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What has business continuity learned from the H1N1 pandemic?

January 28, 2010

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Agenda

1. Swine Flu – Historical Perspective
2. H1N1 Emerges: April 2009 – January 2010
3. What Have We Learned?
4. Going Forward

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Historical Perspective

- An estimated 58% of the 1407 known human pathogens are zoonotic, which means that they normally occur in animals but also infect humans.
- Illness with influenza in pigs was first recognized during the influenza pandemic of 1918.
- A swine influenza virus was first isolated from a human in 1974.
- In 1976, swine influenza virus caused a respiratory illness with one fatality among 13 soldiers in Fort Dix, NJ.
- Between 1958 - 2005, 37 cases of swine influenza were reported.
 - 6 cases (17 %) resulted in death. 44% of infected individuals had known exposure to pigs. Cases were reported in the United States, former Czechoslovakia, the Netherlands, Russia, Switzerland, and Hong Kong.

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H1N1 Outbreak

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Mexico Reports Outbreak




- March 18, 2009 surveillance systems in Mexico reported unusual numbers of influenza-like illness.
 - The event was an outbreak of acute respiratory illness in the states of Veracruz and Oaxaca Mexico.

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Imperial County




- On 3/28/09, 9 yr. girl had onset of cough and fever (104.3F), taken to outpatient clinic who was participating in a influenza study (*chance*):
 - April 17 CDC received sample of an unsubtypable A virus.
 - CDC ID'ed it as H1N1 novel (turns out later to be the same as the boy in San Diego).
 - **No smoking pig.**

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San Diego

- On 3/30/09, 10 yr boy had onset of fever, cough and vomiting.
 - **No exposure to pigs.**
- Taken to outpatient clinic who just happen to be doing a clinical study on influenza (*chance x 2*):
 - Initial test revealed Influenza A, unable to type.
 - CDC notified on April 13.



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Fast Forward

- Week of April 17 - 23
 - Mexico outbreak continues.
 - Two cases confirmed in California.
 - One case also confirmed in Texas.
 - Additional cases reported in California; first hospitalization on April 23, 2009.
 - **No** epidemiological link to any of the cases
 - Geographically distinct /isolated.
 - **No smoking pig** (no pig exposure in the cases).
- Net-net = probably a **much** bigger problem and could be.....
- CDC opens its EOC April 20, 2009.

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April 24, 2009

- A mysterious illness is reported in the national news – a respiratory illness in Mexico, spreading quickly...
 - People in the streets with masks...Fear spreading like wildfire...
 - “Hey, wait-a-minute, they are next door. Wasn't this supposed to start in Asia?”



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US Flights from Mexico

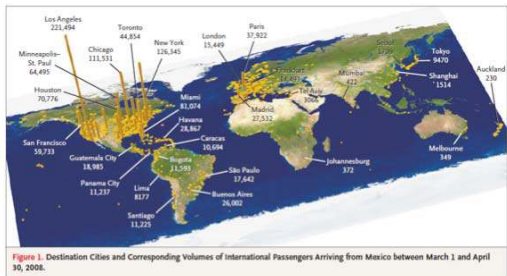


Figure 1. Destination Cities and Corresponding Volumes of International Passengers Arriving from Mexico between March 1 and April 30, 2008.

March and April 2008, a total of 2.35 million passengers flew from Mexico to 1018 cities in 164 countries – New England Journal


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How Quickly Things Changed

- WHO 3: 1997 – April 26, 2009
- WHO 4: April 27, 2009
- WHO 5: April 29, 2009
- WHO 6: June 11, 2009 – a *global* pandemic* was declared



* Epidemic over a wide geographic area and affecting a large proportion of the population

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H1N1 Status

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WHO Confirmed Cases



- World Health Organization (WHO) stopped reporting case numbers globally, July 16, 2009.
- 208 countries and overseas territories or communities have reported *laboratory confirmed* cases of pandemic influenza H1N1 2009, including at least 14,142 deaths.
- Numbers vary greatly by different agencies around the world and due to the change in testing, no longer meaningful.

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US Statistics

- August 30, 2009 – January 16, 2010
 - 38,988 *laboratory-confirmed* influenza-associated hospitalizations.
 - 1,805 laboratory-confirmed influenza-associated deaths.
 - 243 pediatric deaths (307 pediatric deaths since April 2009).



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US Estimates

CDC Estimates of 2009 H1N1 Cases and Related Hospitalizations and Deaths from April-December 12, 2009, By Age Group

2009 H1N1	Mid-Level Range*	Estimated Range*
Cases		
0-17 years	~18 million	~12 million to ~26 million
18-64 years	~32 million	~23 million to ~47 million
65 years and older	~5 million	~4 million to ~7 million
Cases Total	~55 million	~39 million to ~80 million
Hospitalizations		
0-17 years	~78,000	~55,000 to ~115,000
18-64 years	~145,000	~102,000 to ~213,000
65 years and older	~23,000	~16,000 to ~34,000
Hospitalizations Total	~246,000	~173,000 to ~362,000
Deaths		
0-17 years	~1,180	~830 to ~1,730
18-64 years	~8,620	~6,090 to ~12,720
65 years and older	~1,350	~950 to ~2,010
Deaths Total	~11,150	~7,880 to ~16,460

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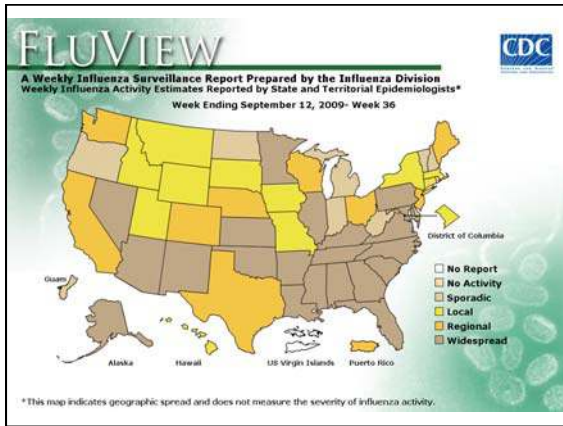
Pediatric Deaths

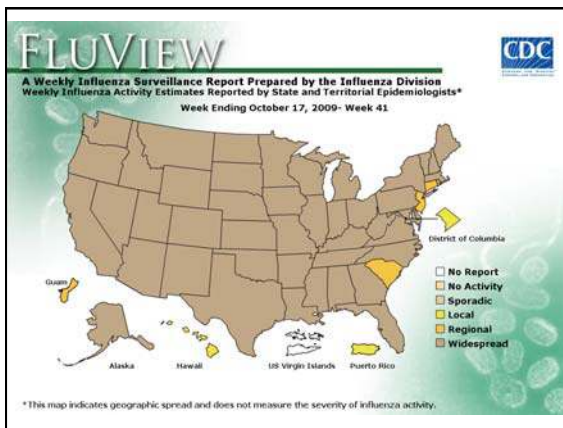
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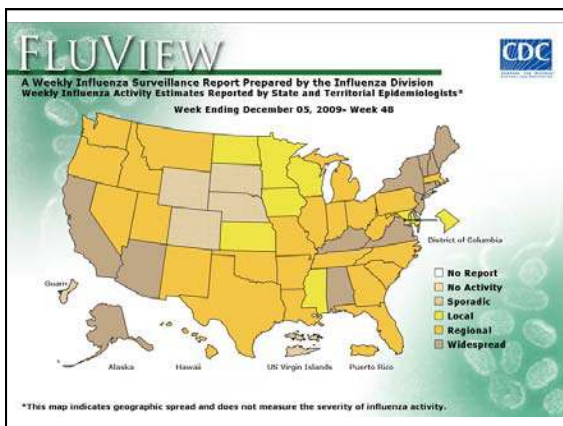
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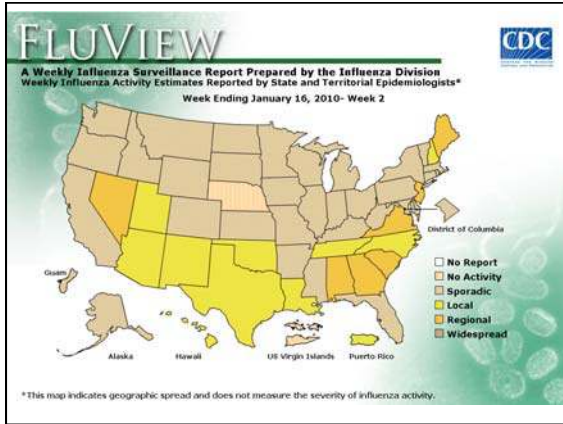
Influenza Waves

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H1N1 Clinical Overview

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Virology - Novel H1N1 Virus

- A quadruple reassortment of influenza A viruses:
 - 34.4% – North American avian influenza.
 - 17.5% – Human influenza.
 - 30.6% – Swine influenza virus, North American.
 - 17.5% – Swine influenza virus, Eurasian.

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Transmission

- Person-to-person: large droplets (sneezing, coughing), other bodily fluids possible.
- Viral shedding: 5 – 7 days. Longer periods of shedding may occur in children (especially young infants), elderly adults, patients with chronic illnesses, and immunocompromised hosts.
 - Virus shed is greatest during the first two to three days of illness.
- Incubation - median incubation period appears to be approximately two days.

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Clinical Characteristics

Clinical Characteristic	Percentage
Fever	93%
Cough	83%
SOB	54%
Fatigue/weakness	40%
Chills	37%
Myalgias	36%
Rhinorrhea	36%
Sore throat	31%
Headache	31%
Vomiting	29%
Wheezing	24%
Diarrhea	24%

August 11, 2009
Epidemiology/Surveillance Pandemic H1N1 Hospitalizations Reported to CDC as of 19 JUN 2009
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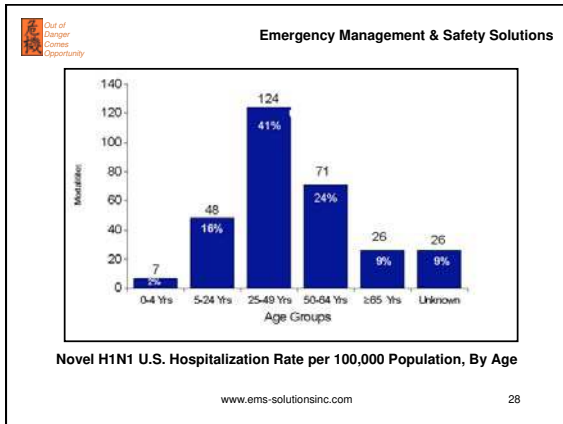
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Age Group	Rate / 100,000 Pop by Age Grp	n
0-4 Yrs	22.9	4816
5-24 Yrs	26.7	22,089
25-49 Yrs	6.97	7434
50-64 Yrs	3.92	2187
≥65 Yrs	1.3	513

*Excludes 6,741 cases with missing ages.
Rate / 100,000 by Single Year Age Groups. Descriptive source: 2002 Census Estimates, U.S. Census Bureau at <http://www.census.gov/ipeds/data/cen2002/states/00001.html>

Novel H1N1 Confirmed & Probable Case Rate in the US

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Complications

- Rapidly progressive pneumonia, respiratory failure, acute respiratory distress syndrome, severe hypoxia and multisystem organ failure.
 - Autopsies revealed edema, hemorrhage, or necrosis in the upper respiratory tract and diffuse alveolar damage.
- Bacterial super-infections of the lung.
- Neurological complications such as encephalopathy.

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Risk Groups

- Patients with co-morbidities — Among patients requiring hospitalization in the US, approximately 70 % have had at least one underlying condition.
 - chronic lung disease (37 %), immunosuppressive conditions (17 %), cardiac disease (17 %), pregnancy (17 %), diabetes (13 %), and obesity (13 %).

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Risk Groups

- Pregnant women – 6% of deaths.
 - 1% of population is pregnant at any given time.
- Indigenous populations — fourfold increase in mortality compared to the general population.
- Obesity – connection unclear.
- Older hospitalized patients - may have been the result of comorbidities, since 80 % of patients >50 had underlying medical conditions.

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A Bit of Perspective


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Major Public Health Crisis

- The last major public health crisis was in the 1940 and early 1950's:
 - Polio
 - Tuberculosis
- No one working in public health had any common experience to draw from.
 - Plans were built from research and planning assumptions as what "could happen".



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Instant Communication

myspace.com
a place for friends

Aol. digg

facebook

twitter CNN

WORDPRESS

The 1968 pandemic was discovered when large numbers of children were absent from school in Florida...

- This pandemic was broadcast 24 x 7 from the moment people started wearing masks on the street in Mexico.
- How to do you tell between fact, speculation and fiction?

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Everyone Is A Medical Expert

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Lessons Learned

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Lessons Learned

- Divided the lessons into three categories.
 1. General pandemic planning learnings.
 2. Business continuity learnings.
 3. Health care learnings.

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General Pandemic Planning Learnings

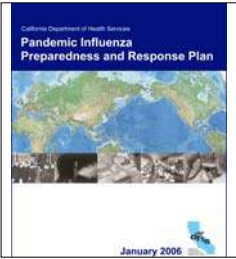
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Preparation Paid Off

- The preparation for “bird flu” (H5N1) from 2003 – 2009 paid off.
 - Federal government and state/local DPH’s revised plans (from 1968).
 - Companies had plans.
 - Antivirals had been stockpiled.



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Need Better Surveillance


- Analysis of the H1N1 virus suggests that this new strain had been circulating in pigs for **almost a decade**, and probably jumped to humans months before it was detected in Mexico.
 - Public- and animal-health communities need to help increase surveillance for emerging diseases with pandemic potential.
 - We need to build disease surveillance and response capacity in developing countries.

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Containment is NOT Possible

- We quickly learned that country containment in the age of jet travel is NOT possible.
 - Border closures did not occur because the “bug” was already out of the bag.




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WHO Alerts Caused Confusion

- There was confusion that the alert levels dictated severity rather than degree of spread.
 - Most built plans using WHO levels “assuming” a severe pandemic...



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International Complications

- International coordination was more complicated than expected.
 - Despite advice from the WHO:
 - Some countries chose to close their borders to Mexican citizens or banned pork products from the United States and Mexico.
 - Irrational pig slaughter in Egypt resulted in a disease issue later – turns out that pigs had been the garbage consumer champions.

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Need New Vaccine Technology

- Fighting the 2009 H1N1 flu with 1950s vaccine technology was challenging.
 - Vaccine production, began rapidly but when the virus grew slowly in eggs there was nothing that could be done.
- Very few vaccine producers in the US.



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Don't Underestimate Anti-Vaccine Sentiment

- Very strong anti-vaccine sentiment in the US and Europe. Issues include:
 - Immune adjuvants.
 - General belief that vaccines do "no good": "There is virtually no science to support the safety of vaccine injections on your long-term health or the health of your children."



Swine Flu FEMA. Preparing for Massive Inoculating with Dangerous Vaccine

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Don't Over-Promise

- The response from the Feds and the states, for the most part has been good.
 - The one major error was HHS' over-optimistic prediction of plenty of vaccine by late September.



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Business Continuity Learnings


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Expect The Unexpected

- It can start **anywhere**... Don't assume anything...
 - After all, wasn't this supposed to come from Asia?
 - What happened to the weeks of advance notice that we had expected?



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Plan Flexibility is Essential



- Build plans with flexibility:
 - Designing plans around the worse case scenario, left companies scrambling to develop other strategies when it was less than that...
 - Flexibility is the key!

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Revisit Plans as Events Unfold




- Yesterday's plans may be unworkable today because of new circumstances:
 - Availability of needed staff, supplies, or equipment or changes in protocols or recommendations.

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Details Are Important



- Details are important - tell people what you expect and what they need to do.
 - For example, instructions for workers to wear masks must be accompanied by instructions about which mask, what size, under what circumstances, when to change and how to receive new ones.
 - HR policies – specify leave, pay & benefit issues.

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"Media" May Provide Conflicting Information

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Social Distancing is Effective

- Social distancing helped in situations like college dorms, prisons and family settings.
 - In general avoiding large crowds was good.
- Awaiting more research and scientific papers to determine if broader social distancing like school closures was effective.

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Social Distancing Has Costs

- Social distancing has a downside as well:
 - School closings have major ramifications for students, parents and employers.
 - Sick leave and policies for limiting mass gatherings were also problematic.

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Personal Behavior Matters

- One's behavior absolutely affects how fast the H1N1 and other flu viruses will spread.
 - Handwashing.
 - Alcohol-based hand sanitizer.
 - Cough and sneeze into your elbow rather than your hand.
 - Stay home when sick.



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Communication Essential



- Get in front of the story.
 - CDC did this rather successfully.
 - WHO less so.
 - Individual companies received mixed evaluations – some good, others not so much.

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Health Care Learnings

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H1N1 Affected Different Population

- Unlike the usual 'seasonal' flu, which impacts the elderly and those with severe coexisting medical conditions, the H1N1 virus affected a different profile.
- Critical illness due to swine flu was most common in infants, middle aged people, pregnant woman, the overweight, and indigenous patients.
- However, about 1/3 of flu patients admitted to an ICU because had no underlying health problems.

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H1N1 = Unpredictable

- Lessons learned from the first 13 children at Johns Hopkins Children's Center to become critically ill from the H1N1 virus show that although all patients survived:
 - Serious complications developed quickly, unpredictably, with great variations from patient to patient.
 - Serious need for vigilant monitoring and quick treatment adjustments.



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Hospitals Were Strained


- Even with a mild outbreak, the health care delivery system was overwhelmed.
 - The surge of patients with H1N1 placed substantial strain on staff and resources.
 - The number of patients admitted to ICUs with this complication represented a 600 per cent increase compared to previous year. (Australia/New Zealand)



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Public Health Is Under-funded

- 27 states cut funding for public health from FY 2007-09.
- 13 states have purchased less than 50 percent of their share of federally subsidized antiviral drugs to stockpile for use during an influenza pandemic.
- 14 states do not have the capacity in place to assure the timely pick-up and delivery of laboratory samples on a 24/7 basis to the Laboratory Response Network (LRN).
- 11 states and D.C report not having enough laboratory staffing capacity to work five 12-hour days for six to eight weeks in response to an infectious disease outbreak, such as H1N1.


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Lack of Communication Between Health Providers

- Communication between the public health system and health providers was not well coordinated:
 - During the outbreak, many private medical practitioners reported that they did not receive CDC guidance documents in a timely fashion.
 - Other practitioners noted that CDC guidance lacked clinically relevant information and was difficult to translate into practical instructions.

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Final Thoughts

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Some Of The Public Will Deny That The Sun Will Rise

- In other words...for some it doesn't matter what you say or what you do...you are wrong!



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The Biggest Danger? Ho Hum

- The danger now is that last year's relatively mild pandemic will create a false sense of security and complacency.
 - The reality is that next time we might not be so lucky — especially given that this time most of the world's population, living in developing countries, had no access to either vaccines or antiviral drugs.




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Ready or Not?



- The report contains state-by-state health preparedness scores based on 10 key indicators to assess health emergency preparedness capabilities.
 - <http://healthyamericans.org/reports/bioterror09/>

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Going Forward - Third Wave?

- Your Challenge?
 - Be ready anything – no one knows what is going to happen in the next few months.



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Thank you

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