



Personal Protective Equipment (PPE) and Practices and Influenza Pandemic preparedness.

Introduction

This advice has been prepared by the Department of Labour in consultation with a number of medical, scientific and health and safety experts. It represents the Department's best information about the likely impact of an influenza pandemic on workers and workplaces and provides a wider reference source for those seeking to understand the rationale behind some of the key protection methods.

It provides general information and a risk management framework to other more specific information on this website, particularly:

- Ways to stop the spread of flu at work
- Risk Management Tool, and
- Should I use masks/respirators at work.

The advice will be updated as appropriate through the Department's web site www.dol.govt.nz and readers should consult this periodically or register to receive automatic alerts.

Summary

The requirement for PPE needs to be determined through a hazard management approach and to be clearly set in the wider context of the hierarchy of controls – *eliminate, isolate, minimise* – as set out in the Health and Safety in Employment Act.

To be effective PPE has to be carefully selected and properly used, which implies that training must be given as specified in the relevant standard. PPE is only a partial solution to pandemic preparedness and its limitations in terms of performance and useability should be clearly recognised.

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Glossary

Mask

Something worn over the nose and mouth and perhaps the whole face.

Surgical mask

A mask is worn to prevent the wearer coughing or sneezing infectious droplets onto others. Some surgical masks are additionally designed to protect the wearer from (a) droplets and (b) particulate matter in the air, and some are certified to P2 standard in this regard

Respirator

A device to protect the wearer from inhalation of harmful contaminants, classified by the amount of face coverage it provides and its method of protection, eg a half-face, negative-pressure, air-purifying respirator; or a full-face, pressure demand, supplied air respirator.

Viral status

Infectivity: Ability to infect a host – i.e. it only needs a few organisms to penetrate the host's defence systems.

Transmissibility: Ability to spread from one host to another – if two people are close there is a high likelihood of infection

Virulence: Ability to replicate in the new host and cause it to shed viruses

Pathogenicity: Ability to cause disease in the host

	SARS	Avian influenza	Common cold	Influenza
Infectivity	High	(Subject to change)	High	High
Transmissibility	Medium	Low – Medium	V High	V High
Virulence	Medium - V High	Low	Medium	Variable
Pathogenicity	V High	High	Low	Variable



1 Occupational groups and settings to be considered

1 Workers managing situations where domestic bird flocks are infected by Avian Influenza:

1. Veterinarians
2. Bird Cullers
3. Disposers of dead birds
4. Shed disinfectors

The Department of Labour has been working with MAF over these issues and developed a draft Health Information bulletin on the matter early in 2005.

2 Workers responding in an Influenza Pandemic

These include workers in many different settings. Some of particular note are:

First responders

– Police, Fire and Ambulance

Health care workers

– with a range of levels of risk

Employees in essential services – Electricity, Transport, Telecoms,
Water supply and sewage etc. –
Transport, Retail food

- Mortuary workers, Coroners,
Defence Force personnel



2 The structure of advice about PPE and its place in the wider picture – the need to consider the HSE Act framework

The use of Personal Protective Equipment is at the bottom of the hierarchy of protections specified in the Health and Safety in Employment Act. There are three levels of protection. They are:

- 1 Eliminate (s8 of HSE Act)
- 2 Isolate (s9)
- 3 Minimise (s10)
 - 3a Engineering controls
 - 3b Work practices and administrative controls
 - 3c Personal protective equipment
 - 3c.1 Environmental Monitoring (s10(2)d)
 - 3c.2 Personal Health Monitoring (s10(2)e)

The HSE Act requires Employers to consider these three options in order of priority. In this scenario options for elimination are limited; the problem is 'isolated' in the sense that certain occupational groups will inevitably be more exposed than others and, therefore, option 3 'minimisation' is also required.

Appendix B spells out some options for elimination and isolation, and this approach is elaborated in the companion document 'Influenza Pandemic Planning – Analysis Tools'.

'Minimisation' has three levels of steps listed to reduce (but not eliminate) exposure. We have proposed a methodology below (Table 2) so that workplace participants can see the place of PPE in the overall prevention picture.

Concern exists about the third level of minimisation because the experience of many commentators is that PPE is generally expensive, is the least effective option and that good compliance is difficult or very difficult to achieve. The protection factors offered by respiratory protective equipment are often less than assumed, and may be much less if PPE users are not trained, if respirators are not fitted to individual's faces properly and their use is not monitored properly.

Providing personal protective equipment (PPE) is a very visible and tangible step – whilst other steps to eliminate and isolate exposures, perhaps through changes in work organisation or procedures may be more difficult to discern. There is often a tendency to feel that once PPE has been provided no further control measures are required. Such notions can lead to dangerous complacency.

One way of extending the overall picture would be to estimate risks faced in different occupational settings and specify prevention measures based on the level of risk, as set out in Section 4 below.



Providing PPE is also more complex than just issuing equipment, particularly for Respiratory Protective Equipment (RPE). In New Zealand and Australia, the recommendations of AS/NZS 1715 and 1716 should be followed as a minimum¹.

This will require at least a management system for PPE including:

- recording
- a maintenance system
- training and education
- selection of respirators
- respirator fit testing

and other requirements.

3 Detailed consideration of PPE specifications

Routes of transmission

The possible methods of transmission of influenza are:

Aerosols	Industrial experience is that where droplets are forcibly expelled there will be aerosolisation (and see below). The particle size, physical nature and other characteristics are important in the selection of the correct respiratory equipment provided. The physiological requirements related to respiratory equipment are important ² as are the limitations of respiratory protective equipment ³ including 'wear time', face seal and other critical issues.
Droplets	It is assumed to be the most important route ie from sneezing or coughing.
Contact	There is clear evidence that this is an important route of transmission, for example from hand to mouth.

Information about droplet sizes in relation to pandemic influenza does not appear to be well developed.

¹ The most up-to-date documents are AS/NZS 1715:2005 (Selection, Use and Maintenance of Respiratory Protective Devices-In final stages of review) and AS/NZS 1716:2003 (Respiratory protective devices).

² A great deal of work is being carried out by the working bodies of the ISO (International Standards Organisation) on this. Particularly important are the breathing volumes and rates required for different types of RPE.

³ American Thoracic Society. (1996). American Protection Guidelines. Am. J. Crit. Care Med. Vol. 154. Pp 1153-1165.



Personal Protective Equipment (PPE) other than Respiratory Protective Equipment (RPE)

There is no argument that PPE will be required for workers exposed to the virus. This PPE will include splash protection, especially for the eyes, and protection from the inhalation of infected droplets or aerosols.

Splash protection can be obtained by the use of disposable overalls (reducing the chance of on-contamination during cleaning), face shields or goggles and respiratory protection.

Effectiveness of respirators (disposable masks)

There is uncertainty about the size ranges of the particles comprising infectious bio-aerosols, the number of particles that a person may be exposed to if not wearing a mask and the number of particles that must breach the host's defences to initiate disease.

However, pure water droplets of diameters 100 and 50 microns falling in air with a relative humidity of 50% have been measured to evaporate completely in 1.3 and 0.3 seconds respectively⁴.

Respiratory droplets containing dissolved and suspended substances would not evaporate completely and would do so less quickly.

However, it can be assumed that small water droplets containing respiratory secretions will desiccate rapidly and result in extremely fine particles in the size range of 0.5 to 12 microns. These are referred to as droplet nuclei and would waft on air currents rather than settle under the influence of gravity. The desiccation proceeds more rapidly as the droplet gets smaller.

Filtration of particles by typical filter media proceeds by five mechanisms:

- inertial impaction
- interception
- diffusion caused by Brownian motion (the peculiar, rapid, vibratory movement exhibited by the microscopic particles of substances when suspended in water or other fluids)
- gravitational settling and
- electrostatic attraction.

As the size of the particles to be filtered changes, the relative contributions of these methods varies. As a consequence of the differing effectiveness of the 5

4 Aerobiology of infectious agents. Eugene C Cole. Proceedings of a Workshop (convened by Centre for Disease Control) on Respiratory Protection for Airborne Infectious Agents. Atlanta, Georgia. December, 2004.



methods in relation to different particle sizes, there is a particle size at which filtration rates are lowest, and this is estimated to be 0.3 microns⁵.

This means that:

- P2 (N95) mask specifications allow the penetration of 5% of 0.3 micron particles at flowrates of 90 litres per minute. This result applies only with a 'perfect' face seal during laboratory testing. In real life use these masks are worn by people who will be breathing at rates up to 400 litres per minute (i.e: a flowrate up to 4 - 5 times greater than in the laboratory test) and with an imperfect face seal.
- In AS/NZS 1715 and 1716, the protection factor for P2 masks is defined as:

(concentration outside the mask) / (concentration inside the mask)

- The protection factor, under AS/NZS is rated at 10 for P2 or P3 half-face respirators. However, there is controversy about this, with some countries reducing the protection factor for disposable respirators to 5 (e.g., the American National Standards Institute). 5% leakage will occur through the respirator, but more significantly, the leakage around the respirator sides may be many times this figure, particularly if fit testing or training and education is not carried out properly. Significant exposure is therefore possible.
- The consequence in terms of an increased likelihood of developing disease because of these limitations has not been measured or estimated quantitatively⁶.
- These observations mean, to us, that:
 - A P2 mask will leak bio-aerosols - to an unknown extent.
 - A 'surgical mask⁹' will allow a greater proportion of small sized particles to travel on air currents through the gaps between the wearer's face and the mask - and thus will lead to a risk of infectious exposure, greater only when there is a risk of aerosolisation.
 - Not using any mask will lead to uncontrolled exposure

Therefore, a prudent risk management approach indicates that workers in close contact with infected people, and where aerosolisation may occur, should use P2/N95 masks in preference to surgical masks.

Surgical masks do have value in health care settings to reduce droplet (but not aerosol) transmission from symptomatic patients (where the patient wears the

5 Aerobiology of infectious agents. Eugene C Cole. (See full citation above.)

6 Protecting the faces of health workers. Yassi A and Bryce E. The Change Foundation and The Ontario Hospital Association. 2004. Occupational Health and Safety Agency for Healthcare in British Columbia. 2004



surgical mask and the worker wears a P2 mask) or in exceptional cases for essential workers who cannot wear a P2 mask (for example due to COPD, asthma or similar respiratory conditions).

Overseas Reactions

As a result of arguments like these the American Federation of Labour and Congress of Industrial Organisations (AFL – CIO) wrote to the Director of the Centres for Disease Control (CDC) asking that *Interim Guidance for Health Care workers Caring for Patients Potentially Exposed to Aerosolised Yersinia Pestis from a Bioterrorism Event*, which advised that a surgical mask was sufficient protection for the healthcare workers exposed to plague patients, be withdrawn⁷.

Evidence that the document was withdrawn appears at a website dated April 14, 2005⁸ and on another website referring to that date⁹.

More recently, the American Pandemic Flu Plan published by the Department of Health and Human Services, which advised the use of surgical masks by health care workers, attracted similar criticism from the AFL – CIO. On December 21, 2005, the AFL-CIO petitioned OSAG (at the U.S Department of Labour) to develop an emergency standard for pandemic Influenza preparedness, citing surgical masks as 'Not being certified by NIOSH as respiratory protection'¹⁰ or as consistent with advice about protection against Avian influenza issued by the CDC.

Monitoring and evaluation

Disposable respirators are only effective if a tight face seal can be obtained. This requires individual face-fitting tests and may involve the provision of a selection of masks in order to accommodate different face shapes and sizes as well as monitoring of their use.

An effective respiratory protection programme is complex, time consuming, and expensive. It is built upon the foundations of:

- Correct choice of type of protection
- Comprehensive fit testing programme
- Proper fitting and use in the event
- Safe removal and disposal

Continuous maintenance of protection is therefore difficult.

Other Respiratory protective Equipment

⁷ Letter from Peg Seminario, Director, Department of Occupational Safety and Health, AFL-CIO to Julie Louise Geberding, Director, CDC. Letter dated 11 April 2005. See: - http://www.seiu.org/docUploads/4_05__CDC_Plague_Guidance_Letter.pdf

⁸ See: <http://ehscenter.bna.com/pic2/ehs.nsf/id/BNAP-6BFG2K?OpenDocument&PrintVersion=Yes>

⁹ See: <http://www.unit47.org/News/041905.html>

¹⁰ See: <http://www.afscme.org/press/pr060103.pdf>



Several levels of Respiratory Protective Equipment offering greater levels of protection exist:

High risk	<p>SCBA – (Self contained breathing apparatus). The familiar apparatus used by firefighters.</p> <p>FPBR – Fan supplied positive pressure breath responsive Respirator. For example: the SE-400 type.</p>
Medium risk	PAPR. (Powered air purifying respirator). Suitable for low rates of physical work only. This type of equipment has significant limitations in terms of flow rates - generally about 120 litres of air per minute. People with high rates of work may use 400 litres of air per minute.

The practical limitations in terms of comfort, maintenance, reduced visibility and communication etc. mean that such equipment is unlikely to be appropriate for pandemic influenza, except in well defined circumstances where there is potential for high exposure for short periods.

Levels of protection reported in the literature.

Another way of expressing these conclusions is to say that different types of respiratory protection equipment give different levels of protection.

It is also clear that nobody can be quite sure what (numerical) level of protection be can be attached to each type of equipment.

One study that was conducted to answer this question in a particular setting concluded, in part, that¹¹: the use of respiratory protection equipment reduced risks by the following proportions:

Surgical mask:	2.4 fold
Disposable dust, mist, fume or disposable high efficiency particular air filtering mask (HEPA):	17.5 fold
Elastomeric HEPA cartridge respirator	45.5 fold
Powered air purifying respirator (PAPR).	238 fold

This single study should be interpreted as providing indicative relative levels of personal protection only. It cannot be taken as providing accurate numerical information about the different levels of protection available from the different Respiratory Protective Devices. However, it appears to support the ideas that P2 respirators provide a significantly greater level of protection than surgical masks.

4 Estimation of Risk

¹¹ Barnhart S, Sheppard L et. a.: Tuberculosis in health care settings and the estimated benefits of engineering controls and respiratory protection. JOEM. Vol. 39. No. 9 September 1997.



Different workers in different settings and different workplace circumstances are exposed to different risks. These will include:

Virus status

Infectivity, transmissibility, virulence and pathogenicity (See Glossary)

Tasks

The inherent risks of a person's task – the degree of exposure to infected droplets and aerosols (concentration x time)

Contact with other people

The wearer's rate of work (and breathing rate)

Familiarity of the wearer with infection control principles

Training to avoid hand – face contacts (e.g. microbiologists)

Possibilities for isolation

Opportunities for hand washing and drying

Work management controls

Environmental controls

Administrative controls

Training and supervision of employees

Familiarity with principles of infection control

Monitoring of employees (exposure and health)

Training in a PPE Programme

Clear advice and information given

Extent to which generic advice is adapted to the particular workplace

Fitting (selection of a respirator that fits the face)

Fit testing (practise using it so ensure a good fit)

Use is practised beforehand

Compliance is monitored

One way of evaluating the risks faced by different groups of workers is shown in Table 1.



- This table presents the main elements of a workplace risk assessment
- The management controls listed in each 'Risk Factor Status' column provide an indicative risk figure (10-7-4-1) at the top of each column
- It will not automatically apply in every workplace
- Other factors will apply in some workplaces
- It should be regarded as something that employers can adapt and modify to suit their own circumstances
- The significance of the overall score needs to be established in house – and used not as a pass/fail but as a way of determining opportunities for improvement and comparison of before and after situations.
- Opportunities for improvement and comparison of before and after situations.



Table 1

Influenza Pandemic PPE Preparedness - Risk Categorisation matrix according to viral status, tasks and organisational preparedness.

RISK FACTOR	Risk Factor Status			
	10	7	4	1
1 Virus status	Highly infective and highly transmissible	Highly infective but low transmissibility	Low infectivity but highly transmissible	Low infectivity and low transmissibility
2 Work Tasks	<ul style="list-style-type: none"> Involves procedures with close exposure to potentially infected droplets 	<ul style="list-style-type: none"> Some potential exposure to infected droplets Exposure to aerosols 	<ul style="list-style-type: none"> Work can be organised to prevent exposure to droplets (> 1 metre) Potential exposure to aerosols 	<ul style="list-style-type: none"> No obvious exposure to droplets or aerosols (community risk)
3 Work Management Controls	<ul style="list-style-type: none"> Uncontrolled environment, No monitoring 	<ul style="list-style-type: none"> Management controls rely on PPE without adequate training programme for its use No supervision No monitoring 	<ul style="list-style-type: none"> Management controls a mixture of distance (designed environment) and adequate PPE programme. Monitoring of staff exists but patchy 	<ul style="list-style-type: none"> Adequate management controls with ventilation, work practice and PPE programme Adequate monitoring of staff
4 Training in the protection programme – including use of PPE	<ul style="list-style-type: none"> No effective training apart from MOH information at www.moh.govt.nz/influenza 	<ul style="list-style-type: none"> MOH information plus pre-epidemic “walk through” 	<ul style="list-style-type: none"> MOH information adapted to employment circumstances and previous staff exercises 	<ul style="list-style-type: none"> Information disseminated in advance Practice use of procedures and Monitoring of staff compliance

Table 2 presents a way in which the protection programme can be specified according to the level of risk faced.

- It is clear that table 2 carries the elements of how to specify the level of protection required.
- It will not automatically apply in every workplace.
- It should be regarded as something that employers can adapt and modify to suit their own circumstances.

Table 2. Influenza Pandemic Prevention Programme Specification – Draft Schema.

Category	Definition	Protection Strategies			Monitoring
		Engineering Controls	Work practice and administrative controls	Recommended PPE	
HIGH Risk of transmission to staff	<ul style="list-style-type: none"> At risk procedures where exposure to aerosolized secretions a very high possibility (bronchoscopy) and infection risk great Exposure to PROBABLE cases <p>E.g.</p> <ul style="list-style-type: none"> Paramedics A & E staff Primary clinicians Resuscitation staff Respiratory specialists 	<ul style="list-style-type: none"> Negative Pressure rooms with adequate air changes and external venting Minimum acceptable air changes 6-8, preferably 12/minute <p>OR</p> <ul style="list-style-type: none"> Clean air delivered by HEPA filter units Fresh air circulating through open windows Interlock entrances with change rooms 	<ul style="list-style-type: none"> Designated infection/influenza manager/representative Appropriate procedures manual Adequate infection control procedures (hand washing/alcohol skin wipes etc) Training in procedures and PPE Quarantine patients until diagnosed Restriction of staff rotation Preferential choice of staff who have recovered from infection IMMUNISE if becomes available Initial and isolated cases: consideration of prophylactic use of antiviral treatment for staff: object is to try and contain outbreak(s) Notification to MOH (confirmed cases) 	<ul style="list-style-type: none"> Disposable fluid impervious suits Gloves Eye splash protection <p>If Adequate Ventilation</p> <ul style="list-style-type: none"> N95 or P2 mask, preferably ½ face & part of PPE programme <p>If Ventilation Is Inadequate</p> <ul style="list-style-type: none"> Positive pressure respirator such as an FPBR N95 or P2 and a surgical mask for patient use Avoid mask with vent valve for patient use (WOULD NOT USE ON A PATIENT) 	<ul style="list-style-type: none"> Designated infection/influenza officer/reporting system Temperature plus clinical symptoms. Advice set as to when to consult doctors. Consideration of fitness to work based on Doctor's certification. If no doctor available one person makes decisions according to a pre-agreed protocol

Table 2. Influenza Pandemic Prevention Programme Specification – Draft Schema.

Category	Definition	Protection Strategies			Monitoring
		Engineering Controls	Work practice and administrative controls	Recommended PPE	
MEDIUM to High Risk of transmission to staff	<ul style="list-style-type: none"> DEFINITE exposure to POSSIBLE cases - in contact with potentially infected people, <p>OR</p> <ul style="list-style-type: none"> Exposure is POSSIBLE to DEFINITE cases - direct close clinical contact is possible with infected people but not undertaking procedures which expose them to high risk, as in the cell above e.g. COULD Include, depending on the circumstances <ul style="list-style-type: none"> GPs and clinical practice staff police arresting offenders fire services attending a MVA ambulance ditto pharmacy staff 	<ul style="list-style-type: none"> Isolate (where possible) contact to specific areas equipped with Clean air delivered by HEPA filter units or other forms of adequate ventilation Screening to avoid droplet contamination where appropriate 	<ul style="list-style-type: none"> Designated infection/influenza manager/representative Training in procedures and PPE Quarantine patients until diagnosis excluded Appropriate procedures manual Adequate infection control procedures (hand washing/alcohol skin wipes etc) Restriction of staff rotation Preferential choice of staff who have recovered from infection IMMUNISE if becomes available Notification to MOH (Confirmed cases) 	<p>Decision about the use of:</p> <ul style="list-style-type: none"> Disposable suits or aprons Gloves Eye splash protection N95 or P2 respirator <p>Will need to be made on a case by case basis, taking into account the circumstances and length of possible exposure.</p> <p>– SEE NOTE</p>	<ul style="list-style-type: none"> Designated infection/influenza officer/reporting system Temperature plus clinical symptoms. Advice set as to when to consult doctors. Consideration of fitness to work based on Doctor's certification. If no doctor available one person makes decisions according to a pre-agreed protocol

Category	Definition	Protection Strategies			Monitoring
		Engineering Controls	Work practice and administrative controls	Recommended PPE	
Medium Risk	<ul style="list-style-type: none"> In contact with potentially infected people but not undertaking procedures which expose them to (potentially) infected droplets (e.g. GP and specialist reception and non-clinical staff, police in non physical contact jobs, non-health related pharmacy staff) 	<ul style="list-style-type: none"> Isolate (where possible) contact to specific areas equipped with Clean air delivered by HEPA filter units or other forms of adequate ventilation Screening to avoid droplet contamination Phone call triage of potentially infected persons before presentation 	<ul style="list-style-type: none"> Training in procedures and PPE Quarantine patients until diagnosis excluded Appropriate procedures manual Adequate infection control procedures (hand washing/alcohol skin wipes etc) Restriction of staff rotation Preferential choice of staff who have recovered from infection IMMUNISE if becomes available Initial and isolated cases: consideration of prophylactic use of antiviral treatment for staff: object is to try and contain outbreak(s) 	<p>Decision about the use of:</p> <ul style="list-style-type: none"> Disposable suits or aprons Gloves Eye splash protection N95 or P2 respirator <p>Will need to be made on a case by case basis, taking into account the circumstances and length of possible exposure.</p> <p>– SEE NOTE</p>	<ul style="list-style-type: none"> Temperature plus clinical symptoms. Advice set as to when to consult doctors. Consideration of fitness to work based on Doctor's certification. If no doctor available one person makes decisions according to a pre-agreed protocol
LOW Risk of transmission to staff	<ul style="list-style-type: none"> Not exposed (more than chosen community experience) but involved in essential public services 				<ul style="list-style-type: none"> Temperature plus clinical symptoms. Advice set as to when to consult doctors.

*** Note:** In some instances the level of exposure and risk will be unclear or unpredictable. In these situations a choice in the face of uncertainty will be required. Ways of informing such a choice are (a) to under-specify a level of protection (in the hope that the risks in the event will remain small); (b) to overspecify a level of protection (which runs a different risk - in this case, of inability to comply); (c) to reach an agreement – which will only be valid if there is good faith discussion (between parties with unequal power). Whichever instance is the basis for a decision, promptness and completeness of ongoing feedback, monitoring of the situation by management and review of how a situation is developing will be needed to inform about what is not working and the need to alter practices.



5 Information, Training and Supervision in relation to PPE protection against an Influenza Pandemic.

Compliance with best practice regarding PPE usage is vital and employees will need to be given information and training in its use and be properly supervised and monitored.

The importance and potential effectiveness of training for PPE use is generally underestimated. Full details are spelled out in AS/NZS 1715 and 1716. These standards should be the basis of a complete training programme.

The use of PPE, apart from respiratory protection, such as overalls and eye protection, is relatively straightforward. However their use without prior education and training still places the wearer at risk of harm.

The safe use of respiratory protective devices requires a certain amount of dexterity and opportunity for practice. This means employees must be given the opportunity to try using PPE **beforehand** to discover what the best fit feels like, donning, fit checking and removal methods. Including education to ensure a level of understanding in their safe use.

It will be no good to hand out masks in the event of a pandemic and expect people to work out how to use them in a pressure situation.

This is important, given that the compliance with RPE usage was credited with preventing further infection of HCW nursing SARS patients in Toronto¹².

¹² Protecting the faces of health workers. Yassi A and Bryce E. The Change Foundation and The Ontario Hospital Association. 2004. Occupational Health and Safety Agency for Healthcare in British Columbia. 2004



Appendix A – Examples of Elimination and Isolation:

- Payments made at service stations through night windows.
- “Sneeze-guards” are already employed in the hospitality industry where open trays of cooked food or salads are displayed
- Similar shields may be an option for customer service or retail check-out personnel.
- Increased physical separation of staff may be obtained by rostering people to work on two or three shifts instead of one shift and occupying alternate workstations.
- telephones on front counters (visible through a transparent divider) replace receptionists
- People work from home, increased use of internet and phone
- Delivery of maintenance services out of usual hours, with minimal staff/customers present.



Appendix B – Provisions of the HSE Act

In addition to the requirements under the Civil Defence Emergency Management Act 2002, planning should include obligations under the Health and Safety in Employment Act 1992.

Employers must take all practicable steps to mitigate the risk and protect employees, especially those at high risk from pandemic influenza. Employers need to actively plan to cover their risks and the risks to their workers and the public.

The most relevant sections of the Health and Safety in Employment Act 1992 are:

Section 6: “All practicable steps”

Every employer shall take all practicable steps to ensure the safety of employees while at work; and in particular shall take all practicable steps to:

- provide and maintain for employees a safe working environment
- provide and maintain for employees while they are at work facilities for their safety and health...”

Sections 7-10 describe a hierarchy of action for the management of hazards

Where a significant hazard, including the likelihood of avian influenza, is identified, the Act sets out the steps an employer must take:

1. Where practicable, the significant hazard must be eliminated (section 8);
 - This may involve removing the hazard or hazardous work practice from the workplace.
2. If elimination is not practicable, the significant hazard must be isolated (section 9);
 - This may involve isolating or separating the hazard or hazardous work practice from people not involved in the work or the general work areas. It could mean reducing the potential for contamination through changing work practices to achieve a greater degree of social distancing, or installing screens or barriers.
3. If it is impracticable to eliminate or isolate the hazard completely, then the employer must minimise the likelihood that the hazard will harm employees (section 10). In addition, the employer must, where appropriate:
 - Provide, make available to, and ensure the use of suitable clothing and equipment to protect the employees from any harm arising from the hazard;
 - Monitor employees’ exposure to the hazard;



- Seek the consent of employees to monitor their health; and
- With their informed consent, monitor employees' health.

This includes introducing work practices that reduce the risk. It could limit the amount of time a person is exposed to the potential hazard, or the use of protective clothing and/or equipment.

In some special situations, i.e. where work must continue for humane reasons or the maintenance of civil order, minimising the hazard may involve the use of prophylactic anti-viral medicines.

Refer to the Ministry of Health site for detailed guidance on appropriate personal protective equipment (PPE) for workplaces.

Sections 12 and 13: Information, Training and Supervision

Employees must be given information - in a form they are reasonably likely to understand – about:

- what to do in an emergency
- the hazards s/he will face and the steps to be taken to minimise the likelihood of harm
- hazards the employee may create while doing the work and the steps to be taken to minimise the likelihood of harm
- details of where safety equipment etc is kept.

Employees must be trained in the safe use of plant, objects, substances and protective clothing and equipment the employee is required to handle

Although it is not stated in the Act, 'adequately trained' may be taken to mean:

1. The employee knows how to do the job properly
2. The employee knows the hazards of the job
3. The employee knows the safe way to do the job

Supervision would be required until the employee can demonstrate these three things.

In the instance of pandemic influenza, the programme of training suggested in Appendix C would be one way of providing the required information.



Section 28A: Employees may refuse to perform work likely to cause serious harm

Employees have the right to refuse to perform work if they believe it is likely to lead to their suffering serious harm. However, their belief must be on reasonable grounds, and they must have attempted to resolve the matter with their employer before they can continue to refuse. The right to refuse unsafe work does not apply unless the understood risks of the work have materially increased. The right of an ambulance worker or nurse to refuse is therefore different to that of, say, a carpenter. It is also different to that of a sworn staff-member of the police, fire service or armed forces.

Ethical considerations of health staff, and the actual versus perceived risk to the individual would need to be considered.

The question in the case of infectious disease would amount to whether the exposure to the worker would exceed that which could be expected in the general community, and whether the efforts of the employer to eliminate, isolate and minimise harm would be sufficient to ensure worker safety.

NB: Independent contractors and volunteer workers have the right to withdraw their labour or services at any time, including when they feel the work environment presents an unsatisfactory level of risk.

Appendix C – Comments on Training in respirator use.

To get the most protection from wearing a respirator, it is a possible to think in terms of the 6 stages of information and training; selection, fitting, fit testing, fit checking; removal and disposal:

Stage	When	What the user needs to know and do
1 Limitations	Analysis required beforehand	<ul style="list-style-type: none"> • Is the effectiveness of the PPE adequate for the risk involved? • To see if a person or group of people are unlikely to be able to use the PPE - because the work-rate is too great or the need to wear goes on for too long • To see if medical assessments are required – because a person may not be able to wear PPE without compromising their health due an existing medical condition • To see if there is a realistic chance that the PPE can be worn and will be worn.
2 Information and training	Well before the need for use	<ul style="list-style-type: none"> • The place of PPE and respirators in the overall scheme of protection – the use of other PPE, the importance of hand washing • That respirators to not eliminate risks entirely and hence don't have a false confidence and hence – • Use all protective strategies available • Do not engage in high risk activities unless wearing the right respirator for that level of risk
3 Selection of a well fitting respirator	Well before the need for use	<ul style="list-style-type: none"> • That face shapes and sizes differ from person to person • That different size respirators are available • That a badly fitting respirator is ineffective • Facial hair invalidates effective use of disposable masks
4 Fitting	Well before the need for use	<ul style="list-style-type: none"> • There are standard methods of putting on a respirator • There is a certain level of dexterity in this – so practice is needed
5 Fit testing	Well before the need for use	<ul style="list-style-type: none"> • That respirators can leak – but that proper selection, fitting, fit testing and adjustment can inform the use of respirator limitations and what a proper fit feels like – and therefore reduce this markedly
6 Fit checking	Every time it is put on	<ul style="list-style-type: none"> • How to perform a fit check
7 Removal and Disposal	After use	<ul style="list-style-type: none"> • Techniques for removing respirators and their methods of disposal