

# The H1N1 2009 Pandemic

## Disaster Recovery Information exchange Tuesday, December 1, 2009

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What is  
H1N1 Pandemic Influenza A  
Virus?



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## What is the Flu?

Respiratory illness caused by influenza virus spread person to person by:

- inhalation of respiratory droplet secretions from sneeze/cough...or
- ingestion of virus via contaminated hands...or
- touching eyes, nose mouth with contaminated hands

(Anatomy Note: virus introduced into the eyes with unwashed hands can enter the respiratory tract via the “nasolacrimal” tear duct system which allows virus-contaminated tears to flow into the nasal passages and, from there, into the throat, then down into the lungs)

Fever, headache, myalgia, fatigue, nasal congestion, sore throat, cough are common

Upper Respiratory Tract.....usually “benign” with recovery 3-5 days

Lower Respiratory Tract.....much greater danger due to a possible fatal “cytokine storm” or secondary bacterial pneumonia (causing shortness of breath, chest discomfort).



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**VIRUSES  
VS  
BACTERIA**



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## BACTERIA:

- relative large micro-organisms
- can be seen by the ordinary light microscope
- invade around the cell...not into the cell
- respond to various antibiotics (e.g., penicillin, sulfonamide, tetracycline, cephalosporin, etc.
- vaccines helpful for prevention in some cases, e.g., D P T , pneumococcus, meningococcus



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## Examples of Bacteria:

- **Staphylococcus (incl. Methicillin-Resistant Staphylococcus Aureus = MRSA)**
- **Streptococcus**
- **Pneumococcus**
- **Meningococcus**
- **E.coli**
- **Salmonella**
- **Listeria**
- **Clostridium botulinum (“Botox”)**
- **Clostridium tetanus (tetanus, “lockjaw”)**
- **Clostridium difficile (antibiotic-associated colitis)**



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## VIRUSES:

- much smaller than bacteria
- cannot be seen by ordinary light microscope
- can be seen only by EM (electron microscope)
- typically invade into cells and can damage the DNA in the cell's nucleus or can mix with and exchange genetic information within the host cell's DNA/RNA (reassortment)
- the usual antibiotics (penicillin, etc.) are useless
- Some antivirals are useful:
  - Tamiflu (oseltamivir); Relenza (zanamivir)
- vaccines are very useful for prevention (but HIV vaccine is not yet available)



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## Examples of viruses:

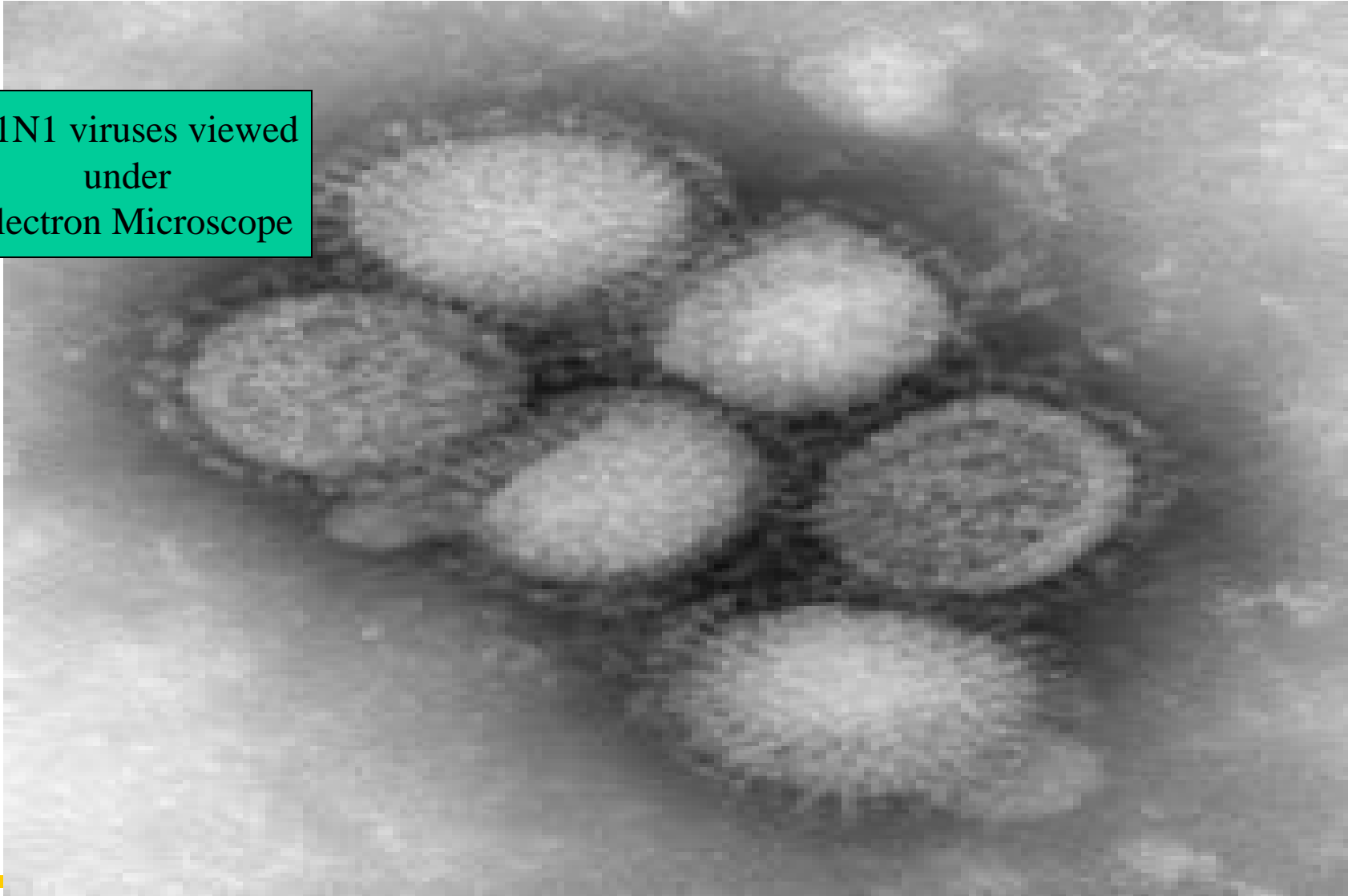
- Chicken pox (varicella)...can cause “shingles” decades later
- Measles (rubeola)----- →
- Mumps----- → = “MMR”
- German Measles (rubella)---- →
- Polio
- Infectious mononucleosis
- Hepatitis: A, B, C
- Human papillomavirus (HPV)..... [ “Gardasil vaccine” ]



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H1N1 viruses viewed  
under  
Electron Microscope

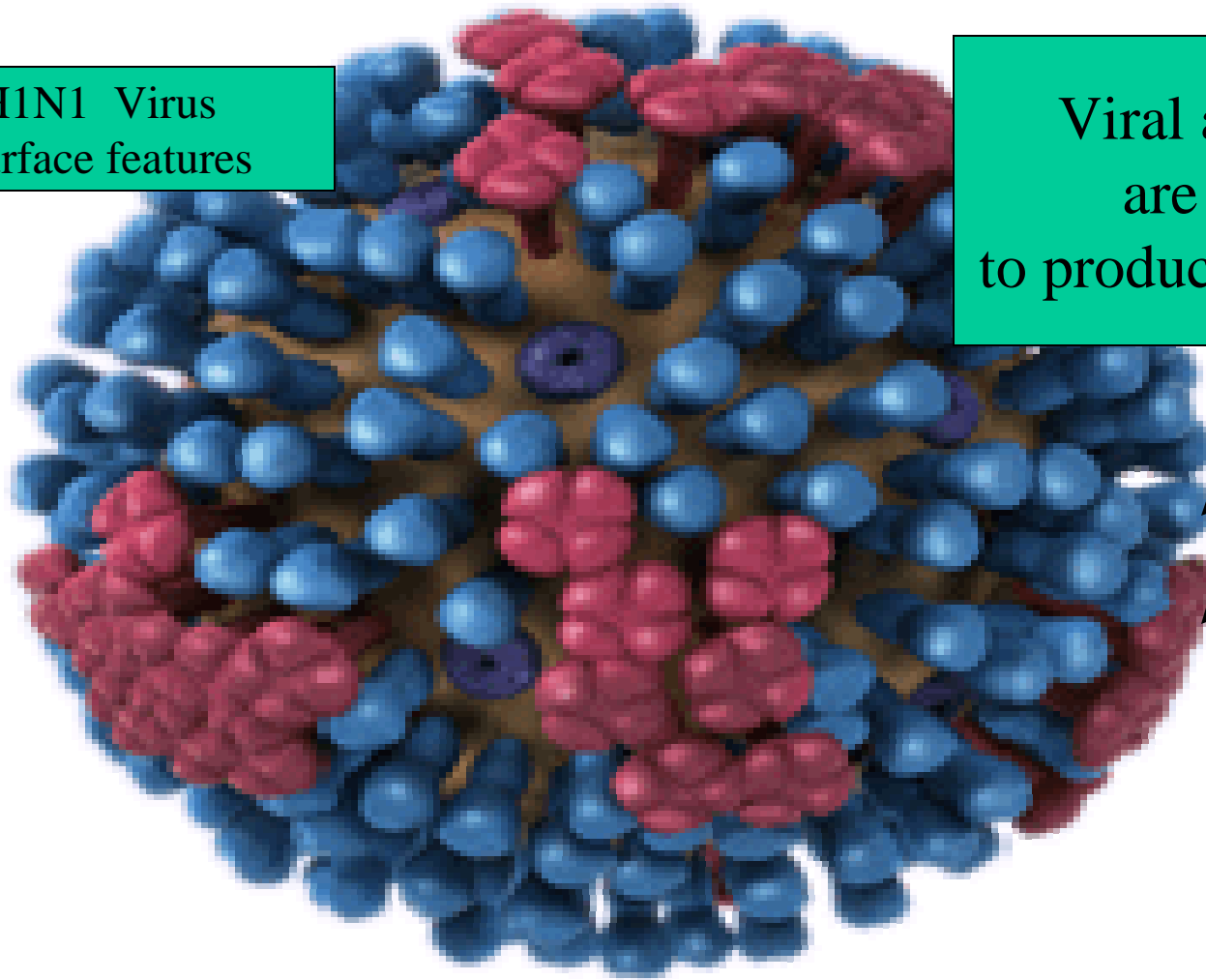


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H1N1 Virus  
Surface features

Viral antigens  
are used  
to produce vaccines



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## Viral Surface Proteins (= Antigens):

- Hemagglutinin (15 subtypes):
  - allows virus to attach to & invade cells in respiratory tract
- Neuraminidase (NA) (9 subtypes):
  - allows virus to leave original cell and to continue to reproduce & spread locally
- Antiviral medications Tamiflu (oseltamivir), Relenza (zanamivir) are NA-inhibitors...they bind to NA allowing body's immune system to destroy the virus



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**What is a Pandemic?**

**Why the Concern?**



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## PANDEMIC (WHO):

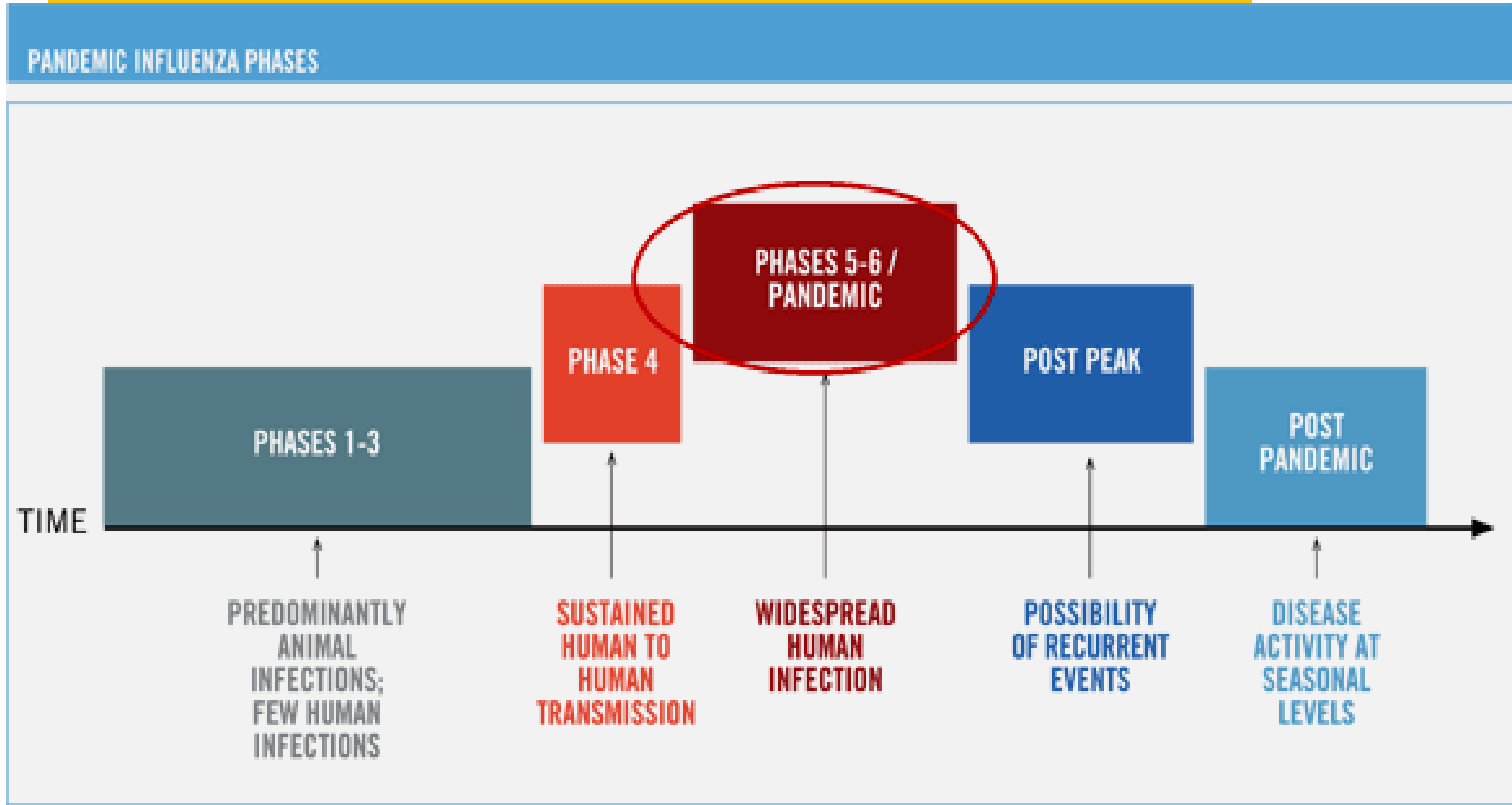
### Pandemic can occur when 3 conditions are met:

1. Emergence of a new disease....no population immunity
2. Disease agent can readily infect humans and cause illness
3. Disease agent can spread easily and sustainably human-to-human worldwide



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Do we have a “novel” virus now?

**Yes, we do!**

This brand new, never seen before H1N1 virus arose from a triple “re-assortment” ....

.....i.e., combination of RNA from three  
different influenza viruses.....

**Human + Avian + Swine influenza viruses**



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# Novel Hybrid Influenza A Virus

(“Swine” flu = misnomer)



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**Pigs are excellent “mixing bowl” hosts for invading viruses...**

**If one or more virus invades a pig, these microbes can mix together and exchange genetic material with each other through “re-assortment”**

**This can result in the emergence of a brand new, never-seen-before virus as happened in the case of the currently circulating H1N1 Influenza A virus born in Mexico in March-April, 2009**



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Do we have a Pandemic at this time?

**Yes, we do!**



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## WHY THE CONCERN?

- Sudden widespread disease worldwide
- No immunity to this H1N1 virus anywhere in world (especially the young)
- No vaccine yet available...chicken eggs are needed for vaccine production...therefore, can be a major disaster if chickens get sick worldwide and are culled (as with 2005-6 H5N1 avian influenza)
- Health care services overwhelmed (first responders, nurses, MD's, ER's, ICU's)
- Spreading panic, confusion, conflicting opinions, misinformation



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## Some comparison stats:

### Seasonal flu:

- 90% of deaths are in (a) the elderly and (b) the chronically ill

### H1N1 flu:

- 50+ % of deaths are in < 40-50 yr age group
- children get more frequent infections and the v. young may get more severe infections as well
- pregnant women don't get more infections but, when they do get infected, their illness tends to be more severe esp. later in pregnancy

( No proof that taking Seasonal Flu shot before H1N1 shot increases susceptibility to H1N1 infection )



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Main Target of H1N1 is people of working age....i.e., our employees!

- Huge potential economic impact due to loss of in-house productivity and loss of “just-in-time” deliveries
- Absenteeism: businesses, schools, transit, communications, etc.
- Impact on international travel...more spread of disease, business travel restrictions, country quarantines, trade boycotts (irrational general closure of borders vs specific restrictions (e.g., pork, chicken))
- Persistence of pandemic for months...1<sup>st</sup>, 2<sup>nd</sup>, (and, rarely, 3<sup>rd</sup>) waves
- Fear of unknown....many uncertainties about next steps, corporate planning



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## Why are young people more vulnerable to getting H1N1 infection?

1. Lack of Immunity: Never exposed to H1N1-type virus before. Older people (>55 yrs.) have probably been exposed to past H1N1 antigens (e.g., 1976) and therefore have some residual immunity/protection
2. “Cytokine Storm\*\*”: Young people’s immune system might mount an excessively aggressive immune response to respiratory viral infections...i.e., destruction of virus AND the lungs AND the host...(cf. avian influenza)

\*\* “Cytokine Storm” is a descriptive term for a poorly understood chain of events that can lead to death due to influenza infection ...many fatal influenza cases show secondary bacterial pneumonia but other fatal cases remain unexplained and may well be related to an overwhelming immune reaction to viral presence in lung tissue resulting in irreversible damage to the host lung tissue.



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## What can we do?

### From a corporate/employer's perspective:

1. Proper Preparation and Prevention strategies with proactive BCM and CMT
2. Prepare for ALL types potential emergencies (pandemics, floods, power failure, threats, etc.)
3. Up-to-date employee communications must be on FRONT PAGE of your corporate Intranet site...tell your employees to read it daily.
4. Involve your medical director early & often



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## From an employee's perspective:

1. Read your company's intranet influenza advice page daily
2. Don't panic
3. Read media/internet sensibly



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4. **Common sense hygienic habits**
5. **Respiratory Etiquette**
6. **Wash hands...soap & water or alcohol-based hand sanitizer  
(keep small container in purse/pocket)  
....and, it's OK to shake hands...just wash hands frequently**
7. **Avoid flu-sick people**
8. **Keep hands away from face**



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9. **Stay home if you are sick...postpone travel plans till well again**
10. **Call your MD or go to ER if you have any concerns especially if you have more serious symptoms such as breathing difficulty, chest discomfort, vomiting, diarrhea**
11. **Do not share food or drinking & eating utensils (water bottles, straws, spoons, cups, etc.)**



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12. Healthy lifestyle...proper food, sleep, exercise, no smoking

13. Getting flu shots is an individual decision....but  
it is highly recommended that you get vaccinated against  
**BOTH:** - H1N1 Influenza and  
- Seasonal Influenza

.....**REMEMBER:** all types of influenza can cause  
serious, even life-threatening, illness all of which  
are potentially VACCINE-PREVENTABLE

**NB:** getting flu shots can protect **BOTH** you and those around you!

14. Use of masks/gloves and extra office cleaning during flu season  
are neither necessary nor effective....best defence is same  
message as always...wash your hands before eating



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**.....AND:**

**15. Teach your children respiratory and  
handwashing hygiene habits**



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**Careful attention to these simple and  
easy-to-follow good habits can  
minimize vulnerability to  
all  
respiratory-type  
infectious diseases**



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## Some FAQ's:

1. **Is the pandemic over?...No. Some countries still reporting local surges but many others report a plateauing or even slight drop of case reports. Both the H1N1 and H3N2 viruses are around and will stay with us for another few months....and can still cause serious disease**
2. **Will there be a third wave? Unlikely.**
3. **Are these vaccines safe? Yes, both H1N1 (with & without adjuvant) and Seasonal flu vaccines are very safe.**
4. **Should I get a flu shot? Yes....get both in any order...OK to get both at same visit (one in each arm)**



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5. **Why so much confusion? It's actually not too surprising. Everything is a moving target when a new infectious enemy suddenly appears on the scene.....therefore lots of opinions from lots of PH organizations and lots of Public Health officials and lots of media attention with lots of information/instructions/misinformation.....only one vaccine producer (GSK)....confusion re priority groups and fears of adjuvant and vaccine safety, etc. etc.**
  
6. **What about recent Tamiflu resistant H1N1 case reports? There are sporadic cases (USA, UK, Norway, Brazil, Ukraine, Japan)... but appears to be limited or no human to human spread of such mutated viruses. Mutation in one viral characteristic often cause loss of spread potential. Possibility of viral mutation is always present and is always monitored v. closely by WHO. et al**



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## The Good News:

1. S. Hemisphere “dress rehearsal” = fewer fatalities than anticipated
2. N. Hemisphere case/death reports have levelled or even started to drop in some regions
3. Canadian Flu deaths: H1N1 ~ 329 (Dec 1/09)..(cf. Seasonal ~ 4000/yr)
4. H1N1 & Seasonal flu vaccine available for all CDN’s
5. Vaccine (Arepanrix) is free, safe, effective, no priority lines now
6. ~ 40-50% of CDN’s are already vaccinated
7. Herd immunity has likely “vaccinated” many others
8. No significant numbers of viral mutations reported
9. For serious illnesses, Tamiflu remains highly effective



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## The Bad News:

1. ~ 50+ % CDN's not formally vaccinated
2. Public has “flu-fatigue” complacency due to info. overload, misinformation, continued confusion, now less media attention, & declining case & death reports worldwide
3. H1N1 and H3N2 viruses still circulating.....and will do so till spring 2010
4. Unvaccinated people still vulnerable to these vaccine-preventable illnesses & deaths (esp. very young, the old, and the medically disabled (co-morbid illnesses)
5. Tamiflu-resistant H1N1 mutants reported, albeit small numbers so far (WHO is monitoring closely)



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## Confusion Persists!!!

For example, November 25/09 news:

1. Hungary orders all schools to be opened to permit vaccination of all students
2. France orders 200+ schools to be closed to prevent spread of H1N1
3. Canada recommends “immunize everyone”
4. Poland says H1N1 vaccine not yet proven to be safe...recommends “don’t vaccinate anyone”



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## Lessons learned (again!):

1. **Need a proper global communication cascade:  
WHO > HC > Provinces > Cities > Corporations,  
Schools, general public**
2. **Vaccine production: need > one producer**
3. **Need improved vaccination distribution network**
4. **Early and firm decisions re “priority” population**



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**5. MAIN RESOURCE: strong, regularly updated internal communication strategy backed by solid support from:**

- Human Resources**
- Advisory Services**
- Medical Department**

**.....to allay ee fears, to reassure ee's re uninterrupted support from benefits during unavoidable absences, and to answer questions.**



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- NOTE:**
- no knowledge promotes panic, suspicion, speculation
  - a little knowledge is a dangerous thing
  - full knowledge is power
  - imperative to prevent misinformation (esp. internet)

**Tell your ee's what you are doing to protect them and to support them**

**Be available to answer all their questions and concerns**

**Be consistent with messaging across your entire company**



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**Healthy Lifestyle**

**Wash your hands**

**....and**



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GET YOUR FLU SHOT(S)



Leona Aglukkaq...Federal Health Minister



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## H1N1/Influenza Reference Sites:

1. Canada: Public Health Agency of Canada:  
[www.phac.aspc.gc.ca](http://www.phac.aspc.gc.ca)
2. USA: Centers for Disease Control and Prevention  
[www.cdc.gov](http://www.cdc.gov)
3. World: The World Health Organization  
[www.who.int](http://www.who.int)



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