

DEVELOPING AN INFECTION CONTROL PLAN FOR THE SRFD

Developing a Comprehensive Infection Control Plan for the

Santa Rosa Fire Department

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

The problem is that Santa Rosa Fire Department (SRFD) does not have a comprehensive infection control plan, thus leading to the possible discontinuity of the department's mission: to save life and property. The purpose of this research was to identify how SRFD can better prepare for infection control.

Through descriptive research infection control guidelines and standards were identified, other fire departments were surveyed about this issue and essential components SRFD should consider were included, along with the internal infection control knowledge of SRFD company officers.

The research was accomplished through literature review and surveys. The results showed the importance of developing a comprehensive infection control plan. Recommendations included the design, implementation and evaluation process for a comprehensive infection control plan.

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Introduction

An effective infection control plan is essential in any healthcare organization. Exposures to tuberculosis (TB), human immunodeficiency virus (HIV), hepatitis and seasonal influenza are common when administering emergency medical services (EMS). The deadly swine flu, now known as H1N1, surfaced last spring. The President's Council (2009) states H1N1 could infect between 30 and 50 percent of the American population during this fall and winter and lead to as many as 1.8 million U.S. hospital admissions. An infection control program should be a document labeled as such, or a group of policies and procedures identified as guidelines used to deal with infection control issues. Each employee must learn how to protect him or herself from possible infection thus preventing passing an infection onto others.

Developing a workable infections control plan is the first step in actually implementing and having a plan for all to use. Like any process or plan in today's fire service, an infection control plan must flow from the overall philosophy, mission and goals of the organization. If the mission includes references of community service, then the department's infection control plan should also address community activities. Dwight D. Eisenhower once said, "Plans are worthless, planning is essential." This statement could refer to any written plan found in manuals across America's fire service. Ramsey (2002) states the components of an infection control program should include: a) methods of communications, b) approval and review process, c) hand washing, d) infectious waste management, e) bloodborne pathogens, f) bioterrorism readiness and g) patient outcomes. All plans should also include an evaluation step and a regular review process to ensure up-to-date information and activities.

The problem is that Santa Rosa Fire Department (SRFD) does not have a comprehensive infection control program, thus leading to the possible discontinuity of the department's mission, to protect life and property.

The purpose of this research is to identify how SRFD can better prepare for infection control. Descriptive methodology will be utilized to answer the following questions: a) what components are needed for an infection control program? , b) what are other fire departments doing to protect their citizens and workforce from the effects of infectious disease? , c) what are the essential components SRFD should consider when developing an infection control program? , and d) what is SRFD currently doing for infection control?

Background and Significance

The City of Santa Rosa Fire Department is located approximately 40 miles north of San Francisco in middle of the Sonoma County wine country. It is an all-risk fire department with a total population of approximately 163,095 within 43 square miles. SRFD has an annual budget \$26.2 million and is the largest fire department between San Francisco and Portland, Oregon. In 2008, SRFD responded to 19,137 requests for service.

Unfortunately, the City of Santa Rosa resides on top of the Rogers Creek earthquake fault line which, on April 18, 1906, caused over 100 deaths and the highest structural damage per capita for any city in California, including San Francisco.

City limits for Santa Rosa were established in 1984. Soon after, City Ordinance #115 was passed creating the City's first paid fire department. By 1900, SRFD was serving a population of 5,500 out of one fire station with only one officer, the fire chief. Today SRFD is staffed with 150 sworn and twelve non-sworn personnel. The

organization structure operates within three bureaus: Administration, Operation and Prevention. The Administration bureau consists of the fire chief and nine non-sworn administrative personnel.

The Operation Bureau has 140 sworn personnel managed by two division chiefs, three battalion chiefs and 38 captains. It provides all-risk service to the citizens of Santa Rosa with the delivery of emergency medical services, fire prevention and suppression, hazardous material mitigation, public education and technical rescue. These services are provided out of ten staffed fire stations which house one battalion, ten advance life support fire engines and two basic life support truck companies. Also included are a hazardous material unit, technical rescue unit, water tender and two wildland patrol units which are crossed staffed at various stations.

The Prevention Bureau operates with ten sworn and three non-sworn personnel who perform building plan checks, code enforcement, fire prevention activities, as well as hazardous material compliance, neighborhood rehabilitation and public education programs.

SRFD is faced with significant challenges with regards to future planning. Today's budgetary crisis has reached an all time high with several budgets being slashed throughout every bureau and division within the SRFD. They are now faced with the possibility of layoffs and/or browning out fire engines to save more money. Currently there are few guidelines within SRFD to prepare firefighters to handle significant exposures to infectious diseases, thus leading to the possibility of discontinuity of the department's mission which reads: "The mission of the Santa Rosa Fire Department is to minimize the loss of life and damage to property and the environment resulting from

fires, medical emergencies, complex rescues, and disasters through prevention, education, fire suppression, medical services, and other related emergency and non-emergency activities, Varner (2007).

Varner states, “We will actively participate in our community, serve as role models, and strive to effectively and efficiently utilize all of the resources at our command to provide a service deemed excellent by our citizens” (SRFD Strategic Plan, 2005, p. 6).

The significance of this applied research project (ARP) relates to the organizational culture and change curriculum discussed in the Executive Leadership course (NFA 2005). This ARP relates to the United States Fire Administration (USFA) Operational Objectives: “Improve local planning and preparedness” and “Improve the fire and emergency services’ capability for response to and recovery from all hazards” (USFA 2009). This ARP will examine ways SRFD personnel can better prepare for infection control before and after exposures, thereby increasing the survivability of life, conservation of property and protection of the environment.

Literature Review

The purpose of this literature review is to research components which help identify how SRFD can best develop a comprehensive infection control program. The literature review collected data from both private and public sectors relative to the topic. Research primarily consisted of gathering information at: a) Learning Resource Center (LRC), b) Sonoma County, California public library system, c) National Fire Protection Association, d) International Association of Fire Chiefs, e) International

Association of Fire Fighters, and f) Santa Rosa Fire Department Training Division. The Internet was also used to gather pertinent subject matter.

Exposures to blood and other body fluids occur across a wide variety of occupations, states the National Institute for Occupational Safety and Health (NIOSH, 2009). Health care workers, emergency response and public safety personnel, and other workers can be exposed to blood through needlestick and other sharps injuries, mucous membrane, and skin exposures. The pathogens of primary concern are the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV). Workers and employers are urged to take advantage of available engineering controls and work practices to prevent exposure to blood and other body fluids.

There are many reasons for keeping your fire department's infection control plan updated, but the main reason is to protect fire service personnel and the citizens they serve from the transmission of many transmittable infectious diseases such as: a) hepatitis A, B & C, b) human immunodeficiency virus (HIV), c) conjunctivitis, d) cytomegalovirus, e) diphtheria, f) gastrointestinal infections, g) herpes simplex, h) measles, i) meningococcal disease, j) mumps, k) parvovirus, l) pertussis, m) poliomyelitis, n) rabies, o) rubella, p) scabies, q) smallpox, r) staphylococcus aureus, s) streptococcus, t) tuberculosis, u) varicella, and v) viral respiratory infections such as influenza.

In 1991, Occupation Safety and Health Administration (OSHA) issued the Code of Federal Regulations 1910.1030 (29 CFR 1910.1030), the Blood Borne Pathogen Standard to protect workers of this risk. In 2001, in response to the Needlestick Safety and Prevention Act, OSHA revised the Blood Borne Pathogen Standard. The revised

standard clarifies the need for employers to select safer needle devices and to involve employees in identifying and choosing these devices. The updated standard also requires employers to maintain a log of injuries from contaminated sharps. OSHA (2009), states an employer, who is required to establish an infection control plan shall solicit input from non-managerial employees responsible for direct patient care who are potentially exposed to injuries from contaminated sharps in the identification, evaluation, and selection of effective engineering and work practice controls shall document the solicitation in the infection control plan.

In 2001, California adopted a new state standard called the California Code of Regulations, Title 8, Section 5193 (8 CCR 5193) which required employers to have an infection control plan for bloodborne pathogens designed to prevent or minimize employees' occupational exposure to blood and other potentially infectious materials. Paulison (2002) emphasis that "Infection control is an essential health and safety topic for the fire service today. Every fire and emergency services department needs to have a strong infection control program as part of an overall departmental health and safety strategy".

California/Occupation Safety and Health Administration (Cal/OSHA, 2001) developed a guide to help employers and employees design an effective exposure control plan in accordance to 8 CCR 5193. The elements of this plan contain: a) exposure determinations, b) methods of compliance, c) hepatitis B vaccination and post exposure evaluation and follow-up, d) communications of hazards to employees, e) recordkeeping, f) provisions for the initial reporting of exposure incidents, and g) hepatitis B vaccination series for unvaccinated employees. Also included are effective procedures for: h)

evaluating the circumstances surrounding exposure incidents, i) work practice controls, j) gathering sharps injury log information, k) making periodic determinations of the frequency of use and the types and the brands of sharps involved in exposure incidents, l) identifying and selecting appropriate and currently available engineering control devices, m) patient safety determinations, and n) actively involving employees in the review and update of the exposure control plan for the procedures they perform.

Respiratory protection is one of the first lines of defense for fire and EMS personnel to take during exposures to infectious diseases. The United States Department of Labor, Occupational Safety & Health Administration (OSHA) advises that all respirators that rely on a mask-to-face seal need to be annually checked with either qualitative or quantitative methods to determine whether the mask provides an acceptable fit to the wearer. The standard for fit testing falls under 29 CFR 1910.134. Fit testing individual employees with 3M P-100 masks are extremely important and recommended by the International Association of Firefighters (IAFF, 2006) to help protect first responders from influenza.

The IAFF (2008) recommends that fire and EMS organizations review the health and safety documents developed by the National Fire Protection Association (NFPA). The NFPA is a leader in developing safety codes and standards for both fire and EMS organizations. They have developed the following recommendations for response to routine emergencies or major disasters: a) NFPA 1500 - standard on fire department occupational safety and health programs, b) NFPA 1521 – standard for fire department safety officer, c) NFPA 1561 - standard on emergency services incident management, d) NFPA 1581 – standard of fire department infection control programs, e) NFPA 1999 –

standard on protection clothing for emergency medical operations, f) NFPA 1600 – standard on disaster/emergency management and business continuity programs.

Cal/OSHA (2009) adopted a new section to the General Industrial Safety Orders (GISO) on August 5, 2009. Section 5199, Aerosol Transmissible Diseases was added to Title 8, Division 1, Chapter 4, Subchapter 7, Article 109 of the GISO and effects paramedics and emergency medical services which includes services provided by firefighters and to other emergency responders. Employers are required to provide all safeguards pertaining to this new section, including provision of personal protective equipment, respirators, training, and medical surveillance and management. This is to be at no cost to the employee, at a reasonable time and place for the employee, and during the employee's working hours.

The National Department of Health and Human Services (HHS, 2008) and the CDC have identified important, specific activities to help prepare local government with the imminent danger associated with pandemic influenza. These include: a) infection control and clinical guidelines, b) surveillance, c) community preparedness leadership and networking, d) healthcare and public health partners, e) public health and clinical laboratories, f) vaccine distribution and use, g) antiviral drug distribution and use, h) community disease control and prevention – includes managing travel-related risk of disease transmission, i) public health communications, j) workforce support – psychosocial considerations and information needs.

An enormous gap still exists between the knowledge accumulated over the past decades and implementation of infection control practices, World Health Organization (WHO, 2009). If outbreaks hit health care settings without a culture of safe practices, the

risk of disruption to healthcare systems can be high. Being prepared and having a culture of safe healthcare practices that can prevent and control pathogen dissemination is key to coping with outbreak situations. Failure to apply infection control measure favors the spread of pathogens, and healthcare settings can act as amplifiers of disease during outbreaks, with an impact on both hospital and community health.

An infection control plan should include a structure responsible for policies, goals, and strategies. WHO (2008) suggest the core components to consider when developing an infection control plan should be: a) organization of infection control programs, b) technical guidelines, c) human resources, including training, program staffing, and occupational health issues for healthcare workers, d) surveillance of disease and assessment of compliance with infection control practices, e) microbiology laboratory support, f) environment, g) evaluation of infection control programs, and h) links with public health and other services/societal bodies.

Certain elements are necessary to attain the infection control goals of a personnel health service, Centers for Disease Control and Prevention, (CDC, 1998). CDC recommends the following: a) coordination with other departments, b) medical evaluations, c) health and safety education, d) immunization programs, e) management of job-related illnesses and exposure to infectious diseases, including policies for work restrictions for infected or exposed personnel, f) counseling services for personnel on infection risks related to employment or special conditions, g) maintenance and confidentiality of personnel health records.

Comprehensive infection control plans are essential for defending against many different diseases. Currently healthcare organizations throughout the world are placing a

large emphasis on developing plans to combat the next pandemic influenza outbreak. American Red Cross (2008) states “sometimes, a new type of flu virus may emerge to which the general public has no resistance. The lack of immunity enables the virus to spread quickly and easily from person to person impacting communities around the world in a very short time, causing serious illness and death.” Unlike the annual common flu which is most dangerous to the very young and very old, a pandemic flu can be catastrophic to all age groups due to their lack of immunity. Vaccines for any new strain of pandemic influenza may take 4-6 months to develop, leading to high mortality rates throughout affected geographical areas. Personal hygiene such as hand washing is crucial to prevent the spread of disease, Pryor (2009). This should be done after using the latrine and also when going from patient to patient.

There is a wide variance in infection control plans in today’s fire service. Some are well written and continually updated and others have been written, but never updated. The City of Corona (2006) has a comprehensive plan which includes: a) policy statement, b) roles and responsibilities, c) exposure determination, d) personal protective equipment, e) engineering and work practices control, f) equipment and clothing decontamination procedures, g) disposal of supplies and waste, h) post exposure management, i) information and training, j) compliance monitoring, k) vaccination program, l) hygiene procedures, m) glossary of terms, n) history of TB, and o) samples of related forms.

Standard Operating Procedures (SOPs) have been a functional part of SRFD for decades. Most of these SOPs were developed by incorporating NFPA standards and very much assisted SRFD in their development of an infection control plan. These SOPs include: a) SOP 5.1.8 – disinfection of medical equipment, b) SOP 6.10.2 – emergency

plan activation & implementation, c) SOP 6.10.2 – SRFD emergency plan, company procedures, d) SOP 6.10.3 – emergency call back for the emergency operations center, e) SOP 6.10.4 – emergency notification procedure, f) SOP 6.11.2 – duty chief for incident command & support, g) SOP 7.1.1 – probationary firefighter manual, h) SOP 7.1.2 – employee attendance at conferences and/or training, i) SOP 10.1.2 – reporting on the job injuries, j) SOP 10.1.3 – reporting work connected fatalities and serious injuries, k) SOP 10.7.1 – safety officer, l) SOP 10.8.1 – fire department safety program, m) SOP 10.9.1 – critical incident stress debriefing, n) SOP 19.1.2 – emergency callback in the event of an earthquake or other disaster, o) SOP 21.2.1 – infection control program, and p) nineteen medical response SOPs.

SRFD developed an infection control plan in the early 1990's in order to maximize the protection against communicable diseases for all members, and for the public they serve. The intent was to comply with: a) CFR 1920.1030 (Occupational Exposure to Bloodborne and The Needlestick Safety and Prevention Act), b) Title 8, Section 5193 of the CCR (General Industry Safety Orders, Bloodborne Pathogens), c) CDC (Guidelines for Preventing the Transmission of Tuberculosis (TB) in Health-Care Settings, with Special Focus on HIV-Related Issues), and d) Title 8, CCR, Division 1, Chapter 4, Subchapter 7, Group 16, Article 109, Section 5197 (Prevention of Occupational TB. This infection control plan was once a comprehensive plan which complied with current laws and regulations, but has never been updated and no longer is a compliant infection control plan.

Procedures

The purpose of this research project was to gather and analyze information to assist SRFD with developing comprehensive infection control plan. The author started obtaining information through the LRC at the National Fire Academy in Emmitsburg, Maryland. Periodicals, journals and published books were obtained with regards to infection control plans. Also included were applied researched projects that were completed by other EFO candidates.

A descriptive research methodology was utilized to answer the following questions: a) what components are needed for an infection control program? , b) what are other fire departments doing to protect their citizens and workforce from the effects of infectious disease? , c) what are the essential components SRFD should consider when developing an infection control program? , and d) what is SRFD currently doing for infection control? This Applied Research Project (ARP) was formatted through the guidelines published in the American Psychological Association (APA) manual.

Two survey instruments were developed to gather specific information regarding the development of a comprehensive Infection Control Plan within the SRFD (See Appendixes A, B, D and E). The Developing an Infection Control Plan Intra-Departmental survey is found in Appendix A and B and was distributed by way of www.surveymonkey.com to 38 fire captains within the SRFD. Appendix A is a memorandum preceding the survey that states the purpose of the Intra-Departmental Developing an Infection Control Plan survey gives instructions and provides a reasonable completion date. The survey itself is found in Appendix B. This was sent to the 38 fire captains in order to obtain base knowledge of SRFD fire captains with regards to

infection control planning and their work availability during a pandemic outbreak. Upon expiration of the survey return date, a total of 28 surveys were completed which equaled a return rate of 74%.

The second survey was an Infection Control Plan External-Departmental survey. Appendix D states a clear purpose for the survey and gives instructions on how to take the survey and provides a reasonable date for its completion. Appendix E was the Infection Control Plan External-Departmental survey. This survey gathers input from like cities with regards to infection control planning including their employees' familiarity with this topic. These cities were selected from the Memorandum of Understanding (MOU) between the City of Santa Rosa and the Santa Rosa Firefighters, Local 1401. These ten comparable cities (See Appendix G) were used during the contract negotiations. Upon expiration of the survey return date, a total of seven surveys were completed which equaled a return rate of 70%.

Assumptions and limitations

It was assumed that the intra-departmental survey participants had some knowledge in infection control, advance and basic life support, use of personal protective clothing and social distancing, and that they would answer the questions objectively. Responses from the ten comparable cities survey were assumed to be from chief officers who had experience in infection control planning and would answer the questions through the knowledge of those past experiences. It was also assumed that both surveys would have an element of subjectivity from the participants. Some limitations identified were the number of survey cities for this topic. The results should be viewed with that in mind. The questions contained in both surveys were developed by the author based on the

literature review and were not validated by outside means, and therefore, can be viewed as a limitation to this research. The research was also limited to the amount of time the author had available.

Definitions of terms

EFO – Executive fire officer

LRC – Learning resource center

SRFD - Santa Rosa Fire Department

Chief Officer – Mid and executive management level positions in the fire department

Captain – 37 field suppression fire captains and one forty-hour training captain

Infection Control Planning – Playing a key role in protecting employees' health and safety while providing excellent service to external customers.

Results

The results of this applied research project were obtained from the literature review and through two surveys. The results of the survey can be review in Appendixes C and F.

Research question 1: What components are needed for an infection control program?

Research has identified the following as the most common standards or guidelines that are available to assist with establishing an infection control plan: a) World Health Organization's core components to consider when developing an infection control plan, b) National Institute for Occupational Safety and Health, Protection Human Health, c) National Department of Health and Human Services – Center for Disease Control and Prevention's, Preparing Local Government, d) International Association of Fire Chief's

Guidelines for Fire Departments, e) International Association of Fire Fighters, Health and Safety Recommendations f) National Fire Protection Association's, Safety Codes and Standards, g) Occupational Safety & Health Administration infection control standards, h) California Department of Health Services, Infection Control Preparedness Plan, i) American Red Cross, Influenza Awareness, j) Corona Fire Department's Infection Control Plan, and k) Santa Rosa Fire Department's Standard Operating Procedures.

Research question 2: What are other fire departments doing to protect their citizens and workforce from the effects of infectious disease?

A survey instrument was used to gather the information needed in order to ascertain how other departments are preparing their personnel to work safely with infectious diseases.

Survey participants were asked how familiar they were with their department's infection control plan. Six chief officers (85.7%) stated being very familiar, one (14.3%) was somewhat familiar and zero (0.0%) were not familiar. Three of the ten cities did not respond to this survey.

Participants were then asked to reflect over their careers in order to answer how well their department provided current, good quality, infectious control information. Out of the seven responses, four (57.1%) stated yes, one (14.3%) replied no and two (28.6%) felt their department did a somewhat good job at disseminating the information.

The next question asked was how often their department updated its infection control plan. The results found that no departments updated their plans twice a year or once every five years. Two (28.6%) performed this task once a year and five (71.4%) did it every other year.

Participants were then asked if they felt their department's infection control plan was sufficient to help their personnel cope with the dangers of infectious diseases and how to prevent them from spreading them to family members, co-workers and the general public. There were three (42.9%) who felt comfortable stating yes, one (14.2%) replied no and three (42.9%) felt their plan were somewhat sufficient.

The next question asked of the participants was if their department had a designated infection control officer, and if so, what rank were they. All departments did have an infection control officer in two different ranks. Five (71.4%) filled the position at the division chief rank and two (28.6%) placed them at the battalion chief rank.

Participants were asked how familiar their department personnel were with decontamination procedures for post exposure to communicable diseases. Two (28.6%) of the participants were very familiar, three (42.8%) were somewhat familiar and two (28.6%) were felt their personnel were not familiar with these procedures.

As a follow up question, the participants were asked how familiar were their department personnel with the risk associated with patient contact during medical care of the sick and injured. One (14.3%) was somewhat familiar and six (85.7%) stated very familiar and none (0%) of the participants were not familiar.

The participants were then asked who their department contact was for post communicable disease exposures. All (100%) replied all of the above, which were the company officer, battalion chief, department's communicable disease officer and risk management.

The next question was what hospital their personnel went to post communicable disease exposure. No one replied the closest hospital or occupational health center. There

were five (71.4%) who stated the same hospital as the source patient and two (28.6%) had predesignated hospitals.

The final question posed to the participants whether their department would be willing to share their department's infection control plan. If so, to please email those to the author's attached email address. Thus far, the author has received two (29.0%) infection control plans.

Research question 3: What are the essential components SRFD should consider when developing an infection control program?

Protection against communicable diseases is paramount for fire service personnel and the public they serve. These transmittable infectious diseases include, but are not limited to: a) hepatitis A, B & C, b) human immunodeficiency virus (HIV), c) conjunctivitis, d) cytomegalovirus, e) diphtheria, f) gastrointestinal infections, g) herpes simplex, h) measles, i) meningococcal disease, j) mumps, k) parvovirus, l) pertussis, m) poliomyelitis, n) rabies, o) rubella, p) scabies, q) smallpox, r) staphylococcus aureus, s) streptococcus, t) tuberculosis, u) varicella, and v) viral respiratory infections such as influenza.

WHO has excellent worldwide source which should be taken advantage of when developing an infection control plan. Their suggested core components are: a) organization of infection control programs, b) technical guidelines, c) human resources, including training, program staffing, and occupational health issues for healthcare workers, d) surveillance of disease and assessment of compliance with infection control practices, e) microbiology laboratory support, f) environment, g) evaluation of infection control programs, and h) links with public health and other services/societal bodies.

Failure to apply infection control measure favors the spread of pathogens, and healthcare settings can act as amplifiers of disease during outbreaks, with an impact on both hospital and community health. Being prepared and having a culture of safe healthcare practices that can prevent and control pathogen dissemination is key to coping with outbreak situations. NIOSH (2009) states, health care workers, emergency response and public safety personnel, and other workers can be exposed to blood through needlestick and other sharps injuries, mucous membrane, and skin exposures. The pathogens of primary concern are the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV). Workers and employers are urged to take advantage of available engineering controls and work practices to prevent exposure to blood and other body fluids.

There are many standards for health and safety, but none are utilized more in today's fire service than NFPA. The following are essential for preparing an infection control plan: a) NFPA 1500 - standard on fire department occupational safety and health programs, b) NFPA 1521 – standard for fire department safety officer, c) NFPA 1561 - standard on emergency services incident management, d) NFPA 1581 – standard of fire department infection control programs, e) NFPA 1999 – standard on protection clothing for emergency medical operations, f) NFPA 1600 – standard on disaster/emergency management and business continuity programs.

Departments should encourage personnel to participate in state and countywide infection control committees and projects. This enables local fire departments to broaden their views and obtain an understanding of how other jurisdictions are developing and

updating their infection control plans in order to protect human life from transmittable diseases.

When developing an infection control plan one should focus on achievable goals. CDC (1998) recommends the following: a) coordination with other departments, b) medical evaluations, c) health and safety education, d) immunization programs, e) management of job-related illnesses and exposure to infectious diseases, including policies for work restrictions for infected or exposed personnel, f) counseling services for personnel on infection risks related to employment or special conditions, g) maintenance and confidentiality of personnel health records.

Research question 4: What is SRFD currently doing for infection control?

Another survey instrument was used to gather the information needed in order to ascertain the level of knowledge of infection control from SRFD fire captains. The survey was sent via email to 38 fire captains, 28 (74%) of whom answered the survey questions.

Each participant was asked how familiar they are with the current SRFD infection control plan. Three (10.7%) were very familiar, twenty-one (75.0%) were somewhat familiar and four (14.3%) answered not being familiar.

The second question asked each candidate how they felt the department has done over their careers with providing them current, good quality, infectious control information. Out of the 28 responses, three (10.7%) felt the department did a good job providing the information, sixteen (57.1%) said the department did not. Nine of the respondents were somewhat satisfied with the information disseminated over the years.

Participants were then asked how often they felt SRFD's infection control plan should be updated. Six (21.4%) felt twice a year, twelve (42.9%) wanted it done once a

year and ten (35.7%) were okay with it being updated every other year. No respondents wanted the plan updated every five years.

The next question asked them if they felt the current infection control plan was sufficient to help them and their personnel understand the dangers of infectious diseases and how to prevent them from spreading to their families, co-workers and the public. There were three (10.7%) who felt it was by responding yes, fourteen (50.0%) replied no and eleven (39.3%) answered somewhat.

They were then asked how familiar they were with the guidelines and regulations regarding personal protective (PPE) for infectious diseases. Three (10.7%) were very familiar, sixteen (57.1%) felt they were somewhat familiar and surprisingly nine (32.1%) were not familiar.

The follow up question was does the current infection control plan assist them with the selection of PPE. There were six (21.4%) participants who stated yes, ten (35.7%) felt it did not and twelve (42.9%) said it was somewhat useful.

In the next question, participants were asked how familiar they were with the decontamination procedures for post exposure to communicable diseases. Of the 28 responses, three (10.7%) were very familiar, twenty-one (75.0%) somewhat and four (14.3%) not at all familiar.

Participants were then asked how familiar they were to the risk associated with patient care during medical care of the sick and injured. Fourteen (50.0%) stated very familiar, eleven (39.3%) were somewhat familiar and three (10.7%) replied not being familiar.

The follow up question asked the participants was who they report a post communicable disease exposure to. Twenty (71.4%) only notified the battalion chief, while the other eight (28.6%) stated they would notify not only the battalion chief, but the department's infection control office and risk management.

The final question asked to the participants was what hospital they would go to for a post communicable disease exposure. Eight stated they would report to the department's designated occupation health center (Kaiser Hospital), eighteen (64.3%) would go to the same hospital as the source patient and two (7.1%) did not know what hospital to go to for care.

Discussion

When comparing the literature review with the results of the intra-departmental and external fire department surveys for this applied research project, similar patterns were identified to provide SRFD information to assist with developing a comprehensive infection control plan. American Red Cross (2008) states "sometimes, a new type of flu virus may emerge to which the general public has no resistance. The lack of immunity enables the virus to spread quickly and easily from person to person impacting communities around the world in a very short time, causing serious illness and death."

Many fire service organizations throughout the nation have modified their infection control plans to include pandemic influenza preparedness plans. These plans range from employee absenteeism to emergency response. This type of preparation is paramount for fire and EMS personnel. Departments are educating workforces on the potential devastation a pandemic outbreak would leash on all communities. A "Bird Flu" (H5N1) influenza virus hit Hong Kong in 1997 and quickly spread across Asia with

hundreds of people being infected. Symptoms are similar to the common flu. Patients find themselves with a cough, sore throat, muscle aches and fevers greater than 100.4 degrees. Pryor (2009) stresses that personal hygiene such as hand washing is the first line of defense for preventing the spread of influenza.

The fear of HIV dominated the 80's with regards to infection control. In 1991, OSHA issued the Blood Borne Pathogen Standard, 29 CFR 1910.1030. This mandate was to protect workers of this risk, and in 2001 OSHA revised this standard to include the Needlestick Safety and Prevention Act. This addition required employers to use safer needle devices and would allow employee input towards identifying and choosing these devices. An employer, who is required to establish an infection control plan, shall solicit input from non-managerial employees responsible for direct patient care who are potentially exposed to injuries from contaminated sharps in the identification, evaluation, and selection of effective engineering and work practice controls shall document the solicitation in the infection control plan, OSHA (2009).

Infection control is an essential health and safety topic for the fire service today. Every fire and emergency services department needs to have a strong infection control program as part of an overall departmental health and safety strategy, Paulson (2002). California adopted a new state standard in 2001 called the California Code of Regulations, Title 8, Section 5193 (8 CCR 5193). This required employers to have an infection control plan for bloodborne pathogens with the needle stick provision to prevent or minimize employees' occupational exposure to blood and other potentially infectious materials.

In order to aid employers and employees with designing their own exposure control plan in accordance with 8 CCR 5193, a guide was developed by Cal/OSHA (2001) which had sections pertaining to exposure determinations, methods of compliance, and hepatitis B vaccination and post exposure evaluation and follow-up. It covered other items such as communications of hazards to employees, recordkeeping, provisions for the initial reporting of exposure incidents, and hepatitis B vaccination series for unvaccinated employees. Also included were effective procedures for evaluating the circumstances surrounding exposure incidents, work practice controls, gathering sharps injury log information, making periodic determinations of the frequency of use and the types and the brands of sharps involved in exposure incidents. They further identified ways of selecting appropriate and currently available engineering control devices, patient safety determinations, and actively involving employees in the review and update of the exposure control plan for the procedures they perform.

A first line of defense when dealing with infectious diseases is respiratory protection. Fit testing individual employees with 3M P-100 masks are extremely important and recommended by the International Association of Firefighters (IAFF, 2006) to help protect first responders from influenza. The standard for fit testing falls under 29 CFR 1910.134. OSHA (2001) advises that all respirators that rely on a mask-to-face seal need to be annually checked with either qualitative or quantitative methods to determine whether the mask provides an acceptable fit to the wearer.

The author agrees that NFPA is a good place to gather information when developing a pandemic operational response plan. IAFF (2008) recommends that fire and EMS organizations review the health and safety documents produced by NFPA. Utilizing

the NFPA standards will assist any organization with response to routine emergencies or major disasters. NFPA provides guidance in areas such as developing occupational health and safety programs, emergency services incident management systems, infection control programs, protective clothing for emergency operations, as well as disaster/emergency management and business continuity programs.

The survey went on to reveal that 85.7% of the external fire departments are very familiar with their department's infection control plans which were developed to fit their departmental and community needs. An infection control program should be a document labeled as such, or a group of policies and procedures identified as guidelines used to deal with infection control issues. The President's Council (2009) recently stated departments must prepare for H1N1 because it could infect between 30 and 50 percent of the American population during this fall and winter and lead to as many as 1.8 million U.S. hospital admissions.

Current and future leaders within SRFD need to prepare a comprehensive infection control plan to meet the needs of their department and the community they serve. The Aerosol Transmissible Diseases, Section 5199 was adopted into the GISO by Cal/OSHA on August 5, 2009 under 8 CCR 5199. This addition affects paramedics and emergency responders due to their employers being required to provide all safeguards pertaining to this new section including provision of personal protective equipment, respirators, training, and medical surveillance and management. This is to take place at a reasonable time and place for the employee, at no cost to the employee, and during the employee's working hours.

The researcher found through the external survey that an infection control plan is one document that should be updated at least once every other year due to the new law and regulations being passed in order to protect the employees and public from communicable diseases. The SRFD infection control plan has not been updated since 2001 and is not compliant with current standards for infection control procedures. WHO (2009) points out that a large gap still exist between the knowledge accumulated over past decades and implementation of infection control practices.

Through research and surveys the author has discovered that SRFD is behind the curve when it comes to development of a comprehensive, up-to-date, infection control plan which educates the workforce of the dangers of communicable diseases. The intra-department survey was sent to all 38 fire captains, 28 of whom participated. The survey revealed that 75.0% of the surveyed fire captains were only somewhat familiar with the current infection control plan, while 14.3% had no knowledge of the plan. There were only 10.7% who felt the department provides them good quality infection control information, and an alarming 57.1% were completely unsatisfied with the infection control information disseminated by SRFD. Of the 28 respondents, 50.0% felt the current plan was not sufficient to keep them safe from communicable diseases. Currently, 57.1% of fire captains were very familiar with the guidelines and regulations regarding personal protective equipment for infectious diseases.

There would be a cost associated with training and development of an infection control plan for department personnel. The City of Santa Rosa is currently under budgetary restraints due to the housing market and sales tax shortfalls. Many of these programs prove unfeasible at this time due to the current budgetary restraints. One might

argue that there is also a cost associated with not implementing infection control training program and developing a comprehensive infection control plan.

The author found through the literature review and surveys that there are better ways to protect SRFD employees and the citizens they serve from infectious diseases than what is currently taking place. Although there is not a standardized approach for an infection control plan, there are many components and characteristics that should be considered when writing a plan. The information gathered will assist the author and SRFD with preparing a draft comprehensive infection control plan.

The SRFD has a unique opportunity to create an up-to-date infection control plan in order to avoid the possibility of not effectively managing emergency operations during a communicable disease outbreak. While timing of such a program is of the utmost importance, it will also provide guidance and a standardized approach for future leaders of SRFD to follow in order to perform safe operations during a catastrophic event.

Recommendations

The problem, as previously stated, was that SRFD does not have a comprehensive infection control program, thus leading to the possible discontinuity of the department's mission, to protect life and property. The purpose of this research is to identify how SRFD can better prepare for infection control.

The findings in this study demonstrate the need for the revision of the formal infection control plan within SRFD. If this comprehensive plan is not developed to assist the department with the transition from day-to-day operations to disaster operations, the possibility exists to have a catastrophic failure with fire and EMS response.

Based on information gathered in the literature review and the analysis of the results, the following recommendations are suggested to assist SRFD with the development of a comprehensive infection control plan: a) obtain support from labor, and management, b) form a committee to revise and develop an infection control plan, c) develop short term and long term goals of the plan, d) review SRFD's mission statement for alignment with the plan, e) develop an evaluation tool to gauge the efficiency of the plan, f) implement the plan as soon as possible and g) conduct on-going evaluations of the plan in order to ensure it stays on track with the department's mission.

If the mission includes references of community service, then the department's infection control plan should also address community activities. Dwight D. Eisenhower once said, "Plans are worthless, planning is essential."

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Appendix A

MEMORANDUM

DATE: November 2, 2009
TO: Fire Department Captains
FROM: Bill Shubin, Division Chief
SUBJECT: Infection Control Planning

Last winter I completed the Executive Leadership class at the National Fire Academy in Emmitsburg, Maryland. This is the forth and final class of the Executive Fire Officer Program. As part of this course, I am required to complete a research paper that pertains to the course work. I have chosen to research ways to develop a comprehensive infection control plan for the Santa Rosa Fire Department.

This type of planning is a systematic approach to assist our department with developing a comprehensive infection control plan in order to maintain operational readiness within our community. It will ensure that personnel are educated, prepared and willing to prevent the spread of infectious diseases.

As part of this research I am asking each of you to fill out the attached survey by November 30, 2009.

Please click on the link below for a 10 question multiple choice survey.

http://www.surveymonkey.com/s.aspx?sm=bpPGr5YYV9dCWSzCTwPeAg_3d_3d

All survey results are confidential.

Thank you for your cooperation.

Appendix B

Developing an Infection Control Plan Intra-Departmental Survey

This survey was sent via surveymonkey.com to 38 fire captains within the Santa Rosa Fire Department.

1. How familiar are you with our current infection control plan?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

2. Over your career has our department provided you with current, good quality, infectious control information?
 - a) Yes
 - b) No
 - c) Somewhat

3. How often do you feel our infection control plan should be updated?
 - a) Twice a year
 - b) Once a year
 - c) Every other year
 - d) Every five years

4. Do you feel our current infection control plan is sufficient to help personnel understand the dangers of infectious diseases and how to prevent them from spreading to your families, co-workers and the public?
 - a) Yes
 - b) No
 - c) Somewhat

5. How familiar are you with the guidelines and regulations regarding personal protective equipment (PPE) for infectious diseases?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

6. Does our infection control plan aid you with the selection of PPE?
 - a) Yes
 - b) No
 - c) Somewhat

7. How familiar are you with decontamination procedures for post exposure to communicable diseases?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

8. How familiar are you with the risk associated with patient contact during medical care of the sick and injured?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

9. Who do you notify for post communicable disease exposures?
 - a) Company Officer
 - b) Battalion Chief
 - c) Department's Communicable Disease Officer
 - d) Risk Management
 - f) All of the above

10. What hospital do you go to for post communicable disease exposures?
 - a) Santa Rosa Memorial
 - b) Kaiser Occupational Health or ER
 - c) Sutter
 - d) Same as the source patient
 - e) Unknown

Appendix C

**Developing an Infection Control Plan
Intra-Departmental
Survey Results**

This survey was sent via surveymonkey.com to 38 fire captains within the Santa Rosa Fire Department.

1. How familiar are you with our current infection control plan?

a) Very familiar	(3)	(10.7%)
b) Somewhat familiar	(21)	(75.0%)
c) Not familiar	(4)	(14.3%)

2. Over your career has our department provided you with current, good quality, infectious control information?

a) Yes	(3)	(10.7%)
b) No	(16)	(57.1%)
c) Somewhat	(9)	(32.1%)

3. How often do you feel our infection control plan should be updated?

a) Twice a year	(0)	(0.0%)
b) Once a year	(12)	(42.9%)
c) Every other year	(10)	(35.7%)
d) Every five years	(0)	(0.0%)

4. Do you feel our current infection control plan is sufficient to help personnel understand the dangers of infectious diseases and how to prevent them from spreading to your families, co-workers and the public?

a) Yes	(3)	(10.7%)
b) No	(14)	(50.0%)
c) Somewhat	(11)	(39.3%)

5. How familiar are you with the guidelines and regulations regarding personal protective equipment (PPE) for infectious diseases?
 - a) Very familiar (3) (10.7%)
 - b) Somewhat familiar (16) (57.1%)
 - c) Not familiar (9) (32.1%)

6. Does our infection control plan aid you with the selection of PPE?
 - a) Yes (6) (21.4%)
 - b) No (10) (35.7%)
 - c) Somewhat (12) (42.9%)

7. How familiar are you with decontamination procedures for post exposure to communicable diseases?
 - a) Very familiar (3) (10.7%)
 - b) Somewhat familiar (21) (75.0%)
 - c) Not familiar (4) (14.3%)

8. How familiar are you with the risk associated with patient contact during medical care of the sick and injured?
 - a) Very familiar (14) (50.0%)
 - b) Somewhat familiar (11) (39.3%)
 - c) Not familiar (3) (10.7%)

9. Who do you notify for post communicable disease exposures?
 - a) Battalion Chief (20) (71.4%)
 - b) Department's Communicable Disease Officer (0) (0.0%)
 - c) Risk Management (0) (0.0%)
 - e) All of the above (8) (28.6%)

10. What hospital do you go to for post communicable disease exposures?
 - a) Santa Rosa Memorial (0) (0.0%)
 - b) Kaiser Occupational Health or ER (8) (28.6%)
 - c) Sutter (0) (0.0%)
 - d) Same as the source patient (18) (64.3%)
 - e) Unknown (2) (7.1%)

Appendix D

MEMORANDUM

DATE: November 2, 2009
TO: Bay Area Comparable Cities
FROM: Bill Shubin, Division Chief
SUBJECT: Infection Control Planning

Last winter I completed the Executive Leadership class at the National Fire Academy in Emmitsburg, Maryland. This is the fourth and final class of the Executive Fire Officer Program. As part of this course, I am required to complete a research paper that pertains to the course work. I have chosen to research ways to develop a comprehensive infection control plan for the Santa Rosa Fire Department.

This type of planning is a systematic approach to assist our department with developing a comprehensive infection control plan in order to maintain operational readiness within our community. It will ensure that personnel are educated, prepared and willing to prevent the spread of infectious diseases.

As part of this research I am asking each of you to fill out the attached survey by November 30, 2009.

Please click on the link below for a 10 question multiple choice survey.

http://www.surveymonkey.com/s.aspx?sm=1dg2DEMdCcvfnPa6xq0Ttg_3d_3d

All survey results are confidential.

Thank you for your cooperation.

Appendix E

**Developing an Infection Control Plan
10 Comparable Cities
Survey**

This survey was sent via surveymonkey.com to the 10 City of Santa Rosa comparable cities.

1. How familiar are you with your department's infection control plan?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

2. Over your career has your department provided you with current, good quality, infectious control information?
 - a) Yes
 - b) No
 - c) Somewhat

3. How often does your department update it's infection control plan?
 - a) Twice a year
 - b) Once a year
 - c) Every other year
 - d) Every five years

4. Do you feel your current infection control plan is sufficient to help department personnel cope with the dangers of infectious diseases and how to prevent them from spreading to their families, co-workers and the public?
 - a) Yes
 - b) No
 - c) Somewhat

5. Does your department have a designated infection control officer? If so, what rank are they?
 - a) Deputy Chief
 - b) Division Chief
 - c) Battalion Chief
 - d) Fire Captain
 - e) Paramedic

6. How familiar is your department personnel with decontamination procedures for post exposure to communicable diseases?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

7. How familiar is your department personnel with the risk associated with patient contact during medical care of the sick and injured?
 - a) Very familiar
 - b) Somewhat familiar
 - c) Not familiar

8. Who gets notified for post communicable disease exposures?
 - a) Company Officer
 - b) Battalion Chief
 - c) Department's Communicable Disease Officer
 - d) Risk Management
 - f) All of the above

9. What hospital do you go to for post communicable disease exposures?
 - a) Same hospital as source patient
 - b) Closest hospital
 - c) Predesignated hospital
 - d) Occupational Health

10. Would you be willing to share your department's infection control plan? If, so please email it to BShubin@srcity.org

Appendix F

**Developing an Infection Control Plan
10 Comparable Cities
Survey Results**

This survey was sent via surveymonkey.com to the 10 City of Santa Rosa comparable cities.

1. How familiar are you with your department's infection control plan?

a) Very familiar	(6)	(85.7%)
b) Somewhat familiar	(1)	(14.3%)
c) Not familiar	(0)	(0.0%)

2. Over your career has your department provided you with current, good quality, infectious control information?

a) Yes	(4)	(57.1%)
b) No	(1)	(14.3%)
c) Somewhat	(2)	(28.6%)

3. How often does your department update its infection control plan?

a) Twice a year	(0)	(0.0%)
b) Once a year	(2)	(28.6%)
c) Every other year	(5)	(71.4%)
d) Every five years	(0)	(0.0%)

4. Do you feel your current infection control plan is sufficient to help department personnel cope with the dangers of infectious diseases and how to prevent them from spreading to their families, co-workers and the public?

a) Yes	(3)	(42.9%)
b) No	(1)	(14.2%)
c) Somewhat	(3)	(42.9%)

5. Does your department have a designated infection control officer? If so, what rank are they?
- | | | |
|--------------------|-----|---------|
| a) Deputy Chief | (0) | (0.0%) |
| b) Division Chief | (5) | (71.4%) |
| c) Battalion Chief | (2) | (28.6%) |
| d) Fire Captain | (0) | (0.0%) |
| e) Paramedic | (0) | (0.0%) |
6. How familiar is your department personnel with decontamination procedures for post exposure to communicable diseases?
- | | | |
|----------------------|-----|---------|
| a) Very familiar | (2) | (28.6%) |
| b) Somewhat familiar | (3) | (42.8%) |
| c) Not familiar | (2) | (28.6%) |
7. How familiar is your department personnel with the risk associated with patient contact during medical care of the sick and injured?
- | | | |
|----------------------|-----|---------|
| a) Very familiar | (6) | (85.7%) |
| b) Somewhat familiar | (1) | (14.3%) |
| c) Not familiar | (0) | (0.0%) |
8. Who gets notified for post communicable disease exposures?
- | | | |
|--|-----|--------|
| a) Company Officer | (0) | (0.0%) |
| b) Battalion Chief | (0) | (0.0%) |
| c) Department's Communicable Disease Officer | (0) | (0.0%) |
| d) Risk Management | (0) | (0.0%) |
| f) All of the above | (7) | (100%) |
9. What hospital do you go to for post communicable disease exposures?
- | | | |
|------------------------------------|-----|---------|
| a) Same hospital as source patient | (5) | (71.4%) |
| b) Closest hospital | (0) | (0.0%) |
| c) Predesignated hospital | (2) | (28.6%) |
| d) Occupational Health | (0) | (0.0%) |
10. Would you be willing to share your department's infection control plan? If, so please email it to BShubin@srcity.org (2 received so far)

Appendix G

**Developing an Infection Control Plan
10 Comparable Cities**

The 10 City of Santa Rosa comparable cities were gathered from the memorandum of understanding (MOU) between the City of Santa Rosa and the Santa Rosa Firefighters, Local 1401. These cities were used as comparable cities for the purpose of contract negotiations.

Below are the 10 comparable cities:

Novato Fire Protection District

Hayward Fire Department

Salinas Fire Department

Petaluma Fire Department

San Mateo Fire Department

Richmond Fire Department

Vallejo Fire Department

Santa Clara Fire Department

Modesto Fire Department

Fremont Fire Department