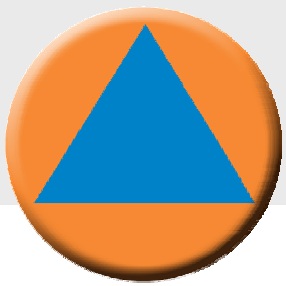
Keeping the Lights on During a Pandemic



International Disaster Reduction Conference
August 25-29, 2008

Gian Di Giambattista

Director – Emergency Management, Ontario Power Generation

ONTARIO POWER GENERATION

Overview

1. OPG and the Ontario Electricity Sector
2. Lessons Learned from SARS
3. Why is Pandemic Planning important to OPG?
4. OPG's Pandemic Plans
5. Moving forward: Improving our plans

OPG Profile: *Who We Are*

Ontario Power Generation is an Ontario-based electricity generation company whose principal business is the generation and sale of electricity in Ontario. OPG's focus is on the efficient production and sale of electricity from its competitive generation assets, while operating in a safe, open and environmentally responsible manner.

2007 Stats

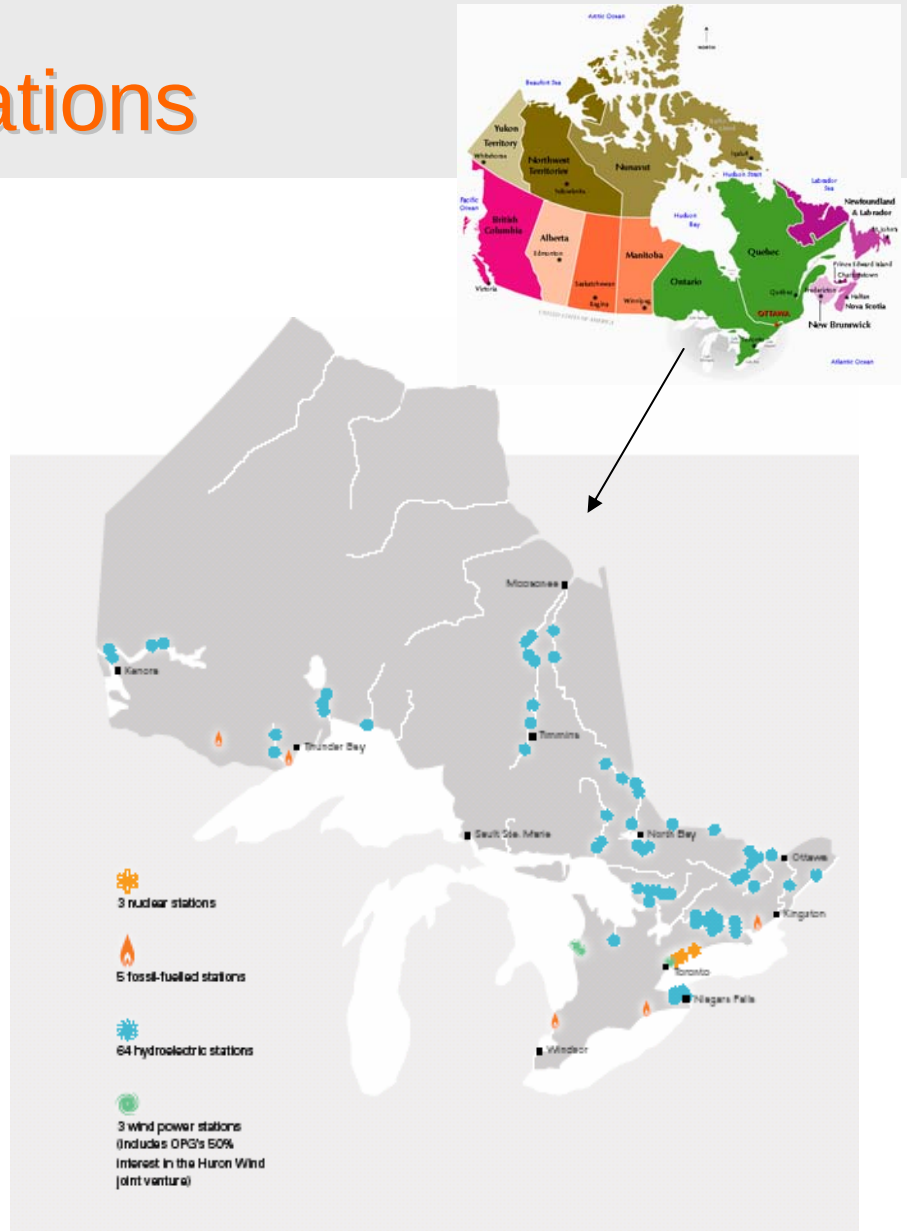
- **Employees:** **11,700**
- **Generation:** **105.1 TWh**
- **Revenue:** **$5.66 Billion***
- **Capacity:** **22,158 MW**
  - **Fossil:** 8,573 MW
  - **Hydro:** 6,972 MW
  - **Nuclear:** 6,606 MW
  - **Wind:** 7 MW

* Canadian

* After rebates

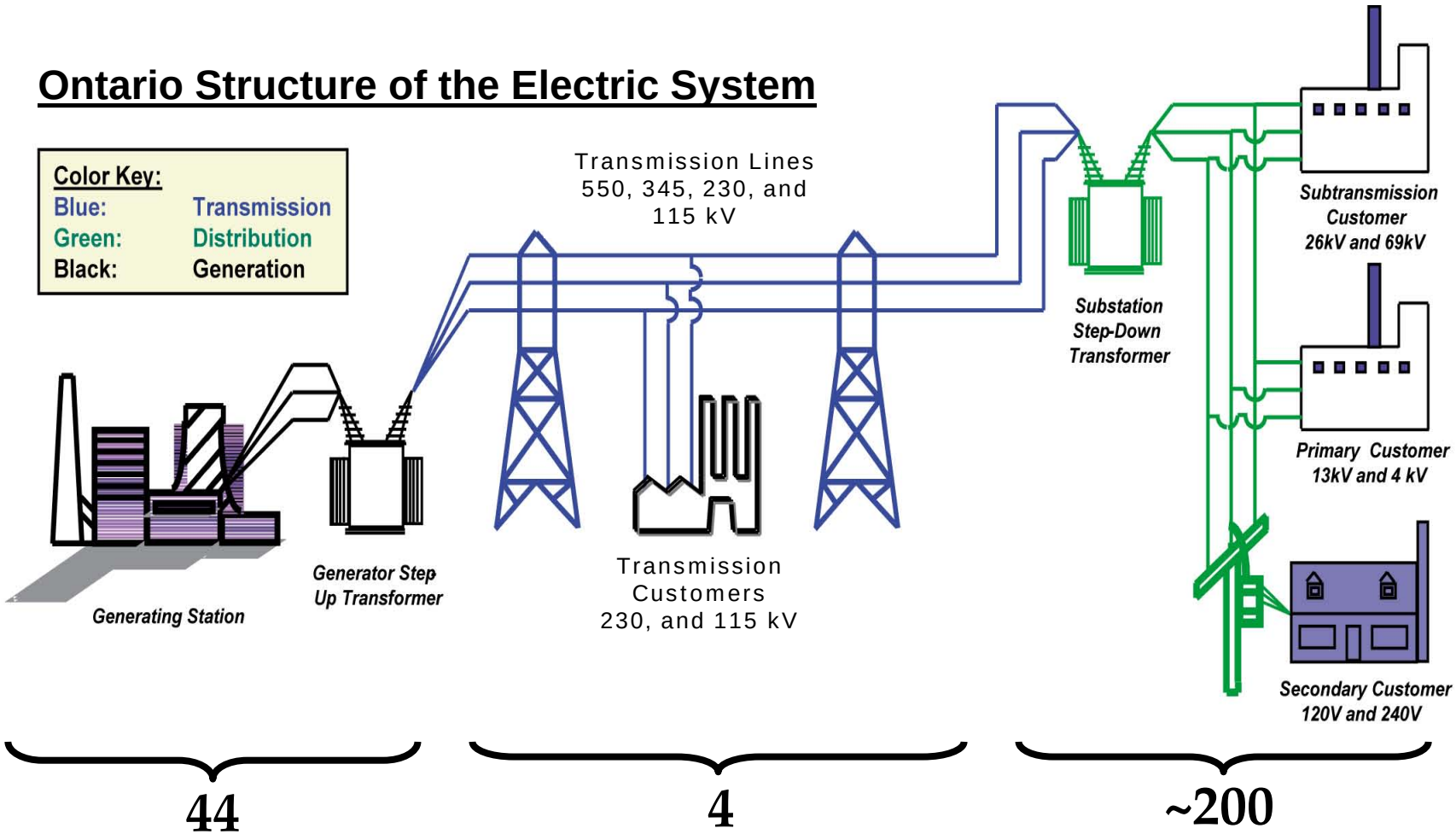
Generating Stations

- **3 nuclear stations**
- **5 fossil stations**
- **64 hydroelectric stations**
- **3 wind power stations**



- *6 Occupational MDs*
- *22 Occupational Nurses*

Ontario's Electricity Industry Diversity



Number of different electricity companies in Ontario:

OPG Lessons from 2003 SARS

SARS (Severe Acute Respiratory Syndrome):

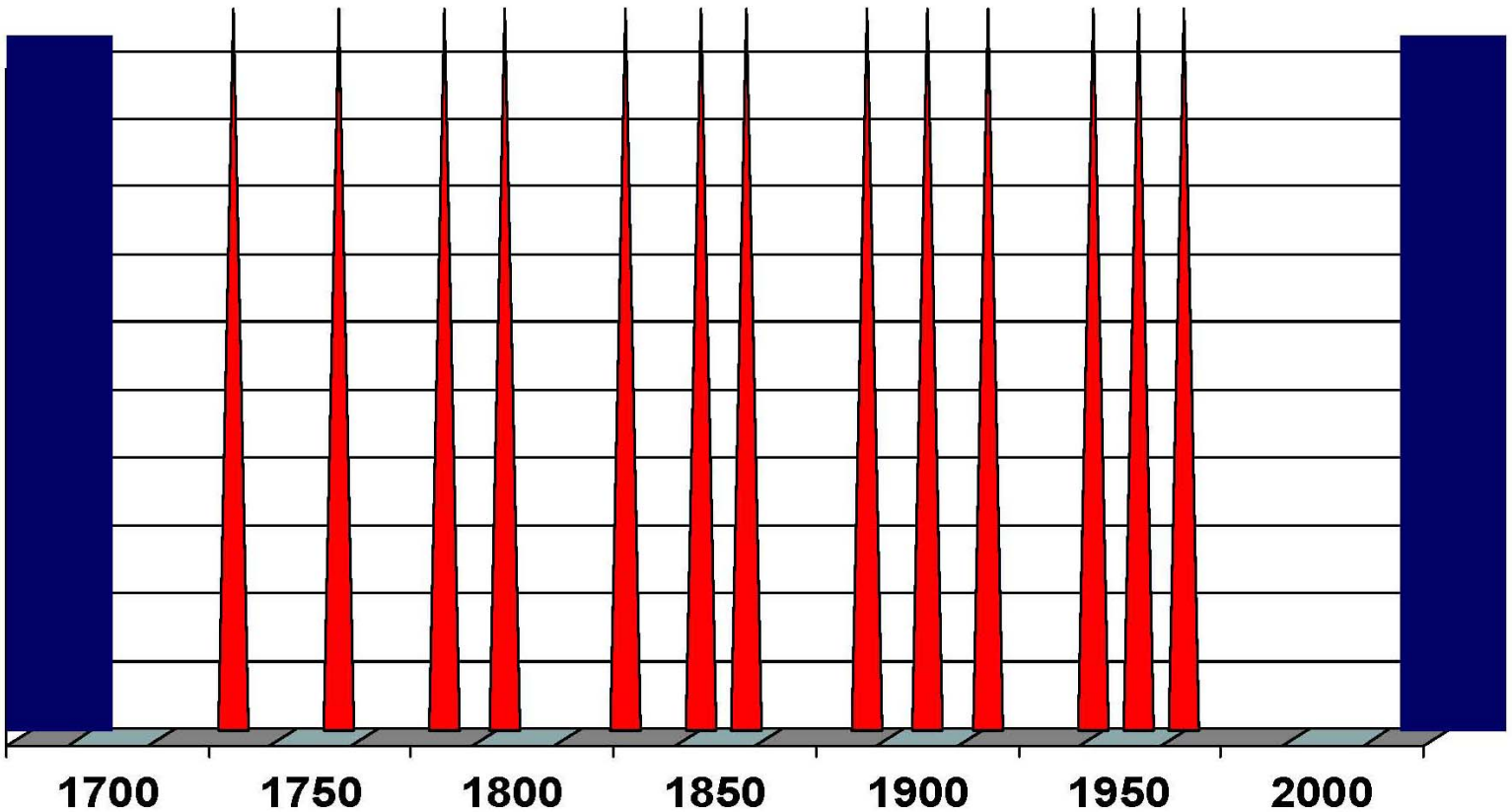
- 800 deaths worldwide; 44 in Ontario
- WHO travel ban on Toronto
- Large economic impact on Canada (tourism, conferences, movie productions)

At OPG:

- OPG SARS Task Force - met twice a day for 3 months
- Daily communication to all OPG Employees with updated medical advice and other critical information was critical
- Contingency planning guidelines for essential staff
- Liaison with Emergency Management Ontario & Provincial Chief Medical Officer
- Enhanced Hygiene protocols - PPE, Sanitizers,etc.
- Self screening, self-quarantine guidelines
- Travel restrictions
- Staff quarantined at one site

The Threat

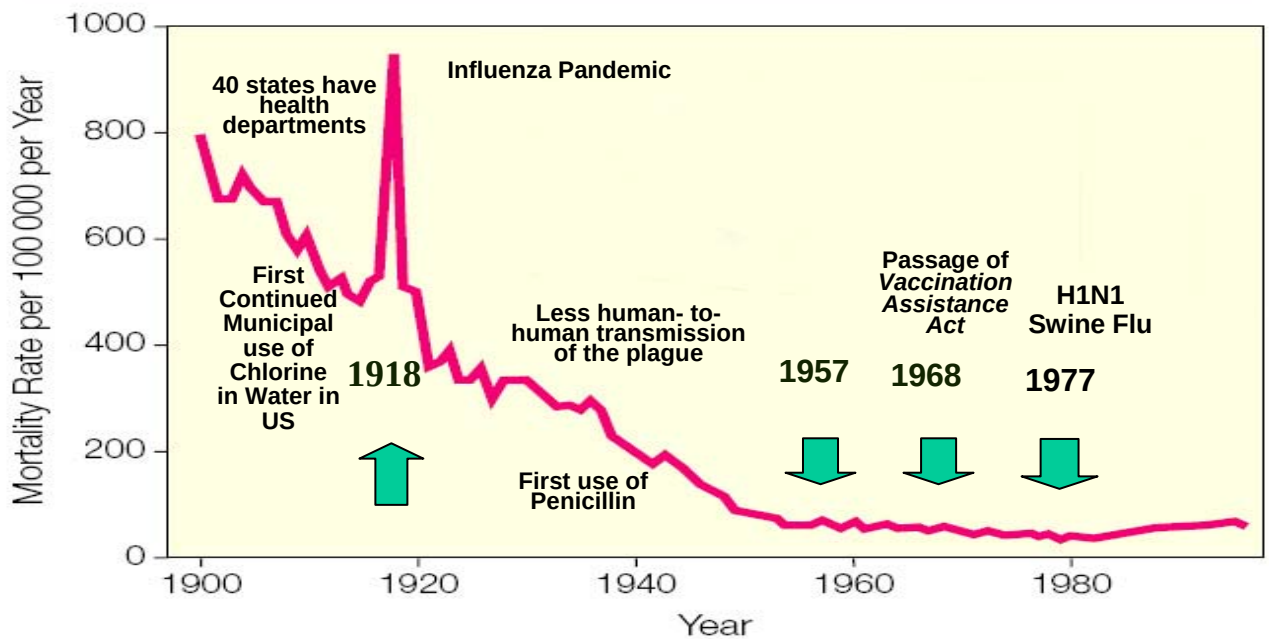
Medical Historians have determined that influenza pandemics have occurred every 30-40 years since the 1700s



The Threat

- 1918-19 Spanish Flu (H5N1) : 650,000 U.S./ 40-50 Million Deaths World-wide
  - Ten times as many Americans died of flu than died in WW I
- 1957-58 Asian Flu (H2N2) : 70,000 U.S./1.5 Million Deaths World-wide
- 1968-69 Hong Kong Flu (H3N2): 40,000 U.S./700,000 Deaths Word-wide
- Typical annual influenza season: 36,000 U.S. Deaths

Figure 1. Crude Infectious Disease Mortality Rate in the United States From 1900 Through 1996



ONTARIO POWER GENERATION

Genetic Re-assortment (Antigenic Shift)

2 different viruses infect a cell, exchange DNA gene segments resulting in a new virus

Avian Influenza

Human Influenza

hosts

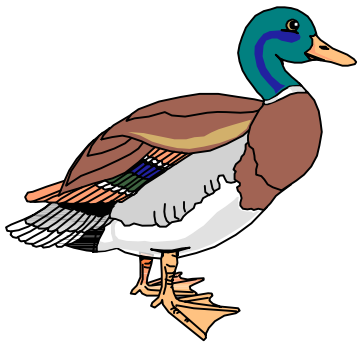
Co-infection in pigs or humans

Reassortment of influenza viruses

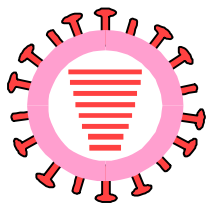
Novel influenza virus capable of infecting humans

Adaptive mutation: Gradual changes to the virus making it more transmissible among humans

Mechanisms of Antigenic Shift

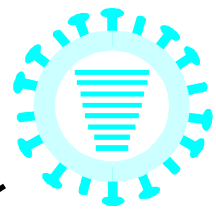


16 HAs
9 NAs

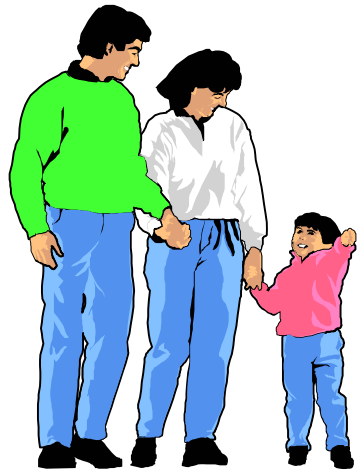


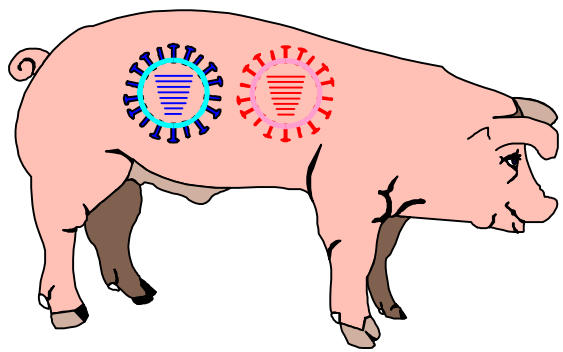
Avian virus

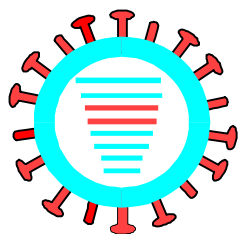
Direct adaptation



Human virus

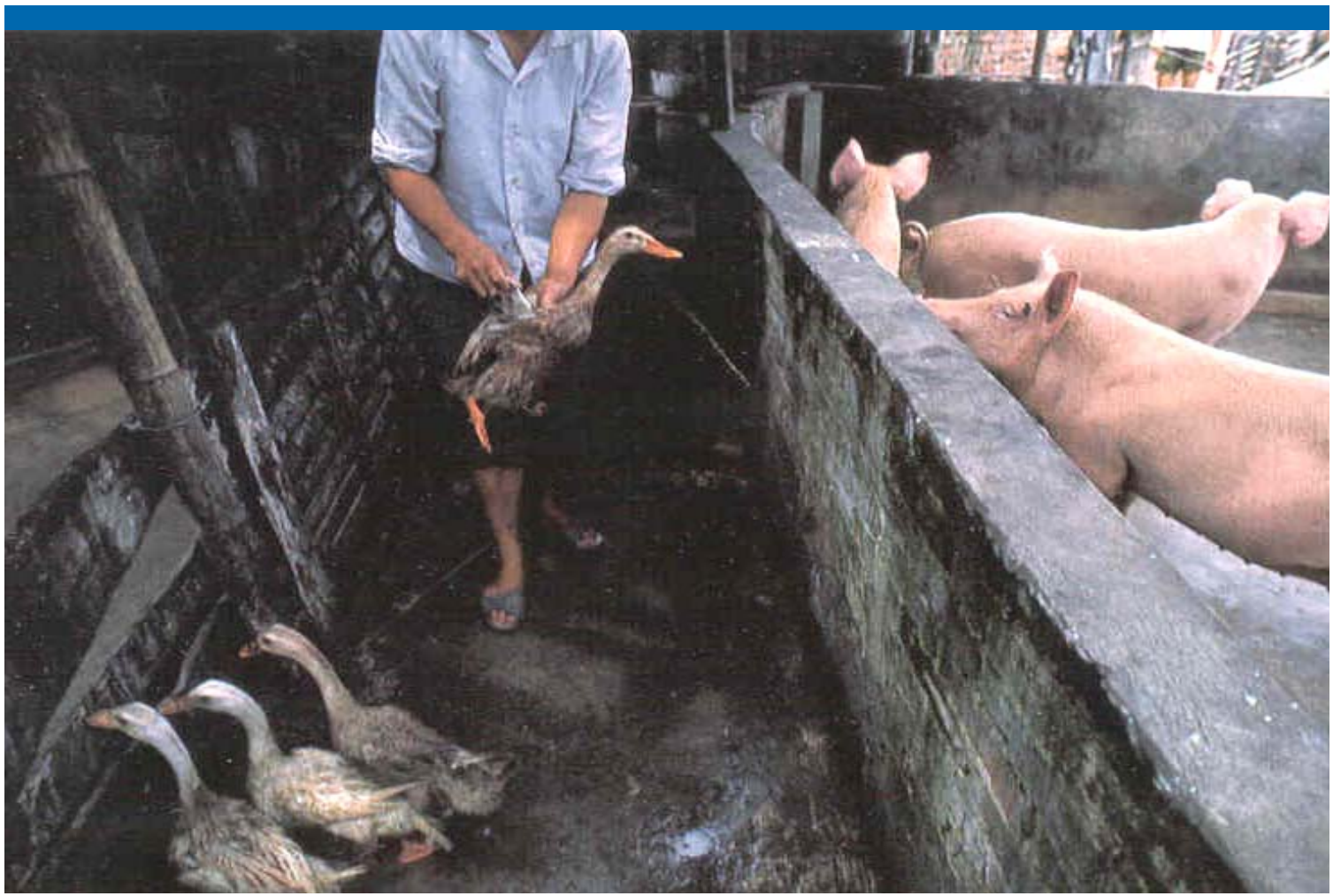






Reassortant virus

Emergence of New Influenza Strains
Where Does It Happen?



Why is it difficult to eradicate Avian Influenza?

Source: WHO

May be endemic in many areas.

Source: WHO

High proportion of backyard farms where chickens, ducks and wild birds roam freely!!

Pandemic Severity Index

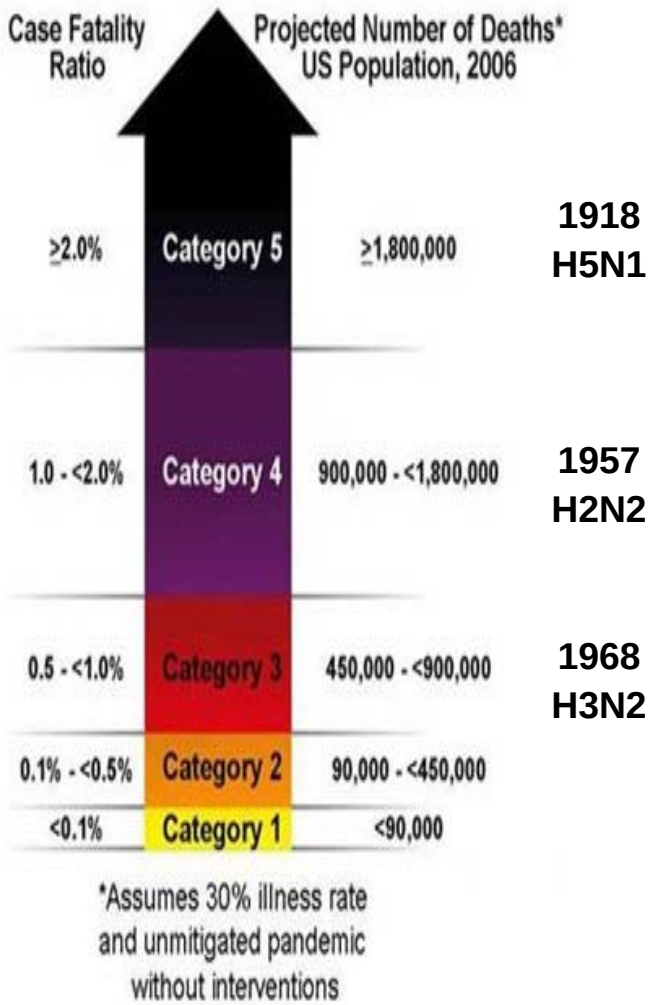
- Similar to the system for categorizing the strength of hurricanes, the CDC interim guidance introduces this severity index

- Uses a fatality ratio as the critical driver for forecasting a pandemic's severity

- Allows for better forecasting the impact of a pandemic

- Enables recommendations to be made regarding mitigation strategies and intervention

- Provides communities and businesses a tool for scenario-based contingency planning to guide their pandemic preparedness plans



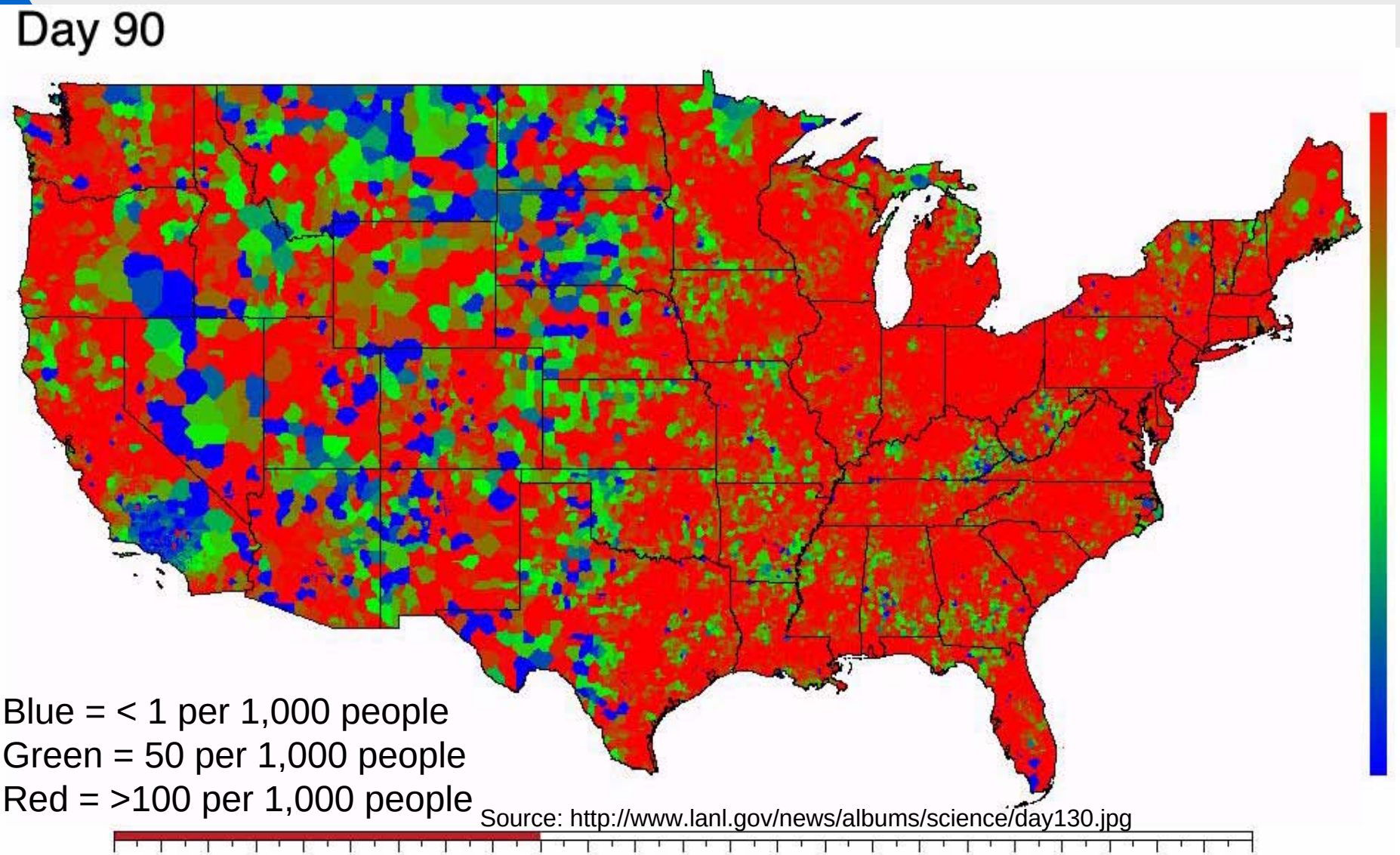
The Planning Challenge

- What made the 1918 flu so lethal?
- Where did it come from?
- Why did it kill young adults almost exclusively?
- Will H5N1 turn into the next pandemic?

Once a pandemic starts

- Workplace absenteeism?
- Fatalities?
- Duration of illness?
- Government response?
- Will schools, borders close? Travel restrictions?
- Impact on vendors and critical infrastructure?

Simulation of a Pandemic Flu outbreak in the USA by the arrival of 10 infected cases in L.A.



Source: http://www.lanl.gov/news/albums/science/day130.jpg

Simulation of a Pandemic Flu outbreak in the USA by the arrival of 10 infected cases in L.A.

With border closures and travel restrictions, countries might delay the virus' arrival, but countries cannot stop it.

Severe travel restrictions may delay U.S. cases by 1-4 weeks.

Border screening is difficult given people may transmit infection for up to 48 hours before showing symptoms.

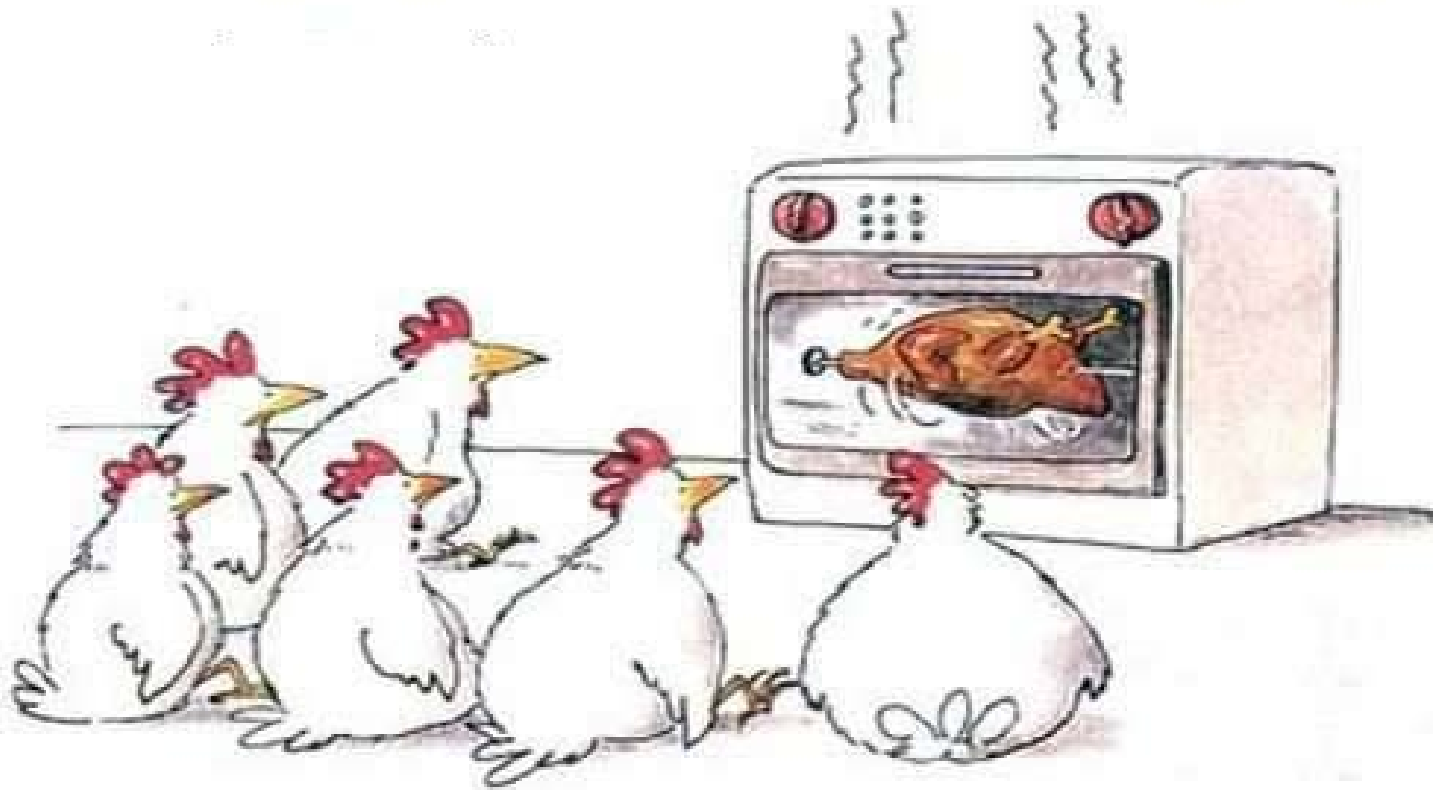
Previous pandemics circled the globe in 6-9 months even though most international travel was by ship.

Given the speed and volume of international air travel today, the virus will likely spread more rapidly, reaching all continents in less than 3 months.

Once a fully contagious virus emerges, its global spread is inevitable. If no intervention, expect global spread in 1 month and U.S. cases in 1-2 months.

Horror Show-" One FLU over the Cookoo's Nest" Restricted to chickens over 18

- From Durham Public Health



Why is Pandemic Planning important to OPG?

- 70% of Ontario power supply provided by OPG
- Day to day work would be disrupted
- High absenteeism
- Nuclear staffing requirements
- Qualified staff required to operate fossil and hydroelectric plants
- OPG relies heavily on suppliers who also will be affected

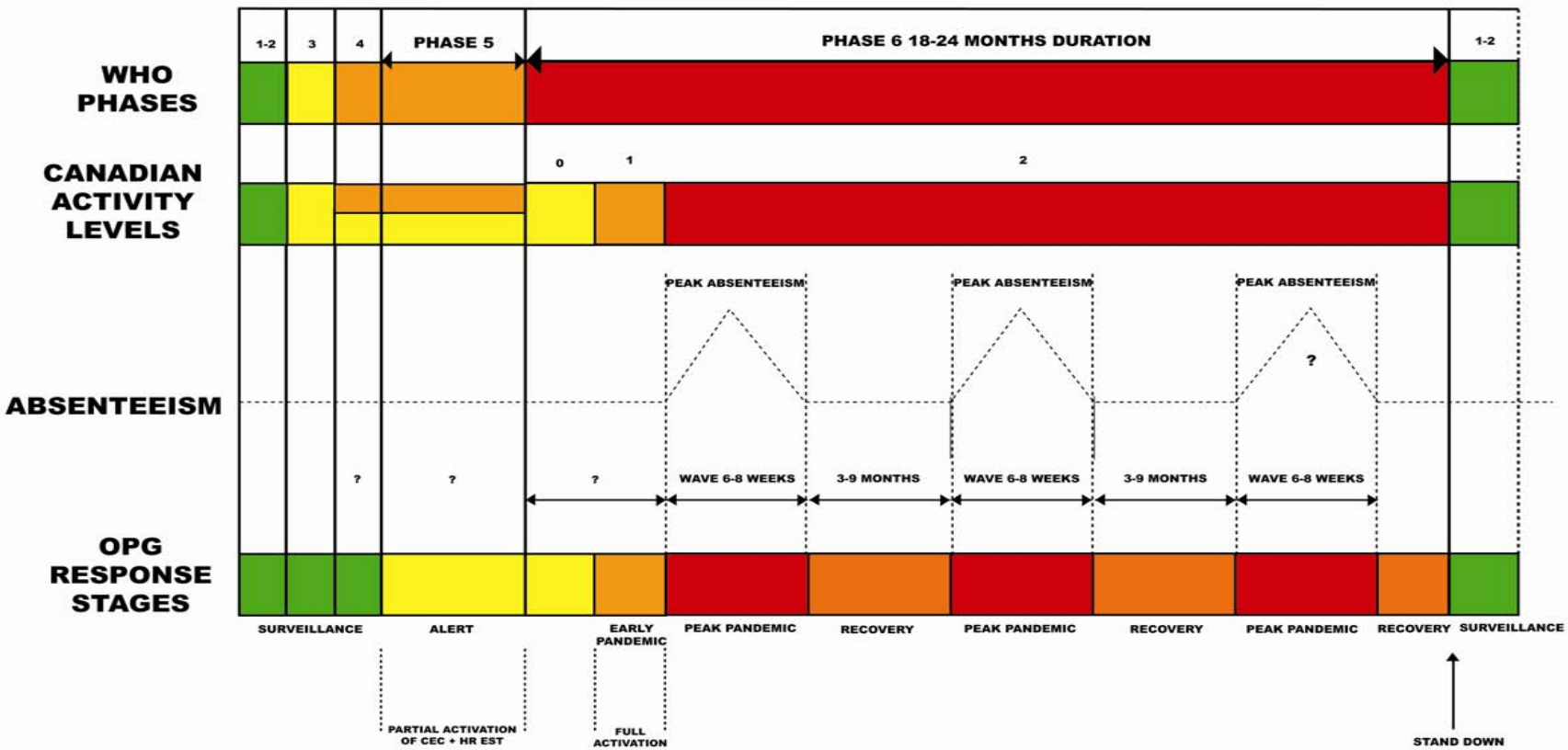
How did OPG Prepare?

- Executive/Board support
- High level plan developed by a cross-functional team provides overall framework, planning assumptions, staged response and 11 protocols developed
- Integrated with OPG's Emergency Preparedness and Response Plans

OPG Planning Assumptions

1. Consistent with Ontario Health Pandemic Influenza Plan
2. Two waves, each lasting up to 8 weeks, peaking at 3-4 weeks; waves 3 – 9 months apart, second stronger than first
3. Attack rate of 35% (severe enough to take at least ½ day off of work)
4. Absenteeism – 3 scenarios:
   - Mild – one week peak at 20%; balance of wave at 10%
   - Medium – one week peak at 30%; balance of wave at 15%
   - Severe – one week peak at 40%; balance of wave at 20%
   - Absenteeism rate includes sick, those caring for sick, absent due to school closures, “worried well”, etc.
5. Little lead time between WHO declaration of Phase 6 pandemic and outbreak in Ontario (1-2 months or less)
6. No effective vaccine prophylaxis or limited antivirals and NO Vaccine for the first wave. Now Tamiflu readily available for prophylaxis and Treatment
7. Regulatory requirements status quo (H&S, Env., etc.)
8. Need Capability to respond to other contingencies

OPG PANDEMIC RESPONSE STAGES
VS.
WHO PANDEMIC PHASES



11 Key Planning Protocols

- **Emergency Response Organization**
- **Monitor and Surveillance**
- **Vaccines and Antivirals**
- **Health Protocols**
- **Human Resources Protocols**
- **Facilities**
- **Supply Chain**
- **Information Technology**
- **Security**
- **Communication Strategy**
- **Guideline for creating continuity of operations plans**

From BIA to COOPs …

Corporate Plan
- Planning Assumptions
- Stage and Response
- Corporate Protocols

BIAs	**47**
COOPs	**42**
Operational Capability Assessments	**12**

Management reviews for alignment

Stakeholder reviews for dependencies, gaps

Top 10 Concerns

Business Unit Planning Assumptions and Staged Response

BIA
- Business continuity risks
- Recovery priorities (key processes, systems, staff)
- strategies

COOPs
- Draft COOPs
- Plans
- Procedures
- instructions

Tabletop exercises

Declare readiness

***Assessment of Operational Capability**

Annual Review, update & practice

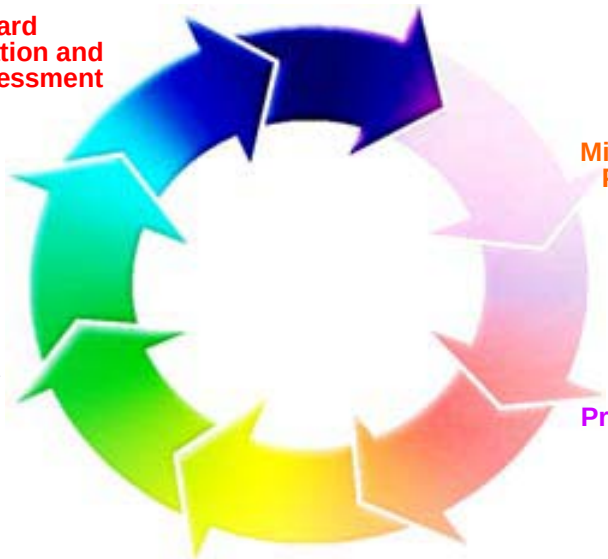
Assessment of Ontario Electricity Sector's Capabilities

- The market operator is responsible for overall power system reliability and to "KEEP THE LIGHTS ON" in Ontario
- Each market participant was asked to assess the following questions related to their pandemic capabilities:

  Under 3 scenarios (mild, medium, severe pandemic) each participant asked to identify capabilities to carry out:

  1. Preventative maintenance;
  2. Corrective maintenance;
  3. Outages maintenance; and
  4. Continue to operate

Pillars of Emergency Management



- BIAs

Protocols

- Antivirals and Health-related stockpiles
- Social Distancing in very early stages
- Enhanced Hygiene

- Education (Pandemic 101)
- Seasonal influenza campaigns
- Employee communications

-Strategies for Critical Processes

OPG Pandemic Plan

- Planning Assumptions
- Protocols
- OPG Staged Response Strategy
- Drills and exercises

-COOPs

Our Approach and Challenges?

Continuity of Operations Plans

- Used the same process across OPG
- Applied industry best practice (DRII methodology)
- Sought executive endorsement
- Built on existing emergency plans/business continuity plans
- Lessons learned from SARS, Power blackout, labour disputes …
- Documented the analysis and plans
- Will maintain preparedness into the future

Challenges

- Business culture and issues in each Division are very different
- “IT concept” of business continuity difficult to apply to production shop floor
- OPG’s 2002 attempt at continuity planning marginally successful
- No incremental budgets approved for Pandemic Planning

Summary of OPG's Capability during a Pandemic

OPG can maintain operational continuity; however a number of challenges have been identified:

- OPG's operational capability depends on "just in time" supply chain and other critical infrastructure
- Employee communications will be a challenge – hence alignment and liaison with key health authorities is critical
- Managing the "FEAR" factor is key to reducing employee absenteeism

Summary of Health-related Measures

To be implemented in the event of a pandemic:

- Distribution of Tamiflu antivirals (prophylaxis)
- N95 masks for first responders and medical staff (optional for cleaning staff)
- Other PPE
- Surgical masks for all staff
- Social distancing
- Enhanced cleaning and hygiene practices (reinforcing hand washing and use of hand sanitizers

Lessons Learned

- Executive Champion/Sponsor
- Industry Collaboration
- Engaging Regional/Provincial and Federal Health Ministries/Agencies
- Engage your Unions
- Critical Infrastructure Interdependencies
- TEAM approach a MUST
- Lots to learn – “Don’t Know is acceptable – but what is important is that ***you know what you don’t know***”

Horror Show continued – “Restricted For Pandemic Planners Only”

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Moving Forward

Improving our Plans

- Annual review of:
  - Planning assumptions/Staged response
  - Protocols
  - BIAs and COOPs
  - Drills based on a 3 year cycle
- Reducing residual risks (supply chain)
- Work with critical infrastructure, other industry sectors
- Ongoing monitoring of the unknowns
- Enhancements to plans (masks, cleaning etc)
- Third party review/audit

Some Useful References

- "The Great Influenza" (book by John M. Barry)
- www.who.org (World Health Organization)
- www.drj.com (Disaster Recovery Journal)
- www.drii.org (Disaster Recovery Institute International)
- DRII courses on business continuity
- www.drie.org (Disaster Recovery Information Exchange)
- www.wcdm.org (Annual Conference on Disaster Management)
- http://www.health.gov.on.ca/english/providers/program/emu/pan_flu/pan_flu_plan.html (Ontario Health Plan for Pandemic Influenza)
- http://www.phac-aspc.gc.ca/cpip-pclcpi/index.html (Canadian Pandemic Influenza Plan for the Health Sector)
- New Zealand Pandemic plan- http://www.moh.govt.nz/moh.nsf/indexmh/nz-influenza-pandemic-action-plan-2006
- In General - Google: business continuity, continuity of operations plans, pandemic planning, NFPA 1600, CSAZ1600 etc

Acronyms

BIA – Business Impact Analysis

COOP- Continuity of Operations Plan

CSA –Canadian Standards Association

OPG- Ontario Power Generation

PPE- Personal Protective Equipment