

Provided resources, information, and tools to advise and assist general workers, health care workers, and management to protect workers in the case of a flu pandemic.



The Role of the Industrial Hygienist in a Pandemic

By the AIHA Biosafety and Environmental Microbiology Committee

The Role of the Industrial Hygienist in a Pandemic



Protecting Worker Health

Approval Date: May 4, 2006

American Industrial Hygiene Association

Disclaimer

This document is neither a comprehensive treatment of issues concerning a pandemic nor a stand-alone resource. Scientific and practical knowledge in this area are rapidly accumulating and evolving. It is intended to complement policies and procedures put into practice by other disciplines within a healthcare environment and should be used by the industrial hygienist in conjunction with existing information.

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I. Background

a. Overview

As industrial hygienists today, we are faced with a myriad of issues that have expanded our role. This includes new technologies, terrorism, emergency preparedness and response, and emerging infectious diseases such as SARS, plague, and influenza. Of particular concern to many governments, public health officials, and medical providers, is the possibility of a pandemic. A pandemic is a global outbreak that occurs when, for example, a new influenza virus causes serious human illness and spreads easily from person to person¹.

A pandemic is, by definition, an outbreak of a disease that initiates simultaneous infections of humans throughout the world. The disease occurs simultaneously because populations share some common susceptibility. Health officials currently fear that the H5N1 subtype of the avian influenza virus is the agent that will initiate the pandemic if it mutates to acquire the ability to spread from human to human. See <http://www.cdc.gov/flu/avian/index.htm> and/or http://www.who.int/csr/disease/avian_influenza/en/index.html.

The primary reason this subtype of virus is so widely feared is because the world's population is immunologically vulnerable. This is a new strain and humans have no residual antibodies from previous seasonal influenza outbreaks. Also, cases where humans have been infected following close contact with infected birds indicate that it is an extremely virulent agent of disease. Estimates of 52–55% mortality rates have been quoted. See http://www.who.int/csr/disease/avian_influenza/en/index.html.

There is no readily available reference or guidance that addresses the industrial hygienist's role in planning for a pandemic, or provides an industrial hygienist with specific actions for prompt and effective response to a pandemic. AIHA recognizes that the working industrial hygiene professional, regardless of employer or background, needs ready access to specific resources, information and tools, in order to plan for and provide assistance in the event of a pandemic. This guideline provides back-

ground, roles and responsibilities, an introduction to infection control and a discussion of the hazards and controls, critical communication strategies, planning, and additional resources. This guideline also includes a checklist that an IH may use for planning purposes (Appendix 1).

This guideline represents a consensus statement by a group of experts about important aspects of the "state of the science." The guidance offered is practical information and does not claim to be a definitive or comprehensive position statement. Because it is not comprehensive, it should always be used with newly emerging guidance in addition to existing guidance documents, as well as professional judgment.

b. Purpose

The purpose of this guideline is to provide industrial hygienists with resources, information, and tools to advise and provide recommendations to general workers, health care workers, and management, in order to protect workers. This guideline was developed in cooperation with several AIHA volunteer groups and other occupational health and safety agencies and professional associations. It should be considered complementary to the many excellent resources available, which are references at the end of this guideline.

II. Roles and Responsibilities

The role and responsibility of the industrial hygienist is to provide advice and recommendations on control measures for the workplace and community. (i.e., administrative controls, personal protective equipment, and engineering), in coordination with the infection prevention and control specialist, based on the best available information.

III. Hazards

The identification of hazards and assessment of risks differ when evaluating biological agents versus chemical and physical agents. Chemicals and physical agents are normally evaluated on a quantitative basis (e.g., measured concentrations that are compared to occupational exposure limits). The risk of exposure to biological agents

¹ CDC pandemic influenza web page <http://www.cdc.gov/flu/pandemic/>

must be determined qualitatively with significant variations based upon factors such as host susceptibility, agent pathogenicity (i.e., it's capability to cause disease, agent stability in the environment, the availability of therapeutic interventions (e.g., treatment or vaccinations). See, <http://bmbi.od.nih.gov/risk.htm>. The National Institutes of Health in "Guidelines for Research Involving Recombinant DNA Molecules," (see, http://www4.od.nih.gov/oba/rac/guidelines_02/APPENDIX_B.htm), list human disease agents according to the following risk criteria:

Table 1: Biological Agents by Risk Group (RG)

<i>Qualitative Grouping</i>	<i>Definition</i>
Risk Group 1 (RG1)	Agents that are not associated with disease in healthy adult humans
Risk Group 2 (RG2)	Agents that are associated with human disease which is rarely serious; preventive or therapeutic interventions are often available
Risk Group 3 (RG3)	Agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk)
Risk Group 4 (RG4)	Agents that are likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk)

Application of these risk groupings for the H5N1 avian flu subtype that has acquired human to human transmission capability indicates these agents fall into risk group 3 or 4. Clearly, the stakes are high and there is strong evidence that a conservative approach is required to protect the broad spectrum of workers addressed in this document.

As a matter of practicality, it would be utterly impossible to apply the isolation, containment, and administrative controls seen routinely in laboratory settings with RG 3 and RG 4 agents in the event of a pandemic wherein thousands of individuals may be potentially infected. Practical guidelines have been developed by infection prevention and

control professionals to minimize transmission and the spread of disease in health care facilities. They are listed in Supplement 4 of the Health and Human Services (HHS) "Pandemic Influenza Plan" (<http://www.hhs.gov/pandemicflu/plan/pdf/HHSPandemicInfluenzaPlan.pdf>).

The plan adopts the common Infection Control approach of rating influenza transmission potential according to three modes:

- **Droplet Transmission:** contact of the conjunctivae or the mucous membranes of the nose or mouth
- **Contact Transmission:** skin-to-skin contact or indirect contact with virus in the environment
- **Airborne Transmission:** dissemination of either airborne droplet nuclei or small particles in the respirable size range containing the infectious agent.

IV. Recommended Controls

a. Administrative/Work Practices

The ability of industrial hygienists to ensure the protection of worker health and safety in the setting of a pandemic influenza outbreak requires the consideration of certain administrative controls. Industrial hygienists participating in the emergency response planning process or tasked with the management of workers during an outbreak should be aware of the principal areas of administrative control available.

Education and Training

Industrial hygienists should be closely involved in training and providing up-to-date guidance/interpretation on recommended safe work practices and PPE use. During a pandemic, industrial hygienists are well positioned to ensure that workers properly follow health and safety procedures and comply with PPE requirements. In the early planning stages, industrial hygienists should engage the participation of all workplace parties:

- To establish mandatory policy on PPE use based on available current guidelines, including procedures to address non-compliance;
- To develop policies limiting use of shared equipment;

- To develop guidelines on the disinfection, including chemical use, of general surfaces including where the sharing of equipment is absolutely necessary;
- To provide on-going worker training and education; and
- To support safe work practices and PPE use during the course of an outbreak, providing leadership by example and encouragement for continuing worker compliance.

Workplace Access and Security

The movement of workers to and from the workplace presents a pathway whereby infectious agents may be acquired and transmitted between the community and workers. The careful control of access to the workplace together with the use of a "fit-for-work" screening tool, can help to protect workers and maintain productivity. A suitable "fit-for-work" screening tool should evaluate workers against relevant, conspicuous clinical features of early-stage infection, such as fever and cough, in order to provide a means to screen out high risk workers prior to their entry into the workplace.

Appropriate questionnaires may be obtained from the U.S. Centers for Disease Control or local health authorities. Effective administration of the tool may require the designation a single or few workplace entrances and exits to which dedicated screening staff can be assigned. Industrial hygienists should participate in the development of policies:

- To restrict and monitor workplace access;
- To provide for follow-up evaluation for tool failure criteria, such as a qualified healthcare assessment or emergency intervention; and
- To establish criteria for refusal of access and isolation of unfit workers, and "case contacts" and return-to-work.

The concept of "social distancing" is the most important feature of a pandemic management plan. The underlying idea of this plan is the limitation of human-to-human contacts that might risk the transmission of infectious disease. No other controls alone, including use of respirators and other protective equipment, has shown to be more effective. Several strategies of social distancing industrial hygienists may consider in the

event of a pandemic influenza outbreak include:

- Implementing telework capabilities where feasible;
- Developing infrastructure to manage meetings by conference call or videoconferencing;
- Encouraging job rotation or staggered shifts to reduce workplace capacity as well as worker exposure risks related to traveling on public transit during peak times;
- Segregating/ isolating critical work clusters;
- Reducing or eliminating work in low-ventilated areas;
- Minimizing the use of shared facilities for eating/ smoking by staggering meals/ breaks or designating multiple sites;
- Reducing or eliminating work travel to high-risk regions and encourage workers engaged in travel to stay away in the event of a local outbreak; and
- Initiating an administrative leave policy for non-essential workers.

Cleaning, Disinfection and Sterilization

Cleaning, disinfection and sterilization are commonly assigned by infection and prevention control specialists to ensure patient safety. Disinfection and sterilization are not often prescribed to ensure worker health and safety. Therefore there is a need for industrial hygienists to obtain a basic understanding of concepts and terminology and apply them to the protection of workers.

Cleaning is the removal of all foreign material (e.g. soil, organic material) from objects. It is normally accomplished with water, mechanical action, and detergents or enzymatic products. Meticulous cleaning must precede disinfection and sterilization procedures.

Disinfection describes the process that eliminates many or all pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial/fungal spores) and other resistant forms, from inanimate objects. The efficacy of disinfection is affected by a number of factors including; previous cleaning, organic load, type and level of microbial contamination, concentration of and exposure time to the disinfectant, physical configuration of the object, and the tem-

perature and pH of the disinfection process. Disinfection is broken into three categories; high, intermediate, and low based upon the effectiveness of killing or neutralizing biological agents.

Sterilization is the complete elimination or destruction of all forms of microbial life. It can be accomplished by either physical or chemical processes.

In the event of an outbreak of agents with unknown characteristics the industrial hygienist will need to keep abreast of current recommendations for cleaning, disinfection and sterilization to ensure a safe workplace. The Center for Disease Control (www.cdc.gov), Food and Drug Administration (www.FDA.gov), World Health Organization (www.who.org) and the Environmental Protection Agency (<http://www.epa.gov/oppad001/chemregindex.htm>) are all repositories of information and expertise on the most effective products and techniques.

Labor Relations

During a pandemic influenza outbreak, industrial hygienists will play an essential role both in ensuring worker health and safety and maintaining adequate workforce to accommodate event-related changes in workflow/production. It should also be expected that workplaces will experience an increase in grievances and work refusals along with an increase in union involvement with respect to workplace health and safety issues. In anticipation of these outcomes, industrial hygienists should participate proactively in the development and implementation of a planning process to:

- Provide input to the business in identifying critical production needs and reduce non-essential production;
- Compile priority requirements for key workers with respect to PPE and training;
- Engage management and workers/union parties in discussions on safe work practices, grievance procedures, and contingencies available for workforce, supply chain and production;
- Maintain effective communications between all workplace parties;
- Address dispute resolution regarding health and safety/safe work issues; and
- Identify and mitigate unique exposure risks posed by multiple jobs/shifts by

part-time/ occasional workers (e.g. health care workers working shifts at multiple hospitals).

- Identify and help secure critical supplies such as personal protective equipment and disinfectants.

Communications

Industrial hygienists should participate closely with all parties in the development of a critical path for communications prior to and during a pandemic event. Robust communication pathways will be critical to keep workers current of evolving procedures and practices, changing production needs, emerging events, and other time-critical or essential information. Depending on the scale of the workplace, particular informational requirements, potential external impacts (e.g., limited phone service, power availability), methods to consider include the implementation of one or more of the following, based on worker accessibility and workplace needs:

- Call-in hotline;
- Up-to-the-minute web splash-page; and
- Dedicated "grapevine".

b. Engineering Controls

The following examples of engineering controls may be used. The industrial hygienist should work closely with the infection and prevention control personnel in terms of application of any of these controls.

- Negative pressure rooms should have established minimum differentials in accordance with accepted practice. Refer to http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e for specific details.
- General ventilation that ensures the flow of non-contaminated to potentially contaminated air throughout the facility.
- Temporary structures adjacent to usual treatment facilities such as air-conditioned and heated tents can be useful areas to triage and screen suspect patients prior to allowing entry into the facility.
- Develop O&M procedures to clean, maintain, and operate HVAC and room ventilation including protection for maintenance staff.

c. Personal Protective Equipment

The industrial hygiene approach to personal protective equipment is based on protection of the worker, and stems from an evaluation of the hazard, primarily the physical form of the hazard, whether it be chemical, biological, or a physical agent. Infection control measures focus primarily on patient safety and aim at reducing the spread of disease. These two approaches can be complementary, resulting in a more comprehensive approach to pandemics. Because of the purpose and history of these two approaches to health protection, infection control measures and industrial hygiene concepts and

approaches can differ. It is essential that industrial hygienists and infection control and prevention specialists work collaboratively to devise the best protective scheme for the particular situation in compliance with OSHA's respiratory protection standard, 1910.134.

The tables shown below show two approaches: Infection Control Measurements and Industrial Hygiene Control Measures. Since approaches to PPE such as respiratory protection and gloves are different, the industrial hygienist should work closely with infection and prevention control specialists to ensure the best approach, based on the specific situation.

Table 2: Infection Control Measures

<i>Scenario</i>	<i>Transmission Mode</i>	<i>Hazard Level</i>	<i>Prescribed Infection Control Measures</i>
Outside the potentially infectious patient's room or containment	None	None Recommended	None Recommended
Entering the potentially infectious patient's room or containment	Airborne, Contact	Low	Surgical mask, vinyl or nitrile gloves, Standard Precautions*
Close contact with potentially infectious patient	Airborne, Contact Droplet Spray	Moderate	N95 respirator, PPE (Splash Protection, vinyl or nitrile gloves, Gowns, Head /Shoe Covers), Standard Precautions*
Patient undergoing endotracheal intubation, suctioning or aerosolized nebulizer treatments	Airborne, Contact Droplet Spray	High	N95 respirator (minimum), PPE (as listed in Contact Section Above), Negative Pressure Isolation Room, and Standard Precautions*

Table 3: Industrial Hygiene Control Measures

<i>Scenario</i>	<i>Minimum Industrial Hygiene PPE Control Measures</i>
Outside the potentially infectious patient's room or containment	None Recommended
Entering the potentially infectious patient's room or containment	N95 respirator, Standard Precautions*
Close contact with potentially infectious patient	N95 respirator, (splash protection, nitrile gloves, surgical gown with long cuffed sleeves), Standard Precautions*
Patient undergoing endotracheal intubation, suctioning or aerosolized nebulizer treatments	N95 respirator, nitrile gloves, protective clothing (preferably disposable outer garments or coveralls), an impermeable apron or surgical gown with long cuffed sleeves, impermeable apron, disposable protective shoe covers or boots that can be disinfected, safety goggles.†
Workers having the potential to come into close contact with potentially infected live or dead animals, or tissues	N95 respirator, nitrile gloves, protective clothing (preferably disposable outer garments or coveralls), an impermeable apron or surgical gown with long cuffed sleeves, impermeable apron, disposable protective shoe covers or boots that can be disinfected, safety goggles

* See Appendix 2 of this guideline for Standard (Universal) Precautions Guidelines described in the OSHA Bloodborne Pathogens Standard. (29 CFR 1910.1030) can be found at www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051.

† Safety goggles should offer splash protection, specifically indirect vented or nonvented goggles.

Tables updated 8/23/2006.

V. Communication/Coordination

a. Coordination with Infection and Prevention Control Specialists

Hospital infection and prevention control teams are typically comprised of medical doctors, microbiologists, nurses and epidemiologists. Their goal is to develop and implement procedures for the evaluation, identification, prevention, and control of infections. They also provide training and oversight to staff, and communicate with government agencies.

Industrial hygiene has evolved into a discrete sophisticated science. Infection and prevention control personnel may be unaware of the capabilities and tools available to them to assist with infection control. Expertise in aerosol science, respiratory protection, protective equipment, chemical safety, ventilation, contamination control, air monitoring, and surface sampling can help infection and prevention control specialists. It can be a challenging task, but it is the industrial hygienists' job to make their expertise and services available to the infection and prevention control team. Their understanding and implementation of industrial hygiene concepts such as ventilation may provide valuable assistance to the infection and prevention control team. It is important for the industrial hygienists to meet regularly with the infection and prevention control specialist at their site, or in their community, in order to communicate with management and employees, and to develop control strategies as information on the agents becomes available.

b. Emergency Responders/Emergency Preparedness Personnel

Industrial hygienists can serve a crucial and essential role in the emergency communications network of organizations that are involved in planning for, or response to, the widespread outbreak of an infectious disease. The industrial hygienist will become a very important source of health, safety and environmental information for municipal, state, or federal governmental agencies, local emergency planning committees, healthcare professionals, public and private emergency response organizations, business leaders and incident commanders (collectively the "emergency planning and

response community"). With their background in anticipation, recognition, evaluation and control, industrial hygienists can provide a wide range of expertise to advise the emergency response community on the means to effectively identify, manage, and ultimately, control health, safety and environmental risks associated with an infectious disease outbreak.

While the industrial hygienist has the requisite skills to effectively communicate risks based upon complex scientific data and field information, it is understood that many may not have direct experience with emergency response and preparedness or experience with a pandemic. However, the skill set of the industrial hygienist would include the ability to ascertain, characterize, and evaluate various hazards in a pandemic. Industrial hygienists have a strong understanding of personal protective equipment, respiratory protection, contamination control, decontamination principles, sampling and analytical methods and other related areas. Whether in emergency planning or during an actual pandemic response, industrial hygienists can provide a vital role in helping the emergency planning and response community deal with issues of risk, exposure and protection, and can help in the challenging communications between various parties such as the incident commander, healthcare providers, private sector response teams, the general public and business leaders.

In the preparedness phase, industrial hygienists can provide valuable information on the types of hazards that might be expected during a pandemic outbreak. Industrial hygienists can advise the emergency planning and response community on hazard control methods, such as ways to substitute or eliminate hazards that may arise from an incident. The industrial hygienist can provide important information about the types of PPE, including assistance with selection, limitations and care and maintenance of equipment. During an event, the IH can assist response personnel with information on the:

- proper donning and doffing of PPE;
- risks of wearing PPE, such as heat stress, lack of visibility or increased accident risks;
- fit testing and fit checking of respiratory protection; and

- proper methods for decontamination and disposal of equipment and clothing.

Industrial hygienists can also help explain, particularly to the healthcare community, the value of using respiratory protection when dealing with airborne infectious diseases.

Industrial hygienists are in a good position to communicate the capabilities and limitations of sampling data and analytical methods. Industrial hygienists understand the potential complexities of various sampling and analytical methods and can help explain non-detect readings, false-positive readings, below detection limits results or cross-reactivity with similarly structured biological agents. In addition, industrial hygienists can explain how sampling results can be affected by temperature, humidity, and moisture presence, and other factors that might exist.

The industrial hygienist can further assist the emergency planning and response community by:

- raising awareness of health and safety issues that will have to be addressed, including explaining how various situations may have an impact on the response worker and community health and safety; communicating procedures, policies, positions and activities to assure the protection of workers and the public;
- assisting with the production of factual informational materials (bulletins, pamphlets, notices, alerts or advisories), as needed, to further understanding of key environmental, health and safety issues; and
- encouraging preparedness and response collaboration among business, government, healthcare professionals, responders, workers and the general public.

The industrial hygienist can serve a critical role in providing on-site safety and health training. The industrial hygienist can communicate incident specific information on hazards and required controls to all impacted workers and response personnel involved. Industrial hygienists are great assets to train current or new response personnel, prior to commencing work, on hazards and ways to control them. This includes conducting "tail-gate" safety briefings to various groups, as needed.

c. Communications Planning

- Assess readiness to meet communications needs in preparation for an influenza pandemic, including regular review, testing, and updating of communications plans.
- Develop a dissemination or communication plan with employees, students, and families, including lead spokespersons and links to other communication networks. Ensure language, culture and reading level appropriateness in communications.
- Anticipate and plan communications to address the potential fear and anxiety of employees, students, and families that may result from rumors or misinformation.
- Develop and test platform (e.g., hotlines, telephone trees, dedicated websites, local radio or television) response and actions to employees, students, and families.
- Assure the provision of redundant communication systems/channels that allow for the expedited transmission and receipt of information.
- Advise employees and students where to find up-to-date reliable pandemic information from federal, state and local public health sources.
- Disseminate information about pandemic preparedness and response plan. This should include the potential impact of a pandemic on housing closures, and contingency plans, e.g., for students who depend on student housing and campus food service, including how student safety for those who remain in student housing will be maintained.
- Disseminate information from public health sources covering routine infection control (e.g., hand hygiene, coughing/sneezing etiquette), pandemic influenza fundamentals (e.g., signs and symptoms of influenza, modes of transmission), personal and family protection and response strategies, and the at-home care of ill students or employees and their family members.

d. Plan for the impact of a pandemic on the organization and its mission

- Identify key staff with the authority to develop, maintain and act upon a pandemic preparedness and response plan. The plan should be written, reviewed as a “table top” exercise, and executed as a drill (where possible and feasible) to familiarize each person with their respective role and improved with lessons learned from a critique of the drill.
- Determine the potential impact of a pandemic on the organization’s usual activities and services. Plan for situations likely to require increasing, decreasing or altering the services the organization delivers.
- Determine the potential impact of a pandemic on outside resources that the organization depends on to deliver its services (e.g., supplies, travel, “waves” of infection, etc.).
- Outline what the organizational structure will be during an emergency and revise periodically. The outline should identify key contacts with multiple back-ups, role and responsibilities, and who is supposed to report to whom.
- Identify and train essential staff (including full-time, part-time and unpaid or volunteer staff) needed to carry on the organization’s work during a pandemic. Include backup plans, cross-train staff in other jobs so that if staff are sick, others are ready to come in to carry on the work.
- Find up-to-date, reliable pandemic information from state and local health departments, emergency management agencies, and the CDC.
- Test response and preparedness plan using an exercise or drill, and review and revise the plan as needed.

e. Plan for the impact of a pandemic on staff

- Plan for extended staff absences (weeks or perhaps months) during a pandemic due to personal and/or family illnesses, quarantines, and school, business, and public transportation closures. Staff may include full-time, part-time and volunteer personnel.

- Work with local health authorities to encourage yearly influenza vaccination for staff, members, and persons in the communities served.
- Evaluate access to mental health and social services during a pandemic for staff members, and persons in the communities served; improve access to these services as needed.
- Identify persons with special needs (e.g. elderly, disabled, limited English speakers) and include their needs in response and preparedness plan. Establish relationships with them in advance to foster trust during a crisis.

f. Set up policies to follow during a pandemic

- Set up policies for non-penalized leave for personal illness or care for sick family members during a pandemic.
- Set up mandatory sick-leave policies for staff suspected to be ill, exposed (case contact), or who become ill at the worksite. Employees should remain at home until their symptoms resolve and they are physically ready to return to duty (Know how to check up-to-date CDC recommendations).
- Set up policies for flexible work hours and working from home.
- Set up policies to prevent the spread of pandemic influenza during the organization’s usual activities and services, including guidance for respiratory hygiene and cough etiquette, and instructions for persons with influenza symptoms to stay home and phone the organization rather than visit in person. Think in advance about how to adapt the activities in ways that protect the community at large, especially those at most risk.
- Follow CDC travel recommendations during an influenza pandemic. Recommendations may include restricting travel to affected domestic and international sites, recalling non-essential staff working in or near an affected site when an outbreak begins, and distributing health information to persons who are returning from affected areas.
- Set procedures for activating the organization’s response plan when an

influenza pandemic is declared by public health authorities and altering the organization's operations accordingly.

g. Allocate resources to protect staff

- Determine the amount of supplies needed to promote respiratory hygiene and cough etiquette (e.g., tissues and receptacles for their disposal, alcohol-based hand sanitizers where soap and water not readily available, etc.) and how they will be obtained.
- Consider focusing the organization's efforts during a pandemic to providing services that are most needed during the emergency (e.g. mental/spiritual health or social services).

h. Communicate with and educate staff members, and persons in the communities served

- Distribute materials with basic information about pandemic influenza: signs and symptoms, how it is spread, ways to protect individuals and their families (e.g., respiratory hygiene and cough etiquette), family preparedness plans, and how to care for ill persons at home.
- When appropriate, include basic information about pandemic influenza in public meetings (e.g. classes, trainings, small group meetings and announcements).
- Develop tools to communicate to staff about pandemic status and the organization's actions. This might include websites, flyers, local newspaper announcements, pre-recorded widely distributed phone messages, etc.
- Consider the organization's unique contribution to addressing rumors, misinformation, fear and anxiety.
- Share information about the pandemic preparedness and response plan with staff members, and persons in the communities served.
- Advise staff members, and persons in the communities you serve to follow information provided by public health authorities—state and local health departments, emergency management agencies, and CDC.

- Ensure that what you communicate is appropriate for the cultures, languages and reading levels of staff members, and persons in the communities served.

i. Coordinate with external organizations and help community

- Understand the roles of federal, state, and local public health agencies and emergency responders and what to expect and what not to expect from each in the event of a pandemic.
- Work with local and/or state public health agencies, emergency responders, local healthcare facilities and insurers to understand their plans and what they can provide. Share preparedness and response plan details and what the organization is able to contribute, and take part in their planning. Appoint a point of contact to maximize communication between your organization and state and local public health systems.
- Coordinate with emergency responders and local healthcare facilities to improve availability of medical advice and timely/urgent healthcare services for staff members, and persons in the communities served.
- Share lessons learned from developing your preparedness and response plan with other companies to improve community response efforts.
- Work together with community organizations in the local area and through networks (e.g. denominations, associations, etc) to help communities prepare for pandemic.

j. Communication/Coordination with Workforce (includes Business Continuity Plan)

It is likely that the industrial hygienist may take a lead role in planning and implementing the communication and continuity plan for your workplace. While the planning may be similar to other emergency and disaster planning, there are key differences in the effect of a pandemic. Some of these differences include:

Widespread Impact: Because the impact of a pandemic may be nation-wide, there may be little outside assistance available to your business.

Duration and Notice: A pandemic would not be a short, limited event like a physical disaster that would lead immediately to a recovery phase. Also, it is likely that there will be advance warning, although this could be very short.

Primary Effect on Staffing: Unlike natural disasters, where business disruption is largely hardware related, the disruption to business services during a pandemic is anticipated to be human resource related. Businesses should plan for 50% staff absences for at least two weeks at the height of a severe pandemic and lower levels of staff absence for a few weeks on either side. Staff absences can be expected for many reasons: illness, caring for ill family members, schools may be closed, or simply because people may feel safer at home.

Business Continuity Teams

Keep in mind that while industrial hygienists and medical staff are essential to many elements of a business continuity and communication plan, additional resources will be necessary to maintain a business in a time of high anxiety and absences. A planning team may include:

- Pandemic Flu Manager
- Medical Advisor
- Human Resources Professional
- Communications Manager
- Business Manager for each "essential operation"
- Information Management Manager
- Internal and External Procurement Managers

Continuity Planning for a pandemic should include:

- Identification of essential business activities (and core people and skills to keep them running).
- Mitigation of business/economic disruptions, including possible shortages of supplies.
- Minimizing illness in workers and customers.

Communication Plans

Communicate frequently with your workforce. You may want to begin your communications right away to let them know that planning is underway. Avoid being alarmist

in communications and give people tools they can use to protect themselves and their families. It may be helpful to train people now in ways they can prevent to spread of seasonal colds and flu so that they can develop good habits.

Additional Resources for Business

To assist in tailoring a plan to your business, a Business Pandemic Influenza Planning Checklist is available from the U.S. Centers for Disease Control and Prevention at <http://www.cdc.gov/flu/pandemic/business.htm>

In addition, the government of New Zealand has prepared extensive planning guidelines for business, available at: http://www.med.govt.nz/irdev/econ_dev/pandemic-planning/

VI. Communication/Coordination with the Public

Industrial hygienists can also play an important role in communications with the general public. Industrial hygienists can assist public information officers and their staff in the transmission of vital information to employees and their families, neighbors, public officials and business leaders. It is essential that there is accurate and timely dissemination of health and safety information to members of the public or the news media during an emergency. The IH can also assist in the control of the spread of rumors that may develop during an outbreak. In a response situation, industrial hygienists can provide necessary information to help public information officers communicate the exposure risks to the community or to the media. This risk communication is extremely vital in order to prevent unnecessary concern from the surrounding community, but also, to effectively address the community's concerns.

VII. Resources

- **The American Industrial Hygiene Association (AIHA):** www.aiha.org
- **The American Biological Safety Association (ABSA):** www.absa.org
- **American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc. (ASHRAE):**
<http://membership.ashrae.org/template/AssetDetail?assetid=48387>

- **Association for Professionals in Infection Control and Epidemiology (APIC):**
<http://www.apic.org/AM/Template.cfm?Section=Home>
- **The Center for Disease Control and Prevention (CDC):**
<http://www.cdc.gov/flu/avian/index.htm>
- **The Center for Disease Control and Prevention (CDC),** *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005:*
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e
- **Environmental Protection Agency:**
<http://www.epa.gov/oppad001/chemregindex.htm>
- **Infectious Diseases Society of America (IDSA):**
http://www.idsociety.org/Content/NavigationMenu/Resources/Avian_Pandemic_Flu/Avian_Pandemic_Flu.htm
- **Health and Human Services (HHS),** *Pandemic Influenza Plan:*
<http://www.hhs.gov/pandemicflu/plan/pdf/HHSPandemicInfluenzaPlan.pdf>
- **The National Institutes of Health, Biosafety in Biomedical and Microbiological Laboratories:**
<http://bmlb.od.nih.gov/risk.htm>
- **The National Institutes of Health, Guidelines for Research Involving Recombinant DNA Molecules:**
http://www4.od.nih.gov/oba/rac/guidelines_02/APPENDIX_B.htm
- **New Zealand Ministry of Economic Development:**
http://www.med.govt.nz/irdev/econ_dev/pandemic-planning/
- **OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030):**
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
- **World Health Organization (WHO):**
http://www.who.int/csr/disease/avian_influenza/en/

VIII. General References

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APPENDIX 1

Industrial Hygiene Planning Checklist

Complete	In Progress	Not Started	
HAZARDS			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Assess risk of exposure to biological agents.
RECOMMENDED CONTROLS			
Education and Training			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maintain close involvement in training, recommended safe work practices, and proper PPE use.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Establish policy on PPE use.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Limit use of shared equipment, establish disinfection guidelines.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Provide on-going worker-training and education.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lead by example; encourage continued worker compliance
Workplace Access and Security			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Careful control of access to the workplace using "fit-for-work" screening tool.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prepare policy for tool failure criteria.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prepare policy for refusal of access to unfit workers and return-to-work.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Implement social distancing practices.
Labor Relations			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Anticipate an increase in worker grievances and union involvement.
Communications			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Participate in development of critical path for emergency communications.
Engineering			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Apply engineering controls.
COMMUNICATIONS COORDINATION			
Communications Planning			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Develop dissemination/communication plan with staff.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Develop and test platforms.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Disseminate information on your pandemic preparedness and response plan.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Disseminate information from public health sources.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Anticipate and plan communications to address potential fear and anxiety.
Plan for Pandemic Impact on Your Organization			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Identify key staff with authority to help.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Determine impact of a pandemic on your organization and its mission.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Determine impact on pandemic on outside vendors.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outline organization structure in the event of an emergency.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Train essential staff needed to continue business during a pandemic.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Find up-to-date pandemic information from state and local health departments.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test your response and preparedness plan using an exercise drill.

Complete	In Progress	Not Started	
Plan for Impact of a Pandemic on your Staff			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Plan for absences.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Encourage yearly influenza vaccinations.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Evaluate access to mental health and social services during a pandemic.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Identify people with special needs. Be sure to include them your preparedness plan.
Pandemic Policies			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Set-up policies for non-penalized leave.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Set-up mandatory sick leave policies for staff suspected to be ill.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Set-up policies for flexible work hours and work from home.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Set-up policies to prevent spread of pandemic influenza during your organization's usual activities.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Make CDC travel recommendations public.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Set-up procedures to activate your organization's response plan.
Allocate Resources to Protect Staff			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Determine supplies needed to promote respiratory hygiene and cough etiquette.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Focus organization's efforts to providing services that are most needed.
Communication			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Distribute information about pandemic influenza. When appropriate include in public meetings.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Develop tools to communicate with staff about pandemic status.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Consider your organization's unique contribution to addressing rumors, misinformation, fear, and anxiety.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Share information about your pandemic preparedness and response plan with staff.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Advise staff to follow information provided by public health authorities.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ensure what you communicate is appropriate for cultures, languages, and reading levels.
Coordinate with External Organizations			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Understand roles of federal, state, and local health agencies.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Appoint a point of contact to maximize communication between your organization and your state and local health systems.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ensure availability of medical advice and timely/urgent healthcare services.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Share what you've learned with other companies.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Work together with Community Organizations to help communities prepare for pandemic influenza.
Coordinate with Infection and Prevention Control Specialists			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Make your expertise and services available to the infection and prevention control team.
Emergency Responders/Emergency Preparedness Personnel			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Advise emergency response community on means to effectively identify, manage, and control health, safety and environmental risks.
Communication/Coordination with Workforce			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Plan for 50% staff absences for at least two weeks, and lower levels of staff absences for a few weeks on either side.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Begin communications plan right away.
COMMUNICATION/COORDINATION WITH PUBLIC			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Assist public information officers and their staff in the transmission of vital information.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Assist in the control and spread of rumors.

Appendix 2: Standard Precautions

According to the Centers for Disease Control, standard precautions apply to 1) blood; 2) all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood; 3) non-intact skin; and 4) mucous membranes.

Standard Precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

HANDWASHING

- Wash hands after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
- Wash hands immediately after gloves are removed, between patient contacts, and when otherwise indicated to avoid transfer of microorganisms to other patients or environments.
- It may be necessary to wash hands between tasks and procedures on the same patient to prevent cross-contamination of different body sites.
- Use a plain (nonantimicrobial) soap for routine handwashing.
- Use an antimicrobial agent or a waterless antiseptic agent for specific circumstances (e.g., control of outbreaks or hyperendemic infections), as defined by the infection control program.

GLOVES

- Wear gloves (clean, nonsterile gloves are adequate) when touching blood, body fluids, secretions, excretions, and contaminated items.
- Put on clean gloves just before touching mucous membranes and nonintact skin.
- Change gloves between tasks and procedures on the same patient after contact with material that may contain a high concentration of microorganisms.
- Remove gloves promptly after use, before touching noncontaminated items and environmental surfaces, and before going to another patient, and wash hands immediately to avoid transfer of microorganisms to other patients or environments.

MASK, EYE PROTECTION, FACE SHIELD

- Wear a mask and eye protection or a face shield to protect mucous membranes of the eyes, nose, and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

GOWN

- Wear a gown (a clean, nonsterile gown is adequate) to protect skin and to prevent soiling of clothing during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.
- Select a gown that is appropriate for the activity and amount of fluid likely to be encountered.
- Remove a soiled gown as promptly as possible, and wash hands to avoid transfer of microorganisms to other patients or environments.

http://www.cdc.gov/ncidod/dhqp/gl_isolation_standard.html

Appendix 3

Pandemic Planning Template

Pandemic Planning

Purpose

Roles and Responsibilities

Hazards

Recommended Controls

Administrative/Work Practices

Education & Training

Workplace Access & Security

Cleaning, Disinfection and Sterilization

Labor Relations

Communications

Engineering

Personal Protective Equipment

Communication/Coordination

Coordinate with Infection & Prevention Control Specialists

Emergency Responders/Emergency Preparedness Personnel

Communications Planning

Plan for the Impact to your Organization

Plan for the Impact to your staff

Set Up Policies

Allocate Resources to protect Staff

Communication with and Educate

Coordinate with External Organizations

Coordinate with Infection & Prevention Control Specialists

Communication/Coordination with Workforce

Communication/Coordination with Public

Resources

Additional Information

NOTES

NOTES

The Role of the Industrial Hygienist in a Pandemic

By the AIHA Biosafety and Environmental Microbiology Committee

Industrial hygienists are provided resources, information, and tools to advise and assist general workers, health care workers, and management to protect workers in the case of a flu pandemic. This guide identifies hazards, risk groups and recommended controls; offers a communication plan; describes the impact of a flu pandemic on organizations, and lists key resources to contact for further information.

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