%	39,470
Silver Bow	46.6 (rural)	594	54	9%	33,067
Yellowstone	50 (urban)	2246	190	8%	134,806
Medium Counties 10,000-20,000					
Bighorn	2.6 (frontier)	98	10	10%	13,076
Custer	3.0 (frontier)	250	27	11%	11,427
Fergus	2.7 (frontier)	191	18	9%	11,619
Glacier	4.4 (frontier)	121	15	12%	13,527
Hill	5.6 (frontier)	271	21	8%	16,343
Jefferson	6.3 (rural)	205	19	9%	10,863
Lincoln	5.2 (frontier)	151	14	9%	19,065
Park	5.7 (frontier)	172	19	11%	15,774
Roosevelt	4.4 (frontier)	114	6	5%	10,576
Sanders	3.8 (frontier)	106	12	11%	10,896
Small Counties <10,000					
Beaverhead	1.6 (frontier)	92	11	12%	8,824
Blaine	1.6 (frontier)	59	10	17%	6,673
Broadwater	3.7 (frontier)	47	4	9%	4,526
Carbon	4.7 (frontier)	159	18	4%	9,770
Carter	0.4 (frontier)	18	3	17%	1,337

Table 7 Continued from previous page

Choteau	1.4 (frontier)	76	3	4%	5,546
Daniels	1.4 (frontier)	24	5	21%	1,847
Dawson	3.7 (frontier)	104	10	10%	8,657
Deer Lodge	12.3 (rural)	201	20	10%	8,968
Fallon	1.7 (frontier)	28	2	7%	2,771
Garfield	0.3 (frontier)	10	0	0%	1,228
GoldenValley	0.9 (frontier)	13	1	8%	1,105
Granite	1.7 (frontier)	25	4	16%	2,894
Judith Basin	1.2 (frontier)	19	4	21%	2,204
Liberty	1.4 (frontier)	19	2	11%	2,035
McCone	0.7 (frontier)	20	3	15%	1,789
Madison	1.9 (frontier)	71	14	20%	7,094
Meagher	0.8 (frontier)	25	1	4%	2,004
Mineral	3.1 (frontier)	53	4	8%	3,880
Musselshell	2.4 (frontier)	58	2	3%	4,514
Petroleum	0.3 (frontier)	1	0	0%	499
Phillips	0.8 (frontier)	40	5	13%	4,240
Pondera	3.8 (frontier)	79	6	8%	6,108
PowderRiver	0.6 (frontier)	13	3	23%	1,766
Powell	3.0 (frontier)	80	16	20%	6,914
Prairie	0.7 (frontier)	22	0	0%	1,140
Richland	4.4 (frontier)	135	6	4%	9,077
Rosebud	1.8 (frontier)	76	10	13%	9,227
Sheridan	2.3 (frontier)	50	7	14%	3,638
Stillwater	4.7 (frontier)	105	8	8%	8,428
Sweet Grass	1.9 (frontier)	37	8	22%	3,697
Teton	2.8 (frontier)	86	10	12%	6,258
Toole	2.8 (frontier)	61	8	13%	5,143
Treasure	0.8 (frontier)	0	0	0%	736
Valley	1.5 (frontier)	108	10	9%	736
Wheatland	1.5 (frontier)	18	2	11%	2,063
Wibaux	1.1 (frontier)	11	0	0%	974

1 Montana County Health Profiles 2004 http://www.dphhs.mt.gov/PHSD/health-profiles/health-profiles-index.shtml and http://ceic.mt.gov/Demog/estimate/pop/County/CO-EST2005-01-30.htm.
2 MT State Board of Nursing, Professional & Occupational Licensing Nursing Licensing Statistics 10-05
* Montana Nurse Alert System Database

Volunteers by Area of Volunteer Interest (Research Question 3):

3.   What are the areas of volunteer interest as indicated by the NAS Volunteers?

Volunteerism by area of volunteer interest for all NAS volunteers is outlined in

Table 8. The NAS respondents to the registration form had the opportunity to indicate

their willingness, or interest, in volunteering in three major categories: public health,

American Red Cross, or hospitals. Volunteers could check as many categories as desired.

Under the first category, public health/immunization, volunteers could check areas of

screening, vaccinating or educating. Under the second category, American Red Cross

shelters, volunteers could check their interest in well populations only. Under the third

category, hospitals and hospital shelters, there was no subcategory. Under the fourth

category, specialty care, volunteers could check mental health, pediatrics or geriatric

subcategories (Appendix A). For clarity, the tables below (Table 8 and 9) summarize the

three major categories of volunteer interest and indicate that among the total (n=1,297)

NAS volunteers, the interest was almost the same among these categories with 60%

(n=789) interested in public health areas, 58% (n=753) in American Red Cross, and 58%

(n=764) in hospitals (Table 8). The specialty categories received less volunteer interest

than the major categories with 27% (n=349) interested in mental health, 28% (n=359)

interested in pediatrics, and 38% (n=488) interested in geriatric specialty care.

Table 8

Areas of Volunteer Interest by NAS Volunteers

Area Volunteerism by NAS volunteers*	Public Health (n=789)	American Red Cross (n=753)	Hospital (n=764)
Total NAS Volunteers* (n=1297)	60%	58%	58%

*Montana Nurse Alert System Database

Volunteerism by area of volunteer interest based on individual counties varied

greatly based on county size, area of volunteer interest, and number of NAS volunteers in

the individual county (Table 9). The findings in the database indicated at least six small-

sized counties did not have a volunteer interested in at least one of the major three categories. One small sized county (Carbon County) had the most volunteers interested in any one category among small counties with 15 interested in American Red Cross Shelters. In medium counties, one county (Roosevelt County) had only two volunteers interested in American Red Cross Shelters while 16 volunteers (Park County) were interested in public health. In large counties, the area where volunteers indicated the least amount of interest was in Lake County where only 18 volunteers indicated interest in hospital care. Among large counties, Yellowstone County had the most volunteers interested in any one area of volunteerism when 120 volunteers indicated interest in public health (Table 9).

Table 9

Individual Counties by Size[1], Number of Licensed Nurses[2], Nurse Alert Volunteers, and Area of Interest (AI)[3]

County	Population Density #/sq mile	# Licensed Nurses	# NAS Volunteers	AI Public Health	AI Red Cross	AI Hospital
Large Counties >20,000						
Cascade	29.5 (rural)	1259	90	56	61	51
Flathead	15.2 (rural)	1048	111	69	68	71
Gallatin	27.3 (rural)	726	98	59	58	53
Lake	18.1 (rural)	316	32	21	19	18
Lewis-Clark	16.3 (rural)	913	86	48	44	40
Missoula	37.7 (rural)	1469	135	79	83	79
Ravalli	15.8 (rural)	524	48	31	26	27
Silver Bow	46.6 (rural)	594	54	34	25	33
Yellowstone	50 (urban)	2246	190	120	116	101
Medium Counties 10,000-20,000						
Bighorn	2.6 (frontier)	98	10	4	5	6
Custer	3.0 (frontier)	250	27	8	10	13
Fergus	2.7 (frontier)	191	18	9	10	10
Glacier	4.4 (frontier)	121	15	11	6	12
Hill	5.6 (frontier)	271	21	13	16	17
Jefferson	6.3 (rural)	205	19	12	14	14
Lincoln	5.2 (frontier)	151	14	10	9	12
Park	5.7 (frontier)	172	19	16	12	15

Table 9 Continued from previous page

Roosevelt	4.4 (frontier)	114	6	3	2	3
Sanders	3.8 (frontier)	106	12	7	9	10
Small Counties <10,000						
Beaverhead	1.6 (frontier)	92	11	7	6	7
Blaine	1.6 (frontier)	59	10	8	5	5
Broadwater	3.7 (frontier)	47	4	4	3	4
Carbon	4.7 (frontier)	159	18	11	15	12
Carter	0.4 (frontier)	18	3	2	1	2
Choteau	1.4 (frontier)	76	3	2	3	3
Daniels	1.4 (frontier)	24	5	4	3	4
Dawson	3.7 (frontier)	104	10	8	3	5
Deer Lodge	12.3 (rural)	201	20	10	12	11
Fallon	1.7 (frontier)	28	2	1	0	1
Garfield	0.3 (frontier)	10	0	0	0	0
GoldenValley	0.9 (frontier)	13	1	1	0	0
Granite	1.7 (frontier)	25	4	4	3	3
Judith Basin	1.2 (frontier)	19	4	4	3	3
Liberty	1.4 (frontier)	19	2	2	2	1
McCone	0.7 (frontier)	20	3	2	2	2
Madison	1.9 (frontier)	71	14	7	9	11
Meagher	0.8 (frontier)	25	1	0	0	0
Mineral	3.1 (frontier)	53	4	1	1	2
Musselshell	2.4 (frontier)	58	2	1	1	1
Petroleum	0.3 (frontier)	1	0	0	0	0
Phillips	0.8 (frontier)	40	5	3	3	2
Pondera	3.8 (frontier)	79	6	6	4	6
PowderRiver	0.6 (frontier)	13	3	2	3	3
Powell	3.0 (frontier)	80	16	12	10	13
Prairie	0.7 (frontier)	22	0	0	0	0
Richland	4.4 (frontier)	135	6	4	2	2
Rosebud	1.8 (frontier)	76	10	8	4	7
Sheridan	2.3 (frontier)	50	7	3	1	5
Stillwater	4.7 (frontier)	105	8	4	3	4
Sweet Grass	1.9 (frontier)	37	8	4	4	5
Teton	2.8 (frontier)	86	10	7	7	6
Toole	2.8 (frontier)	61	8	6	5	5
Treasure	0.8 (frontier)	0	0	0	0	0
Valley	1.5 (frontier)	108	10	4	2	6
Wheatland	1.5 (frontier)	18	2	2	2	1
Wibaux	1.1 (frontier)	11	0	0	0	0

1 Montana County Health Profiles 2004 http://www.dphhs.mt.gov/PHSD/health-profiles/health-profiles-index.shtml
2 MT State Board of Nursing, Professional & Occupational Licensing Nursing Licensing Statistics, 2004
3 Montana Nurse Alert System Database

Volunteers by Retiree Status (Research Question 4):

4.　What are the characteristics of NAS Volunteers based on retiree status?

Volunteers based on retiree status (Table 10) indicated that one in ten or 10%

(n=128) of total NAS Volunteers consider themselves retired from nursing but still

maintain an active license. These nurses are unique in that they do not have commitments

to a regular job and may be more available to respond to a volunteer event on short

notice. An analysis of the database revealed that 128 out of 1,297 NAS Volunteers

indicated they were "retired" and willing to respond to a disaster event (Table 10).

Table 10

NAS Volunteers by Retiree Status

Retiree Status	Retired	Non-Retired
Total NAS Volunteers (n=1,297)	128 (10%)	1169 (90%)

Volunteers by Out of State Residence (Research Question 5):

5.　What percentage of NAS Volunteers primarily resides out of state?

Although many nurses who reside out of state and hold an active Montana nursing

license did not respond to the registration form, 3.5% (n=45) of the total NAS volunteers

who do reside primarily out of state returned the NAS registration form (Table 11).

Table 11

NAS Volunteers who Reside Out of State

Location	Out of State	In State
Total NAS Volunteers	45 (3%)	1257 (97%)

Volunteers by CPR Certification (Research Question 6):

6.   What percentage of NAS volunteers are CPR certified?

   The vast majority of NAS volunteers are CPR certified according to their self-

report. The NAS database revealed that two-thirds or 71% of volunteers indicated they

held up-to-date CPR training and certification (Table 12).

Table 12

NAS Volunteers with Current CPR Certification

CPR Certification	Up-to-Date CPR Certification	Not Up-To-Date
Total NAS Volunteers	916 (71%)	381 (29 %)

Summary of Analysis

   A descriptive analysis was conducted using Microsoft Excel and Access

programs. Characteristics of the disaster nurse cohort were analyzed using calculations

of counts and percentages. Areas of volunteerism analyzed included level of nurse

licensure, location of volunteer (in and out of state), area of volunteer interest, retiree

status, out of state residence, and CPR certification. Significant results that arose from the

analysis include the high percentage of APRNs that indicated willingness to volunteer in

a disaster event. APRN volunteerism was essentially twice that of LPN and RN volunteer

rates. Also of interest was that among all types of licensed nurses (LPN, RN and APRN)

nurse volunteerism rates were highest rates in small counties (<10,000 people per

county).

CHAPTER 5

DISCUSSION

Summary

In November 2004, there were almost 14,914 Nurse Alert System (NAS) registration forms sent to all licensed nurses (LPN, RN, and APRN) in Montana as part of the Montana State Board of Nursing (SBON) re-licensure mailing. A total of 8.7% (n=1,297) nurses returned their volunteer registration forms indicating a willingness to volunteer in the event of a public health emergency or disaster in Montana.

Wilson and Musick (1997) found that volunteers have greater human, cultural, and social capital. Rogers (2003) describes those individuals who are first to adopt an innovation, or new idea, as "innovators" and "early adopters". Descriptive findings from this study appear to suggest similarities with Wilson and Musick's and Rogers' theories since the NAS volunteers have high degrees of human capital and are "innovators" and "early adopters".

Research Question 1: Volunteers by Licensure Level

Volunteers by Level of Nurse Licensure (Table 1, Chapter 4) described NAS volunteers based on their licensure level (LPN, RN, and APRN). The findings indicate that NAS volunteer response rate increased based on type of license with APRNs responding at the highest rate of 16% (n=90) when compared with RN responders at 8% (n=918) and LPN responders at 8% (n=288). Although there was no difference in the

response rate between RNs and LPNs, at a response rate of 16% (n=90), APRNs

responded to the request for volunteers at nearly twice the rate as LPNs or RNs when

comparing total NAS responders by license type with the total actively licensed nurses in

Montana by license type (Table 1).

There are a large number of APRNs who are actively licensed in Montana but

who do not reside in the state. Montana SBON statistics indicate 132 out of 572 APRNs

reside out of state or 20% of those actively licensed. Therefore, in order to obtain more

accurate volunteerism response, the nurses who reside in state were analyzed separately.

Therefore, when removing the out-of-state nurses from the calculation, APRN response

climbs to 19% (n=85), or almost one out of five APRNs responding versus only one out

of ten for RNs at 10% (n=888) and one out of nine for LPNs at 9% (n=278) (Table 1;

Figure 1, Chapter 4).

This finding is a dramatic response indicating that APRNs may be more likely to

respond to a request for disaster nurse volunteers by returning a registration form. Wilson

and Musick's (1997) Integrated Theory of Volunteer Work describes volunteers as

individuals more likely to have higher levels of education, income and functional health

characteristics (called "human capital") than their non-volunteering counterparts. The

results from this study suggest agreement with the Integrated Theory of Volunteer Work

(Wilson and Musick, 1997) as APRNs often have higher levels of education and income

than their LPN and RN counterparts. The results also suggest agreement with St. John

and Fuchs (2002) who researched volunteering after the bombing of the Murrah Federal

Building in Oklahoma City and found results coinciding with Wilson and Musick's

Integrated Theory of Volunteer Work. St. John and Fuchs concluded The Integrated

Theory of Volunteer Work was a useful framework for studying volunteerism after

disasters.

However, it is interesting that the study results did not show a percentage

difference between LPNs and RNs in response since RNs may have more education than

LPNs and often higher salaries. One possible reason for this lack of difference is that the

educational years between RNs and LPNs is not determinable from this study because

respondents were not asked for their highest level of education and both LPNs and RNs

may have a diploma or associate degree for entry into practice.

Rogers (2003), in Diffusion of Innovations Theory, described innovations (in this

case, willingness to join a newly formed NAS) and the characteristics of innovators

(those individuals who are the first to embrace an innovation) when introducing a new

idea or system. In describing five categories of responders to an innovation (innovators,

early adopters, early majority, late majority, and laggards), Rogers found that these five

fall along a bell curve. Innovators (typically only 2.5% of individuals) are the earliest to

adopt a new idea or system change. This study indicated that 8.7% (n=1,297) of

Montana's nurses are innovators by their willingness to embrace the new idea of the

Montana NAS. APRNs demonstrated an even higher rate of innovation at 16% (n=90)

volunteerism. Both of these percentages indicate that nurses in general have a high degree

of innovation when compared with the typical 2.5% of individuals who are first to adopt

an innovation.

The results from our study indicate that APRNs are uniquely innovative as a

subgroup of nurses, as they responded at twice the rate to the request for volunteers, as

did LPN and RN nurses. According to Rogers (2003), "innovators" are characterized by

being venturesome, educated, having high socioeconomic status, are able to cope with

uncertainty and may or may not be respected by peers. The early adopters are the next

13.5% of individuals who are also educated, are opinion/social leaders, are change

agents, and are popular role models for other members of the social system. APRNs are

highly educated, have high socioeconomic status, and are likely respected by their peers.

They may also be social leaders within nursing as a profession and role models for LPNs,

RNs, and other APRNs within nursing.

Not only APRNs, but all nurses who responded to the NAS registration form

demonstrated unusual motivation and commitment by indicating an interest to

volunteer—knowing there may be personal risk and sacrifice involved with volunteering.

The large number of nurses in Montana who responded to the NAS registration form

(8.7%) indicates that nurses in general appear venturesome, educated and altruistic as a

subgroup (Table 1, Chapter 4). These nurses are also acting as social leaders by

responding to an idea—the Nurse Alert Volunteer System in Montana—before their other

nurse peers who did not respond.

Research Question 2: Volunteers by Location

Significant to the discussion of NAS volunteers by location relates to the degree

of population density—or rurality—from which the NAS volunteers came. Volunteers by

county based on size (Table 3) indicate that the least populated counties (small <10,000)

have the greatest percentage of nurses (out of total nurses in the county) who are NAS

volunteers. The small counties demonstrated the greatest level of volunteer response

when 11.5% (n=233) of their nurses responded. The large (9.5%, n=860) and medium (9.8%, n=164) counties' overall response rates are very similar (Table 3, Chapter 4).

The results of the study indicated that the highest response rates of volunteerism in each license type came from small counties among LPNs (11%, n=63), RNs (12%, n=170), and APRNs (23%, n=14) (Table 6, Chapter 4). It is interesting that small counties demonstrated the highest percent of volunteerism considering that the majority at 67% (n=860) of the NAS volunteers (1,252) reside in large counties (Table 2, Chapter 4).

In addition, APRNs responded at higher rates in all three counties than did RNs and LPNs. APRNs responded at the highest rates in large (20%, n=63), medium (10%, n=135), and small (23%, n=14) counties. This is essentially twice the rate of volunteerism in large and small counties when compared with volunteer rates of LPNs and RNs in large and small counties. Therefore, the greatest response for volunteerism came from nurses in small counties, regardless of licensure level and from APRNs in each county, regardless of size (Tables 4-6, Chapter 4). These findings are consistent with Research Question 1 findings and Roger's Diffusion of Innovations Theory and Wilson and Musick's Integrated Theory of Volunteer Work as discussed above under Question 1 (Rogers, 2003; Wilson and Musick, 1997).

The finding that the smallest counties in Montana have the highest rates of volunteerism is also interesting. Based on Rural Nursing Theory, individuals in more isolated areas have unique characteristics, actions and beliefs when compared with their less-isolated counterparts (Lee, 1998). These unique characteristics may be one indication why more nurses, proportionately, who reside in the smallest counties,

responded to the request for volunteerism. Rural communities are "community-oriented"

and tend to have greater access to "kinship support systems" where families are close in

proximity to help and other community members are eager to volunteer in time of need

(Long & Weinert, 1989).

In addition, rural health care providers indicate that their rurality leads to closer

interpersonal relationships and a greater sense of commitment to one another. This will

be an asset in communities during a disaster event whether called on personally or

through an organized system such as the Nurse Alert System. This will be especially

critical in employing community members as "insiders" to create acceptance for the

system at the local level (Loue & Quill, 2001, p. 56). Furthermore, using an "insider"

nurse to facilitate support for the Nurse Alert System will prompt greater "formal"

registration and support (to promote future nurse responders) since the desire is already

present to help the community in time of need (Lee, 1998, p. 29).

Research Question 3: Volunteers by Area of Volunteer Interest

NAS volunteers responded at similar rates in the three main categories of

volunteer interest: public health (60%), American Red Cross (58%), and hospitals (58%).

Three specialty care categories also received a large number of volunteer interests in

mental health (27%), pediatrics (28%), and geriatrics (38%) (Table 8, Chapter 4).

Considering that the largest number of nurses in Montana are employed by hospitals, the

percentage of NAS volunteers indicating interest in hospital volunteerism seems low.

Most NAS volunteers indicated willingness in more than one area resulting in high

percentages for all main categories. This finding is significant since NAS volunteers

appear to be flexible and willing to be trained to serve in a variety of areas, perhaps

where the need is greatest. It is only possible to surmise reasons for area of interest since

actual individual reasons where not part of the registration form nurses filled out and

returned. However, it is likely that the specialty areas were only checked by half as many

nurses, approximately, than the main categories, since these areas require more specialty

types of training. Many nurses may have felt they would like to volunteer in areas where

their skills and past experience could be best utilized and where they would feel most

comfortable and confident. It does appear, however, that nurses are also willing to be

cross-trained and even work "under their full potential" by volunteering in shelters or

clinics where their full skills are not used (such as in a hospital setting). Considering the

high percentage of APRNs that responded to the registration form, it is also significant

that these highly trained nurses also seem to be indicating that they would be willing to

work "under their full ability" and help with volunteering wherever the need is greatest.

Volunteerism by area of volunteer interest based on individual counties varied

greatly based on county size, area of volunteer interest, and number of NAS volunteers in

that county (Table 9, Chapter 4). Since the findings indicate that at least six small-sized

counties did not have any volunteer interest in at least one of the three major categories of

volunteerism, more recruitment is needed in these small counties. In addition, among all

counties, there was a large percentage difference between the number of nurses interested

in volunteering in each of the three major categories (Table 9, Chapter 4). This is clearly

a weakness in the disaster preparation response and a "gap" in the NAS volunteers in

Montana. During a disaster event, having more nurses trained and cross-trained for all

major types of volunteerism will allow for a greater disaster response, whether that be in

small, medium, or large Montana counties.

Research Question 4: Volunteers by Retiree Status

Volunteers based on retiree status (Table 10) indicated that one in ten or 10% of

total NAS Volunteers consider themselves retired from nursing but still maintain an

active license and are willing to respond in a disaster event. These nurses are unique in

that they do not have commitments to a regular job and may be more available to respond

to a volunteer event on short notice. Retired nurses are a possible "gold mine" of nurse

volunteers in a disaster because of their years of experience, dedication to the profession

and flexibility with other commitments when the need for volunteers arises. This source

of nurse volunteers is even more significant when compared with the total number of

retired nurses among those currently holding an active Montana license. According to the

SBON statistics for 2005, roughly 8.5% (n=1,268) of nurses considered themselves

"unemployed" out of 14,914 actively licensed nurses. Therefore, 91.5% (n=13,646) are

"employed". If we consider this category (unemployed) of nurses equivalent to those who

indicated "retired" on the NAS questionnaire, then nurse volunteerism among retired

nurses is slightly higher than among the general nurse population in Montana with 10%

of the NAS nurses being retired and only composing 8.5% of Montana nurses statewide.

Therefore, retired nurses may have a higher potential for volunteerism than their non-

retired counterparts.

Research Question 5: Volunteers by Residence Out of State

Volunteers who primarily reside out of state and continue to hold an active

Montana license responded at a rate of 3% (n=45) of the total NAS volunteers (Table 11).

Approximately 15% (n=2,303) of actively licensed nurses in Montana reside out of state

according to the SBON occupational statistics (SBON, 2005). The fact that 3% (n=45) of

NAS volunteers reside out of state is interesting because it is unclear why these 45

volunteers out of 1,297 total NAS volunteers would be willing to respond to a request for

volunteers in a disaster event in Montana. Perhaps they only reside out of state during

part of the year, feel loyal to Montana and would be willing to return during a disaster

event, or plan to relocate to Montana at some point in the future. Regardless of reason for

desire to respond to the NAS request for volunteerism, this small cohort cannot be

ignored and could also be a critical part of the volunteer nurse workforce in Montana.

Research Question 6: Volunteers by CPR Certification

Based on the results of the registration form, the vast majority of NAS volunteers,

71% (n=916), are CPR certified (Table 12, Chapter 4). This finding provides insight into

the current capacity of the volunteer workforce as disaster relief organizations (e.g. public

health, hospitals, Red Cross) plan disaster training. This important certification might be

required--rather than included--in the disaster training of volunteers. Many NAS

volunteers may maintain their CPR training and certification through their place of

employment further guaranteeing ongoing preparation of NAS volunteers in this area.

Limitations

Montana Nurse Alert System Registration Form

The methods used for the study carry a variety of limitations that infringe upon the extent to which assumptions or conclusions can be made from the results of the study. The first limitation involves the method of distribution of the nurse volunteer registration forms. The State Board of Nursing gave their approval to include the registration sheet and informational sheet in the licensee renewal but considered the registration form entirely separate from the nurse's license renewal. Since the registration forms were included in the nurse license renewal through the Montana State Board of Nursing, some nurses may have assumed the form to be a part of their renewal, dependent upon it, or influence the State Board of Nursing's bearing on the nurse. For other nurses, the registration form being included with the SBON renewal form may have been perceived as increasing the credibility of the form and thereby increasing the return rate of the form.

Another limitation is that the volunteers were required to fill out, address and stamp an envelope, and return the sheet to a designated post office box in Montana. Some nurses may have neglected to do this although they would be willing to volunteer. Still others, approximately 40, sent their application forms back to the Montana State Board of Nursing (SBON) rather than the designated post office box. Interestingly, a few nurses sent their nurse licensee renewal form to the Nurse Alert System post office box rather than the MT SBON. These variations indicate there was some confusion in returning the required SBON license renewal versus the volunteer NAS registration form.

Another limitation relates to the clarity of the information. Many nurses may have been confused or deterred by the degree of confidential information in the registration form. Although there was an informational sheet included in the form, it may not have answered the nurses' NAS questions adequately enough to compel them to complete the form.

Simply the mode of communication via a paper registration by mail may have deterred some volunteers. With the ease of computer communication via the World Wide Web, some volunteers may have opted to forego the paper form leery of what the intentions of the paper form were and may have instead preferred an alternative form of registration.

Since the volunteer registration forms were intended to gather information useful in training and sustaining a volunteer Nurse Alert System in Montana, information only pertinent to this aim was included in the registration form. Information was not included on volunteer motivation, purpose in volunteering, and other descriptive factors such as religion, household size, income level, age, race or gender.

In addition, the question related to advanced practice licensure number was labeled as "Nurse Practitioner number" rather than "Advanced Practice Registered Nurse number." (Nurse Practitioners are only one type of APRN. Other APRNs include Certified Nurse Midwives, Clinical Nurse Specialists, and Nurse Anesthetists.) Quite a few nurses who were APRNs but not NPs indicated this by specifying their specific APRN specialty while still writing in their APRN license number in the form. It is very likely that our total APRN number of NAS volunteers would be higher had the question stated "APRN license number" so that all APRNs who responded were counted in our

database.

A second study would need to be conducted with appropriate consent to obtain these descriptive factors to more accurately evaluate the nurse volunteers in Montana. From the registration forms, we can only glean area of residence based on city, county, and state, certifications, area of experience/specialty, current employer and position, retired status, CPR certification and the volunteer opportunities individuals would be more interested in hearing about with choices from immunization, shelters, local hospitals and overflow hospital shelters and specialty care areas (Appendix A).

In addition to the tool, the use of Microsoft Access and Excel databases to analysis the data carry a potential for error due to misspelling of county names, mistakes in data entry and mistakes in analysis itself. To help minimize this error, the database was reviewed independently of the data entry person in an attempt to find any mistakes present.

Other Limitations

Interpreting the results of this study must be conducted in clear view of the limitations found in the design, data entry procedures, data analysis techniques as well as the instrumentation (registration form). A descriptive study does not establish a causal relationship between variables but is meant to describe features of the population of interest. This point in time (cross-sectional) observation of the status and characteristics of the first NAS cohort in one rural state limits the generalizability of the findings to other states or regions.

Conclusions

The NAS volunteers are a unique group of nurse volunteers who have

demonstrated their willingness to be included in the NAS and therefore contacted for

further training and mobilization by appropriate agencies were a disaster event in

Montana to occur. This analysis of the characteristics of these volunteers has allowed us

to realize that APRNs are a unique subgroup among the volunteers who indicated

willingness to volunteer at nearly twice the rate of LPN and RN licensed nurses. This

makes the APRN group "innovators" according to Rogers' Diffusion of Innovations

Theory (2003). In addition, they fit the characteristics of volunteers according to Wilson

and Musick's Integrated Theory of Volunteer Work (1997) which describes volunteers as

those likely to have a high degree of human capital as indicated by high levels of

education, income and functional health.

In addition, the study results indicated that the highest volunteerism was among

all types of nurses (LPN, RN and APRN) in the small counties (<10,000 population) in

Montana. This suggests agreement with Rural Nursing Theory, which indicates

individuals in isolated areas geographically are likely to have a high commitment to the

small community in which they live (Lee, 1998).

However, due to the small number of nurses that reside in the smallest counties,

there are gaps in volunteerism in many small counties since five counties have no NAS

volunteers and one county does not have a single nurse (Petroleum County) (MT County

Health Profiles, 2004). It will be important to fill these gaps with more nurses who are

willing to be a part of the NAS system so that more nurses can be adequately trained and

mobilized by appropriate disaster relief agencies in the event of a disaster event.

<u>Recommendations</u>

Based on the findings of this study, the gap in current literature regarding nurse

volunteer characteristics and the desperate need for prepared health care workers in a

disaster event, the following recommendations are suggested.

1. This study indicated that a gap exists in volunteerism in many small counties

    in Montana. A second call for NAS volunteers needs to be initiated with a

    special focus on the smallest size counties in Montana to help recruit more

    nurses in these counties for volunteerism in disasters. Utilizing the SBON

    license renewal form letters could once again expedite the process of asking

    for nurses who are willing to volunteer.

2. In addition, NAS volunteers should be able to access and update their

    information in an online format so that the database can be kept accurate and

    up-to-date. This is currently being established. A goal to have this finished by

    the next SBON license renewal year (December 2006) should be established

    to allow for expediency in organizing the NAS database so that nurses

    themselves will be responsible for keeping their own information up-to-date.

    In addition, administrators of appropriate agencies (e.g. public health

    departments, Red Cross), should be given access to the NAS database so that

    volunteers can be contacted and trained appropriately to be prepared for

    mobilization and deployment in a disaster event.

3. In the next registration form sent out to nurses in Montana, further
   information should be asked and the registration form redesigned to include
   specific APRN licensure number and type of APRN to clarify confusion
   between Nurse Practitioners, other APRNs, and other advanced education in
   nursing (MN, PhD without APRN status). In addition, the questionnaire
   should include reasons for volunteering with an area for nurses to write-in a
   response if their own is not listed. In this manner, reasons for volunteering can
   be analyzed and used to promote further volunteerism. (For example, if
   "dedication to nursing as a profession" is a high reason for volunteering, more
   effort should be aimed at helping nurses feel a part of nursing as an altruistic
   profession.)

4. Further research to verify the hypothesis and statistical significance among
   APRNs and sparsely populated areas in Montana should be completed. In
   addition, other states should investigate their own NAS databases to confirm
   the hypothesis that nurse volunteerism increases among APRNs and among
   sparsely populated areas. APRNs can then be recruited and encouraged to be
   "innovators" regarding disaster nursing to become change agents in their
   leadership role within nursing…

5. Further research should also be done to study nurse volunteerism among all
   nurses and license types in the nation. This could include investigating
   differences in volunteerism among rural versus urban nurse volunteerism and
   regions of the country by considering the entire nurse population in the United
   States.

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APPENDIX A

Montana Nurse Alert System Registration Form

Montana Nurse Alert System Volunteer Registration Form

First Name:_____   Last Name:_____

Street Address:_____

City:_____County:_____State:___Zip Code_____

E-Mail: _____   Home Phone _____

Work Phone: _____ Cell Phone _____

FAX Number: _____

Montana RN License #:_____   Certifications _____

     Area of Experience: _____

Montana LPN License #:_____

Nurse Practitioner # _____

     Area(s) of Specialty:_____

Current Employer: _____ Position: _____

Retired with an Active

License:_____

CPR certification?_____Date of Expiration_____

Please Check off all volunteer opportunities you would be interested in learning more about:
- ❑ Immunization – County/Tribal Health Departments
  - o Screening
  - o Vaccinating
  - o Educating
- ❑ Shelters – Montana Chapter of the American Red Cross
  - o Well populations only
- ❑ Local Hospitals and Overflow Hospital Shelters
- ❑ Specialty Care
  - o Mental Health
  - o Pediatrics
  - o Geriatrics

Return registration to: Montana Nurse Alert System, P. O. Box 247, Polson, MT 59860

This information will only be used for disaster/public health emergency preparedness and response.

MONTANA NURSE ALERT SYSTEM
(Nurse Alert)
Fact Sheet for Nurses

Purpose: The purpose of the **Montana Nurse Alert System** is to establish a network of volunteer nurses who hold an active R.N. or L.P.N. license and would be willing and ready to respond to natural and manmade disasters, including bioterrorism, earthquakes, fires and other unforeseen emergency events in their community. In addition, the **Nurse Alert** will link nurses to opportunities for disaster-related education and training. The Montana Nurses' Association (MNA), Montana Board of Nursing (MT BON), Montana Department of Public Health and Human Services (MT DPHHS), Indian Health Service, Billings Area, Montana Hospital Association (MHA) and American Red Cross of Montana (ARC) recognize the need for one notification and response system that links retired and active nurses with education, training, and in the event of a disaster in your community, service opportunities.

Why Are Nurse Volunteers Needed? Recent disasters (such as wildfires) and public health biological event exercises indicate a lack of sufficient numbers of professional nurse volunteers available and prepared to provide disaster response and/or augment existing nurse staffing in the event of a public health emergency.

Training: Volunteers will be linked to training opportunities specific to their area of interest and expertise. Volunteers will be encouraged to participate in preparedness exercises in their community.

What Agencies Need Trained Disaster Volunteers? Volunteers are needed in a variety of acute care and community-based settings including but not limited to:

American Red Cross Well Population Shelters – The American Red Cross (ARC) provides training to volunteers who agree to work in well-person shelters. All ARC health profession volunteers participate in disaster health services preparedness training and take or show competency in basic first aid training and CPR.

Mass Clinics – County/Tribal health departments need nurse volunteers to participate in providing immunizations and/or medications to susceptible persons in times of contagious disease outbreak or bioterrorism attack. Duties might include intake, history taking, screening, education, and/or administration of immunizations/medications. Volunteers will be encouraged to participate in local county/tribal health department education, training and preparedness exercises.

Overflow Hospital Shelters **–** Hospitals may need supplemental staffing for special needs shelters and/or overflow hospital units. An agreement between hospitals (the Montana Healthcare Mutual Aid System) has been proposed to support the acute care needs of a community when casualties overwhelm local resources.

How Do I Sign Up? – The Montana Board of Nursing has approved the inclusion of this Fact Sheet and Registration Form in the 2005 nurse re-licensure mailing. Please consider this opportunity to serve your community by becoming a part of the Montana Nurse Alert System.