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Controlling Impacts of H1N1/PAN Flu on Respiratory Protection Program

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Introduction

Following years of planning and questioning pandemic flu preparation, 2009 provided the impetus to force several specific industries to refocus and increase planning. The seasonal flu comes every year with vaccines and reminders to wash hands, cough or sneeze into our elbow and stay home if we are sick. However, the attention and tracking that occurred with the H1N1 influenza heightened our awareness and concern to impact organizations in a variety of ways.

The challenge is determining the potential impact or risk to the organization. The seasonal flu has set a level of risk and therefore preventive measures to implement. The CDC estimates that seasonal flu was the cause of an average of 36,000 deaths from the 1990-1991 flu season to the 1998-1999 flu season (CDC, 2009a) H1N1 influenza outbreaks was unknown. The severity, timing and numbers of persons to be impacted were uncertain. The fall/winter H1N1 2009 influenza epidemic appeared to be impacting more communities than the spring/summer H1N1 influenza season. CDC, 2009, Interim) How does an organization plan for such an unknown impact?

In the safety and industrial hygiene arena, prevention starts with engineering the hazard out of the activity. The next step is to implement administrative controls to protect the employee. Finally, when the first two steps are not possible or sufficient, personal protective equipment is provided as a barrier between the employee and the hazard. The primary personal protective equipment against H1N1 is a respirator.

Respiratory protection programs have protected employees from a wide variety of airborne contaminants. These predominantly were identifiable, had exposure limitations, and were able to be quantified. This changed in the H1N1/Pandemic Flu environment. This paper will predominantly focus on the impact H1N1/Pandemic Flu can have on a respiratory protection program as well as ideas to manage the impact.

OSHA Respiratory Protection Requirements

The OSHA Respiratory Protection Standard, 20 CFR 1910.134 provides specific requirements for a respiratory protection program. In the healthcare industry, the N95 respirator is the standard for protection from tuberculosis. In 1997, the advent of the requirement for N95 protection to healthcare workers was in a proposed standard. Many safety and industrial hygienist remember the place keeper in the OSHA standard for the respiratory protection requirements related to tuberculosis. This requirement was the only specific OSHA standard for a biological, respiratory hazard.

In 2003, the respiratory protection requirements for employees potentially exposed to tuberculosis reverted to the standard respiratory protection program that industry was following (Freeman, 2004). OSHA states that "in the control of those occupational disease caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes , sprays or vapors, the primary objective shall be to prevent atmospheric contamination" (OSHA, OTM)). In the H1N1 arena, this objective becomes extremely challenging in the airline, retail, and healthcare industries. Once the engineering options are exhausted, the employer must return to some administrative actions and provide respiratory protection.

A key item for the employment of N95 respirators in the work force is to have a program in place that meets the full standard. Some requirements that become challenging in the H1N1 environment include:

- Develop worksite specific procedures
- Update changes in the workplace
- Address voluntary use of the N95
- Provide sufficient N95 respirators
- Provide the medical evaluation and training to allow use of the N95 respirators
- Include a "reasonable " estimate of exposures to respiratory hazards
- Select respirators from a sufficient number of models and sizes
- Provide a respirator that is adequate to protect the health of the employee and comply with the other regulatory requirements that go along with wearing a respirator
- Perform medical evaluations occur initially and require a follow-up review
- Inform the physician or other licensed health care professional (PLHCP) as to the type and weight of the respirator, duration and frequency of use, expected physical work effort and any additional protection worn or environmental extremes
- Identify wearer physical limitations to wearing a respiratory
- Fit test with the same make, model, style and size of respirator to be worn
- Implement and train on the maintenance and care of the respirator

<u>The Respirators</u>

There are several respirators that have become the work horse of the pandemic environment in protecting employees. The CDC and OSHA agreed that air purifying respirators were the appropriate protection (CDC, 2009b) allowing a selection out of eleven types of respirators.

The N95 filtration mask is the most common design used in protecting employees in this environment. It provides a very close fit, 95 percent filtration of very small particulates; 0.3micron. There are several designs that provide various additional protection. The N95 used for H1N1 protection must be NIOSH approved. The N95 surgical respirator is approved by NIOSH, if indicated on its label, and approved by the FDA for use in healthcare. The R95 provides the same 95% filtration, adds oil based particulate protection and is limited to one-work shift. The P95 provides the same 95% filtration, adds oil based particulate protection, but does not have a shift limit. As with all filters, hygiene and maintenance can shorten the use time. The N/R/P 99 and N/R/P100 filters provide greater filtration rates with the other characteristics being the same. There is discussion on the reusability of this design.

The next option is the elastomeric or half-face piece with removable filters. Also tight-fitting, it reduces the clarity of communication more than the N95 style, but has increased durability and re-use. The filter options for the elastomeric are the same as the filtration mask.

The last option is the powered air-purifying respirator (PAPR) which filters the air first, and then mechanically forces the filtered air into a loose-fitting hood. The hood remains positive pressure to the outside environment, preventing any contaminant to enter the breathing zone.

Pandemic Stages

When planning for a pandemic, it is important to understand the escalation phases. We are usually in Phase 1 with no new virus subtypes and risk to human disease is considered low. When there becomes a substantial risk of human disease, the pandemic moves to Phase 2. Phase 3 introduces a new subtype; however there is no human to human spread. When small clusters of human-to-human contact occur in localized areas, the pandemic moves to Phase 4. Phase 5 has increased cluster sizes, is still localized and the virus appears to be adapting for human to human transmission. Once the transmission is population wide and sustained, the community is in a Phase 6 pandemic. To maintain perspective, one must remember that all the phases are part of the pandemic. Therefore, the term pandemic can be used while a community is in Phase 1. (WHO, 2005)

Environments and Concerns

Consider the various environments and how the exposure environment is uncontrolled for most organizations as the public enters and leaves the work site. The healthcare environment may place some limitations on the patients and visitors, however, they are voluntary and patients are their business. Considering the respirator options, one can visualize customer response when confronting a worker in retail, airline or other similar environment where the protection is worn. Looking at the requirements and the respirator options, the safety professional seeks to engineer the hazard away.

Some organizations opt to limit customer - staff interaction through tele-contact. Others choose to send employees home and outfit them to tele-work. Still others limit who may enter the work environment. What ever the options, most would agree that shutting the company's doors is not on the list of alternative customer support. Let's look at how several activities managed concerns in their industry.

The CDC developed specific guidelines for the air travel industry to protect employees and customers. Moving large numbers of people, they required processes that were controlled, efficient and reduced traveler fear of contracting the flu while flying. The major concern was that the closed environment of an airplane created the close contact environment that was contrary to the guidelines of preventing transmission. Engineering controls were limited to vaccination of crew and removal of symptomatic passengers and crew during initial TSA and crew evaluation. The airline requested crew and passengers delay flying for 24 hours if they had the symptoms. Should an infected passenger be identified in flight, the ventilation was kept running after all passengers and crew disembarked to ensure virus particles were filtered out of the cabin air.

Administrative controls provided the next step in prevention through hand hygiene, maintaining a six foot distance from potentially infected persons, providing a face mask to the infected traveler along with a plastic bag for contaminated tissues. Personal protection was not an option identified for the airline industry employees. Individual airlines could set their own policy and voluntary wear could be an option by following the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Guidance was also developed for business in the CDC "Guidance for Businesses and Employers to Plan and Respond to the 2009-2010 Influenza Season" (CDC, 2010). The engineering measures are similar to that of the airline industry - vaccination and keep the infected employee home. The CDC advised employers to monitor their communities and use that to decide when to increase controls. Administrative controls were also similar with hand washing. However, businesses were provided additional ideas to control exposure through, increased

environmental cleaning, social distancing, decreasing business travel, alternate locations for operations, planning for maintenance of critical functions for minimal operations, and review of flexible leave policies. Each control reduced the potential for exposure or transmission. Personal protection was not an option identified for businesses either. Individual companies could set their own policy, could incorporate protection if desired into existing respiratory protection programs or voluntary wear could be an option by following the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Employers must still contend with the employee who remains concerned with exposure. Consider the employees who come within six feet, the social distance recommended by CDC, of their customers, i.e. bank teller, cashier, waiter/waitress, receptionist or teacher. At what point does a policy need changed: when one voluntary wear of a respirator turns into numerous requests or when the number of voluntary wearers impacts the business-customer relationship?

Significance of H1N1/PanFlu on OSHA RPP requirements

The respiratory protection program is a challenge to manage during routine times. The challenges escalate during an H1N1/Pandemic event. The process for respiratory protection in a facility may start with the supervisor identifying job duties/hazard assessment/exposure data. The industrial hygienist identifies the appropriate respiratory protection for the hazard and job activities. From there, the exposed employee completes a medical evaluation, waits for approval by the PLHCP, and is scheduled to be fit tested. Fit testing is required before starting the job, annually or more often if changes have occurred in their health. The mask with which the employee is fit tested is the only tight fitting mask they should be using.

At times this approach appears to take too much time to keep the employee, and sometimes the supervisor, committed to the process. Program monitoring is necessary to control the occurrences of non compliance such as wearing masks without fit testing, not completing the medical evaluation, facial hair that interferes with the mask seal and wearing whatever mask is nearby. How do you control this process and at what point does the employee need to take responsibility? What if you have clinicians who rotate between clinics and affiliate hospitals, adjunct faculty who move between academic facilities, employees who rotate through different facilities – of different companies? Are these intermittent employees wearing the same make and model respirator at the other location as at yours? Are you accepting medical and fit testing from the other facilities but using different respirators? Do the affiliate hospitals and clinics use the same make and model of mask to which the employee was fitted at your facility? Does the employee understand the necessity for wearing the correct mask? Most of these questions can be remedied with education and training.

Typical isolation requirements for patients with seasonal flu, is droplet precautions. PPE recommendations for droplet precautions include the use of surgical loose fitting masks. With H1N1, isolation requirements for patient care were elevated to airborne precautions which include a higher respiratory protection such as the N95 respirators. A surgical mask versus N95 dilemma arose in some states. The Kentucky Department of Public Health recommended a modification for hospitalized patients with H1N1 influenza to be cared for with both standard and droplet precautions rather than airborne precautions. Current use of N95 protection would be limited to instances of direct airway manipulation. Federal healthcare facilities were directed to follow CDC guidelines and use the N95 or higher protection. (Cabinet, 2009)

Most organizations conducted pandemic planning sessions during the initial stages of H1N1. Questions arise such as who should be protected with a mask/respirator during a pandemic event? Does the janitor need one? How about the receptionist or the police officer? Why shouldn't one

employee have the same protection offered to other employees? Each employee believes their job skills and duties are as important as the next employee. Consider that in the healthcare arena, the protection requirements focuses on clinical staff caring for the patient. What about the supportive services such as housekeeping, maintenance, chaplain service and the receptionist or information desk? In the recent pandemic, flu transmission spread and H1N1 positive patients were being treated at a facility. A sense of "survival" surfaced among some of the employees. As employees listened to the evening news, they heard that N95 respirators were the protection needed to keep from contracting the virus and to prepare by having certain supplies stockpiled in your home (medicine, gloves, and masks). Some healthcare facilities opted to protect starting with the N95 level based on CDC guidance rather than the state requirements for a basic surgical mask. Employees who had never worn an N95 mask before and whose job was not identified as requiring a mask, were commandeering N95 masks. For the employer, the employee wearing a non-issued N95 respirator requires the activation of the 29CFR 1910.134, Appendix D to every employee voluntarily wearing the respirator. How does the employer keep up with the "new wearers"?

Some healthcare facilities set up personal protective equipment (PPE) stations stocked with yellow, ear-loop surgical masks at entrance locations. Adjacent signs advised patients and visitors experiencing ILI (Influenza Like Illness) symptoms to take and wear a mask to protect other patients and staff. These became supply sources for visitors for home stockpiles resulting in depleted supplies early in the pandemic flu event. Did we create a mass hysteria with the warnings or was it necessary to raise awareness for a virus whose severity and path of infection were basically unknown?

<u>Managing Escalation</u>

A large healthcare association may be actively involved with their community. This would include access to table top discussions, teleconferences and resources to aid in the management of H1N1. Tools are developed to regulate and standardize approaches to protect employees at the various organizations. One tool is the surge protocol which assists in managing fit testing as described in the guidance.

OSHA provided an instruction to healthcare facilities in 2009 that recommended exposure risk levels based on job activity and potential for exposure to H1N1. The four levels were very high exposure risk to low exposure risk. One facility already initiated risk levels in the planning stages early in the year. Prior to patient surge, risk assessments were completed by the service chief or designee to classify staff based on job category (I, II or III) and risk (high, medium or low) during normal operations. Normal operations and surge stages were defined with appropriate actions that would occur at each stage. A sample breakout of one organization's job categories, risks, and surge stages is as follows:

1. Job categories (examples)
    a. Category I: Physicians, RNs, janitors, police, HVAC maintenance
    b. Category II: Chaplains, patient shuttle operators, some facility maintenance, transport/escort volunteers
    c. Category III: Librarians, canteen staff, barber

2. Risk (based on proximity to patient and activity)
    a. High: close patient contact <6 feet for more than 1 minute
    b. Medium: near patient contact >6 feet for an extended period of time or direct contact with personal items

c. Low: <6 feet from patient but not personal contact (OSHA listed this as > 6 feet from patient; no close patient contact)

3. Surge
   a. Normal operation
   b. Stage 1: CDC notification of airborne infectious disease in the US
   c. Stage 2: CDC/Public Health notification of airborne infectious disease in state where healthcare facility is located
   d. Stage 3: Patients with suspected/confirmed airborne infectious disease present at healthcare facility
   e. Post Surge: return to normal operation of the RPP

The categories and risk are assessed at each surge stage to plan who and when staff needs to wear respirators. It also allows the organization to plan the support actions necessary to ensure staff are prepared for the next surge stage. The following table is an example of how the matrix could be used. The categories are staff in a healthcare setting. These same jobs could be different in another work setting. Note that the category and risk are merged as in the police in category I are considered a high risk. A category II is considered a medium risk and category III is low risk.

Category/Risk	Normal Operations	Stage 1	Stage 2	Stage 3	Post Surge
I. Police (High risk)	-	Identify who needs	Fit tested	Increase approved wearers	Standby Status
II. Chaplain (Medium risk)	Minimal staff in program	-	Consider increase	Increase approved wearers	Standby status
III. Barber (Low risk)	-	Consider need	Clients screened	Close shop during	Open doors

Table 1. Sample risk matrix for RPP decision during surge

Table 1 illustrates that during normal operations, police do not need to wear respiratory protection based on their daily activities. Once the virus enters the United States (Stage 1), the police in the facility may want to identify if they have a potential for exposure and there fore enter some officers into the RPP. Stage 2 indicates the virus is in the state, the probability of an officer contacting an infected patient increases and therefore the need for protection increases. Stage 3, the virus is in the hospital and the police need to be approved and fit tested for protection. At post surge, those on the RPP go into standby mode where they will not be retained in the RPP.

The Chaplaincy maintains a minimal staff fit tested for potential tuberculosis (TB) patients. At Stage 1, the need to increase is assessed as not necessary. At Stage 2, the Chaplain requests to increase the number of staff protected due to the increased probability of infected patients in the state and coming to the facility. At Stage 3, all the Chaplains are determined in need of protection. At post surge, only those chaplains who were added to the RPP as a result of the pandemic surge would go into standby status.

The Barber would be similar to the retail or gift store. The staff does not require protection during normal operations. At stage 1, there may be a need to consider protection; however, the organization could decide to screen clients. At stage 2, the facility does decide to require the

barber to screen clients, turning away potentially infected (showing flu-like symptoms) patients. As the barber's services are not critical to the health care of the patients, the facility may request the barber shop close until further notice at stage 3. At post surge, the barber shop would reopen.

Based on the decisions of the matrix, the facility's RPP program could grows in size. More medical evaluations for respirator use are completed and reviewed by PLHCP. The organization establishes minimum number and model of N95 respirators (disposable, elastomeric, or PAPR) needed for stages 1-3. Due to the demand in a short time frame, they determine the number of qualitative fit testers required for stages 1-3 and request volunteers to be trained to conduct fit testing. Infection control would determine number of facemasks needed for patients during the surge. Once the facility determines respiratory protection is required for the staff, all elements of the RPP program must be followed. For some organizations, it simply means more people in the program. For others, it could mean the development of an entire program (Radonovich, 2009).

Once the employees are enrolled into the standard, non-pandemic RPP they become part of the program until they change jobs, are no longer exposed to the hazard or are no longer employed at the facility. Consider one organization with just under 2000 employees and an average 400+ employees on the RPP at any one time. The respiratory program enrollees are enrolled for TB protection of healthcare workers, research lab procedures and engineering maintenance needs. During the height of the H1N1, the number of enrollee numbers jumped to over 600 employees on the RPP and were still climbing.

Once the above decisions are made, management still has a challenge to manage. What of the employee not identified as being in a high risk job but still wants to wear the N95 for protection. Should the employer offer voluntary use of an N95? What about the receptionist who greets numerous patients every day within that 6 foot distance. Should she be protected? How do you ensure the patient will comply with the request to wear their surgical masks to protect other patients and your staff? Once the pandemic event moves into post surge, the question moves from who is added to the program due to who is removed from the program. But when is the pandemic event really over? How do you tell an employee you are removing their requirement/permission to wear an N95 for H1N1 protection?

Controlling RPP Resources

Organizations have been planning pandemic preparations for sometime. This should assure stockpiles of resources exist to support those plans. H1N1 provided a realization of the actual quantities that would be required. Considering the surge levels, we can look at the activities ongoing at each level that determines the resources needed. Normal operations have the standard level of airborne precaution resources (masks, respirators, gloves, gowns, goggles, etc.) At Stage 1, the number of respirators required to increase existing stock is determined as well as masks and other supplies. Much of these determinations are facility and activity dependant. At Stage 2, more resources are being depleted as additional staff is entered into the program and supplies distributed. At Stage 3, the organization will find their resources short if re-supply was not initiated on time or community resource requirements has depleted vendor supplies. This is the point at which alternative options are identified. In the healthcare arena, a greater number of patients are being masked. Appointments are rescheduled, cohort more patients, and consider adding isolation rooms.

In the RPP arena, the supply of respirators becomes critical. Following the recent H1N1 pandemic, one RPP vendor indicated requests increased almost 600% from pre-H1N1 to mid-H1N1. The majority of their orders included healthcare and first responder (police, fire and EMS). Shortages became evident in the manufacturer/distributor supply line as requesters

competed for supplies. Some suppliers had relationships that allow sharing across the country to keep their customers supplied. Others were not able to meet their customer needs as manufacturers continued to report up to three month delay in meeting requests. For distributors, the challenges also included balancing existing customer needs versus new customer requests. The most significant comment from this vendor was that organizations that were prepared or at least quickly understood their product and the volume requirements stood the highest probability of securing available product to protect their constituencies. This statement can cover the manufacturer, distributor, and the user.

There are several methods of managing the respiratory protection demand for an organization. The acute care environment will be the largest consumer of protection from potential H1N1 exposure. They provide an overview of the methods and allow us to select what could work for our facility.

Healthcare models were developed to calculate estimates of the amount and types of supplies that would be needed during a pandemic. The calculations are based on assumptions from previous pandemic events dependent on population size, number of ill patients and classification of illness, ventilation requirements, length of hospital stay, and PPE needs of staff. The staff is also categorized according to frequency and exposure to direct patient contact. (CDC, 2009, Interim) (Radonovich, 2009).

Though the focus of respiratory protection against H1N1 is the "N95" respirator, facilities have the option of using the N99 or N100 respirators. In addition, the R95/99/100 models and P95/99/100 models can also fulfill the protection requirements of the N95. Healthcare facilities already use the surgical N95. This model, though more expensive, can be substituted for the standard N95. Facilities can move to the half-face elastomeric respirator with N95/99/100, R95/99/100, or P95/99/100 filters to support their program. Most manufacturers, however, want the user to be fit tested to the manufacturer/model the employee will wear. Changing models increases fit testing requirements for the RPP manager. Many facilities have implemented respirator re-use into their program to extend the use of one respirator and decrease the draw on stocks. Finally, the powered air purifying respirator (PAPR), commonly used when an employee cannot be fitted to a respirator, becomes the protective choice. Fit testing is eliminated. Hoods are assigned to employees or shared with proper cleaning procedures between users. The initial investment is high, however the long term cost could be relatively equal. The PAPR requires batteries, charging, and pre-use inspections.

Once the above options appear to be exhausted or the facility finds the supply of elastomeric and PAPRs respirators is exhausted with long resupply delays, the RPP will need to consider re-using N95 style respirators. In 2006, the Institute of Medicine (IOM) was tasked by the Department of Health and Human Services to assess the option to reuse N95 respirators during a pandemic. The report published in April 2006 stated that N95 respirators "cannot be effectively cleaned or disinfected and should therefore be discarded after each use" (Reusability, 2006). Their evaluation stated that any disinfecting would cause harm to the user, not remove the viral content, or render the respirator unusable.

Understanding the dilemma healthcare and other industries could face in a pandemic, the IOM provided guidelines to permit reuse of a disposable N95 respirator. These guidelines are strictly limited to an employee reusing their own respirator. The respirator would have to be protected from any external surface contamination in a flu virus environment. This would entail covering the respirator with something that would protect it from the environment, but not alter its fit. Storage must retain its physical integrity and not denigrate its capabilities. The user must follow

good hand hygiene practices before and after removal. Finally, the device used to cover the respirator between uses must be cleaned. OSHA requires any reuse activities to be included in the respiratory protection program including the details of when reuse is permitted, maintenance and cleaning procedures, and when to dispose of the re-used respirator. A guideline for reuse of elastomeric respirators, supported by Appendix B of the OSHA RPP, describes the proper cleaning and disinfecting process. PAPRs and reusable head covers can also be disinfected per manufacturers' instructions. The N95 respirator is a disposable filter but CDC allows for multiple uses as long as the respirator achieves a tight seal and is not soiled. The recommended time for reusing a disposable N95 respirator in one healthcare facility was one normal work shift if all other CDC guidance was met. During the fit testing process, the employee must be advised of these guidelines for proper use, storage, cleaning and wearing (donning and doffing). Some employees fit tested from other facilities tell stories of having to keep their N95 respirator indefinitely and stored in a locker due to the shortage of supplies (Reusability, 2006)(CDC, 2005b).

There is ongoing question on the use of the surgical mask. Loose fitting, it is designed as a physical barrier for large droplet, particle, spray or splash that may contain virus or germs. They also contain the wearer from contaminating others. Many practitioners are questioning why the surgical mask may not be an option in the H1N1 environment. In a November 4, 2009 issue of the Journal of the American Medical Association, the results of the first randomized trial comparing the surgical mask protection versus the N95 protection was published. The statistical data showed virtually identical rates of infection. The study did highlight there were other issues such as hand hygiene adherence, triage and preventive etiquettes that were not evaluated, but that could impact the outcome (JAMA, 2009).

There are other resources that are impacted in the RPP when respirator wear increases. The organization must ensure the medical evaluations are completed, reviewed by a PLHCP and recommendations provided in a timely manner. The organization must plan for the time for evaluation completion by the employees, review by the medical staff and additional follow-up exams as necessary. Once approved, the RPP manager must assure fit testing occurs with the appropriate respirator. As the pandemic escalates, the number of fit testers necessary will escalate. The organization must plan how to support the RPP manager with dedicated fit testers who will be trained and provided the time to fit test staff. Additional fit testing equipment will be required to support the additional fit testers. Qualitative fit testing best supports this process, but still requires equipping, training and auditing fit testers to maintain an acceptable performance standard for the RPP.

Fit testing for the N95 respirator can be completed by qualitative or quantitative methods. Quantitative fit testing requires the use of equipment to measure for a proper respirator seal by generating a numeric score. The issue with quantitative fit testing is that the N95 respirator is destroyed during the testing process. Therefore as supplies are more difficult to obtain, qualitative fit testing becomes the method of choice for measuring proper fit of the respirator. During qualitative fit testing, a test agent is used while the employee is wearing the respirator. The test agent is either tasted or not depending on the outcome of the testing process. The respirator is not destroyed during testing and therefore can be used by the employee after the test is completed.

As the pandemic escalates, the need for trained fit testers increases. Volunteers, while maintaining their current job duties, can be given the additional task of learning to fit test by qualitative methods and then complete the fit testing of identified staff within their respective department(s). As to how many fit testers are needed is dependent on the number of staff requiring fit testing within the facility, location of staff and the amount of time this employee

could give to this project. In one healthcare facility, 26 fit testers were trained which seems like a large number. The reality is that every fit tester will not be available at all times and that employees are transient between jobs. The task of fit testing is not difficult but can be time consuming especially when trying to encourage coworkers to complete the whole fit test process amid their normal job duties.

As an alternative to fit testing, staff can be provided with a powered air purifying respirator (PAPR) with a corresponding head cover or hood. These respirators are loose fitting on the employee and therefore fit testing is not required thus eliminating one step in the RPP. Medical evaluations and training still need to be completed. Also those employees with beards can use this type of respirator. This approach to respiratory protection can be cost prohibitive. A PAPR could cost between $600-$800 with an additional $30 per head cover or hood. PAPRs can be shared between employees but each would maintain their own head cover or hood.

Conclusion

The 2009 H1N1 pandemic provided the first reality check of what will occur during a pandemic escalation. The escalation time can occur in months or weeks. The tools developed by the organization may be insufficient and therefore - bypassed just to allow the organization to escalate with the needs of the pandemic. In addition, planning implementation can be compromised as communities compete for RPP resources.

On the horizon there are the several challenges that some organizations must contend with.

1. Consider that we now recognize there will be a shortage; therefore we are going to develop stockpiles of resources. Many have shelf life dates. How will we manage the rotation when stockpiles are huge? Even elastomeric respirators have limitations, requiring some level of environmental controls in storage to prevent drying or distortion in temperature extremes.

2. Some respirator styles are not ideal for the working environment they may be used. The elastomeric respirators are not supportive of patient/healthcare provider communication. Frustration could result in removal followed by infection. The exhalation valve could transmit infection from the user to the patient.

3. The medical community is planning to combine the seasonal flu vaccine of 2010 with the H1N1 vaccine in the fall of 2010. What does this mean for the communities who have planned for these as separate viral pandemics? Will the employees interpret the seasonal flu as the H1N1 flu, increasing the protection requirements? Will the increase drive the draw on resources exponentially, creating another shortage despite the planning efforts of 2009/2010?

4. As respiratory protection use increases in various organizations, what impact will this have in the customer relationship? What does distancing do to a healthcare provider's care when they are not able to wear a respirator? What does the patient think when a health care provider shows up in a PAPR? At what point does the airline begin to require some level of respiratory protection for the TSA representative? Or the airline attendant?

Overall, the H1N1 pandemic of 2009-2010 has provided a rich experience in the practical aspects of emergency planning. RPP is an integral part of pandemic and will require additional detailed planning and tracking.

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