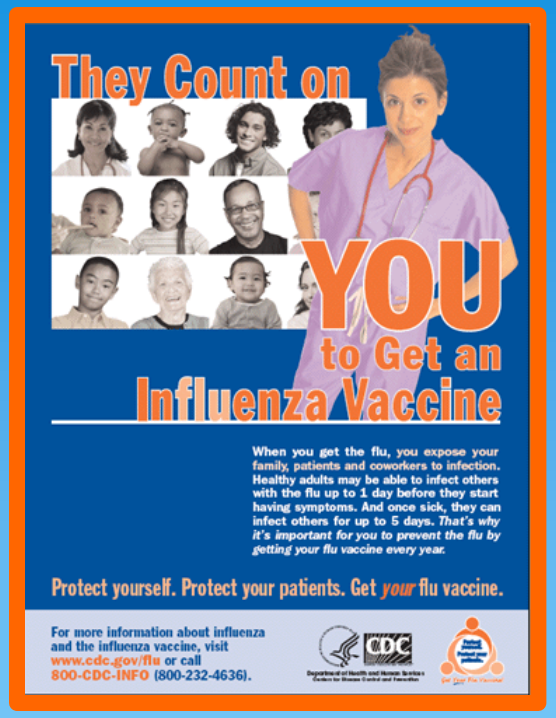


Influenza Vaccination in Healthcare Personnel

Ying "Mai" Kung

DNP, MPH, FNP-BC

The 5th Annual DNP Conference

September 21, 2012

Bio for Mai Kung

Disclosure Information: None to disclose

* FNP for over 20 years & RN for over 30
* DNP from University of Florida
* Post-master's Nurse Educator Certificate from Florida State University
* MN & MPH from Emory University
* BSN from University of Texas at Austin
* Full-time Faculty at Florida State University College of Nursing
* President of Tallahassee Area Council of Advanced Practice Nurses
* Blog author for ADVANCE for NPs & PAs: DNP Answers
* 2010 University of Florida DNP Academic Excellence Award recipient
* Research interest: improving patients' access to safe, high-quality healthcare

Purpose & Outline

* Purpose:
  * Share the process & results of my DNP project aimed to increase influenza vaccination in HCP at a university health center
* Outline
  * Overview of influenza & importance of vaccination
  * QI project

Objectives

By the end of this presentation the participants will be able to:

* Identify the Healthy People 2020 Objective on HCP influenza vaccination.
* Name 2 common facilitators and barriers to HCP influenza vaccine uptake.
* Name 2 most effective interventions to improve influenza vaccine uptake found in this study.

Flu Facts

Epidemiology

* Infects 5-20% of population per year
* Influenza and pneumonia:
  * 8th leading cause of death
* >200,000 hospitalizations per year
* 3,000-49,000 (2003-2004 season) deaths per year
* Financial impact about 37.5 billion per year

Flu Facts

Signs and Symptoms

Fever

HA

Body aches

Fatigue

Cough

Rhinorrhea

Sore throat

N/V/D

Note that some persons may have atypical presentations

Flu Facts

Transmission

* **How it is transmitted**
  * Coughing, sneezing…
  * Touching a contaminated surface then touching mouth or nose
* **Transmit/infect others when you have no symptoms**
  * Start the day before you are sick
    * Healthy adults: continue shedding for 3-5 days
    * Kids: continue shedding for 10 or more days
    * Immunocompromised: can shed viruses for weeks or months
    * LAIV: can potentially shed virus after vaccination

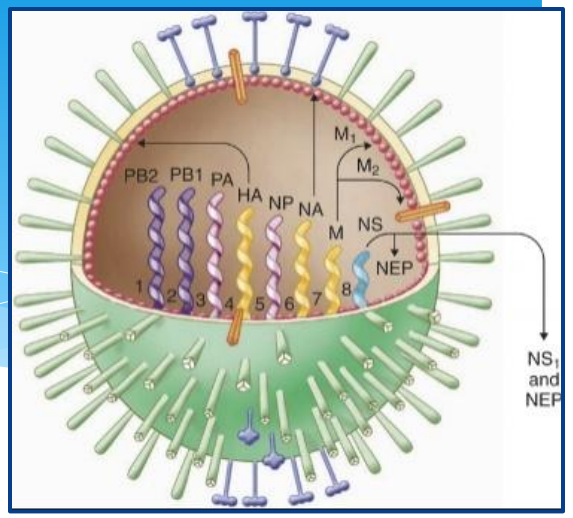
Flu Facts

Transmission

* Randomized, prospective, double-blind, controlled trial over 3 influenza seasons at 2 hospitals (Wilde et al., 1999):
  * 7 – 26% of unvaccinated HCP had serologic evidence of influenza infection
  * 42% could not recall having a febrile illness
* Surveyed 1000 nurses in a large tertiary hospital & 513 completed this survey (Ofstead et al., 2008):
  * 78.4% respondents had influenza-like illness in the past year
  * 81.8% of them worked while ill
* **Incubational period 1-7 days, average of 2 days**

Flu Facts

Types of Influenza Viruses



* **Type A:** Most virulent/Pandemics
  * Subtyped based on surface glycoproteins
    * Hemagglutinin (HA): H1, H2, H3, H5
    * Neuraminidase (NA): N1, N2
      * Seasonal Flu: H1N1 & H3N2 (greatest morbidity)
      * 2009 H1N1: swine (S-OIV), pandemic, novel H1N1
      * Avian (Bird) flu: H5N1
* **Type B:** Less virulent/less rapid antigenic drift
  * Yamagata lineage
  * Victoria lineage
* **Type C:** Rarely causes significant influenza like illnesses (ILI)

Flu Facts

Antiviral Resistance/Susceptibility

2008-2012

	Neuraminidase Inhibitors (NI)		Adamantanes (M2 Channel Inhibitors)
	Oseltamivir (Tamiflu)	**Zanamivir (Relenza)**	**Amantadine (Symmetrel) Rimantadine (Flumadine)**
Influenza A			
Seasonal H1N1 (2008-2009)	**R**	S	S
Seasonal H3N2 (2008-2012)	S	S	**R**
2009 H1N1 (2009-2012)	S	S	**R**
Influenza B (2008-2012)	S	S	Not indicated

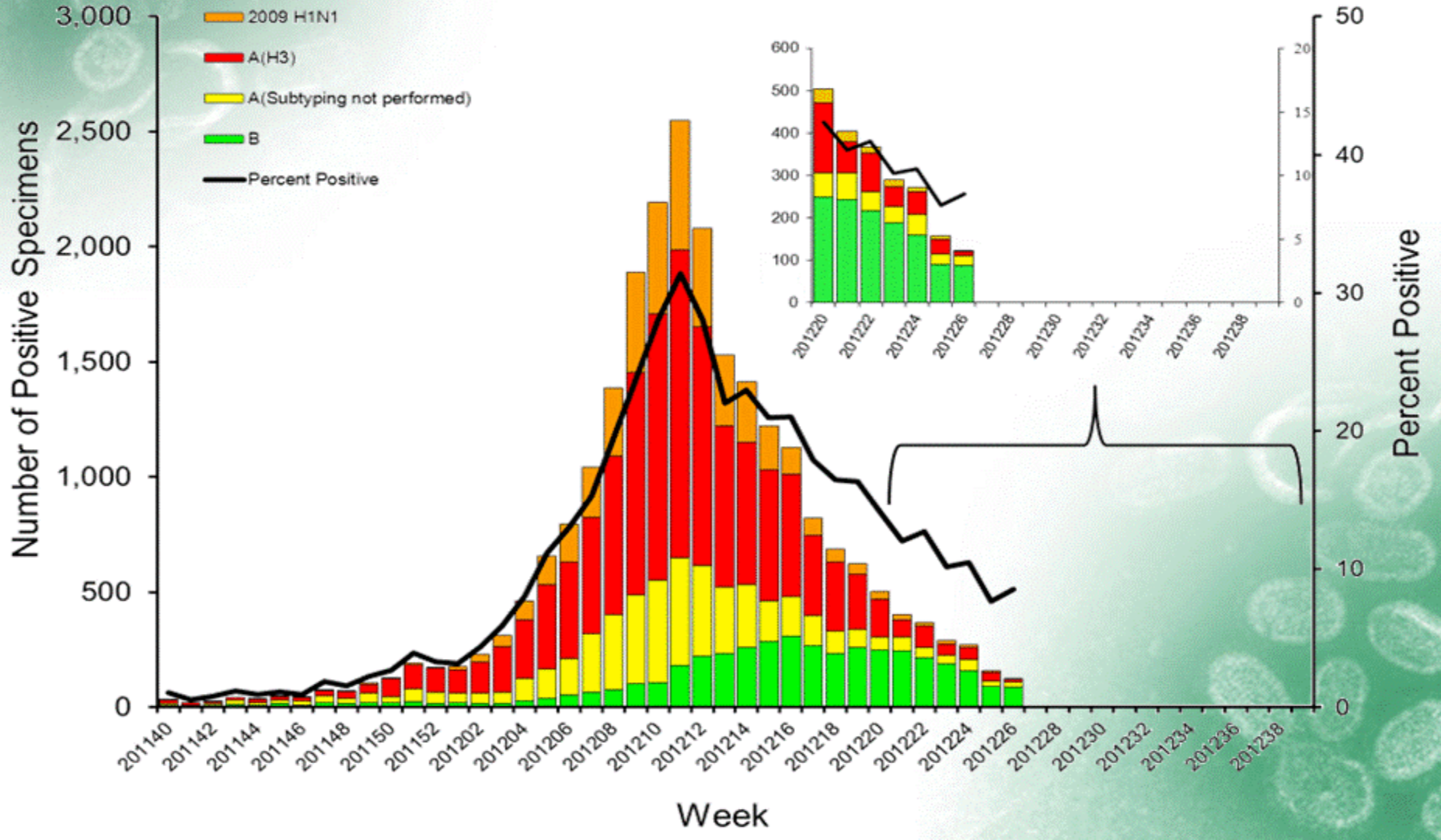
R= Resistant **S= Susceptible**

FLUVIEW

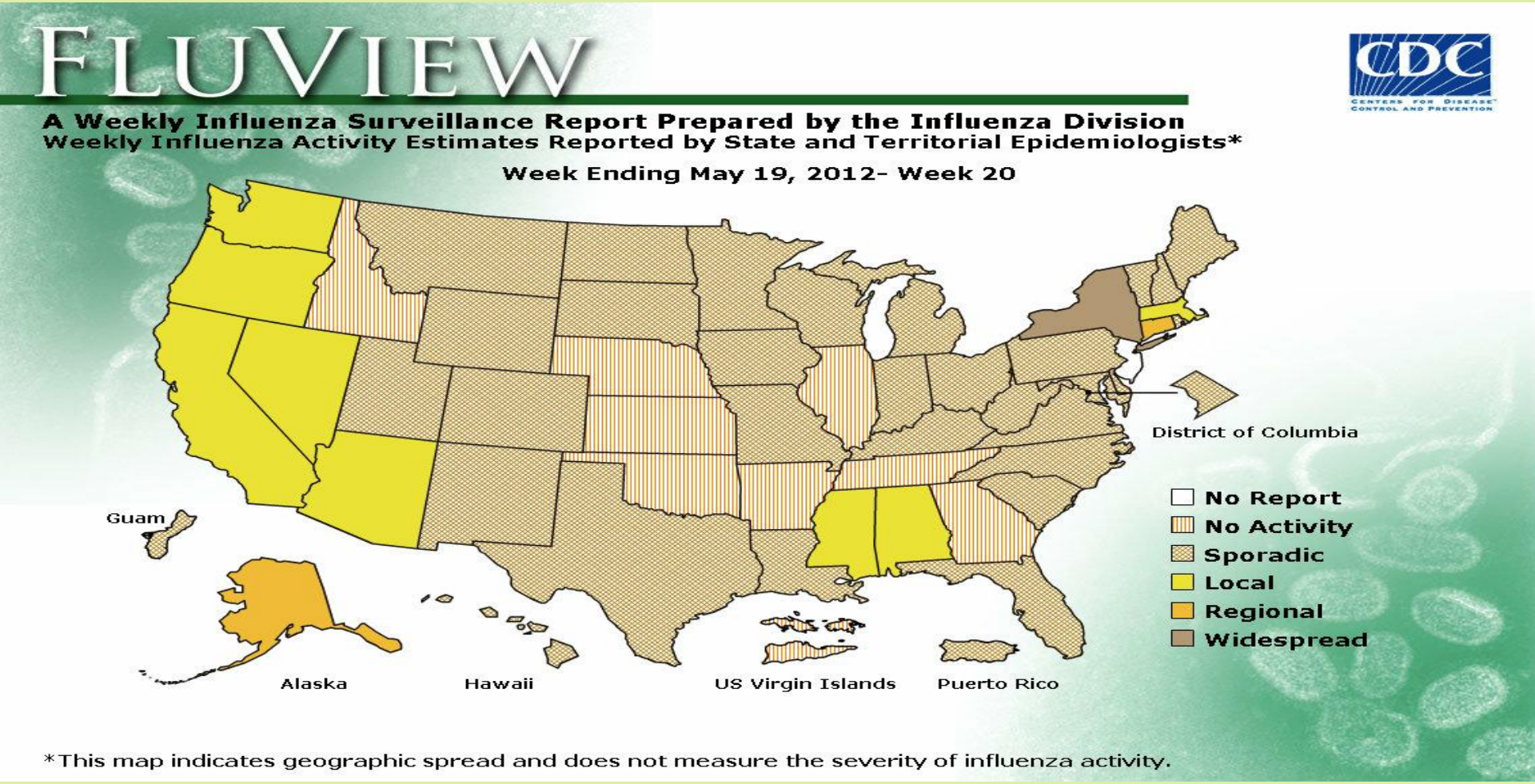
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

CDC Centers for Disease Control and Prevention

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2011-12



Flu Activity & Surveillance



http://www.cdc.gov/flu/weekly/usmap.htm

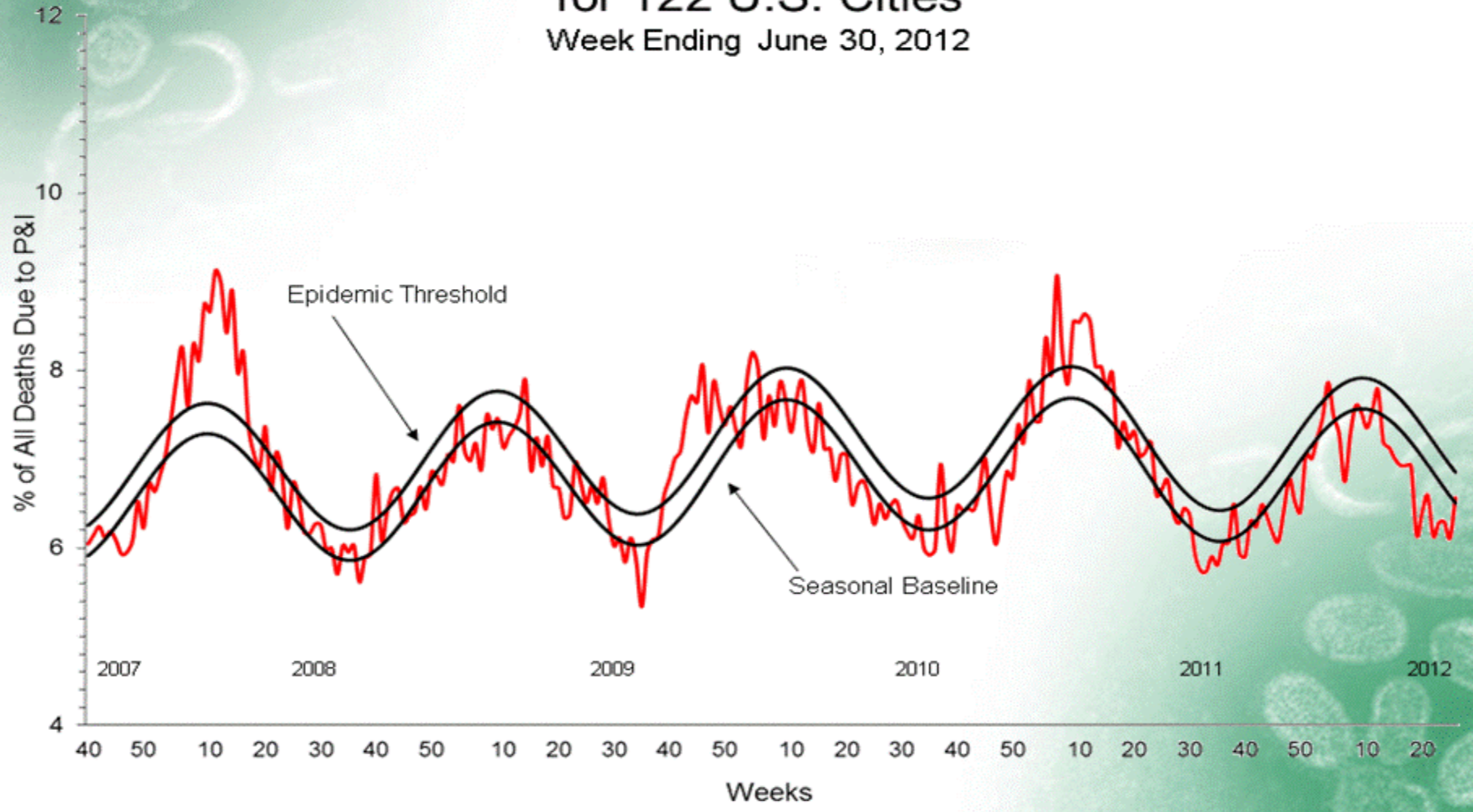
FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Pneumonia and Influenza Mortality for 122 U.S. Cities

Week Ending June 30, 2012

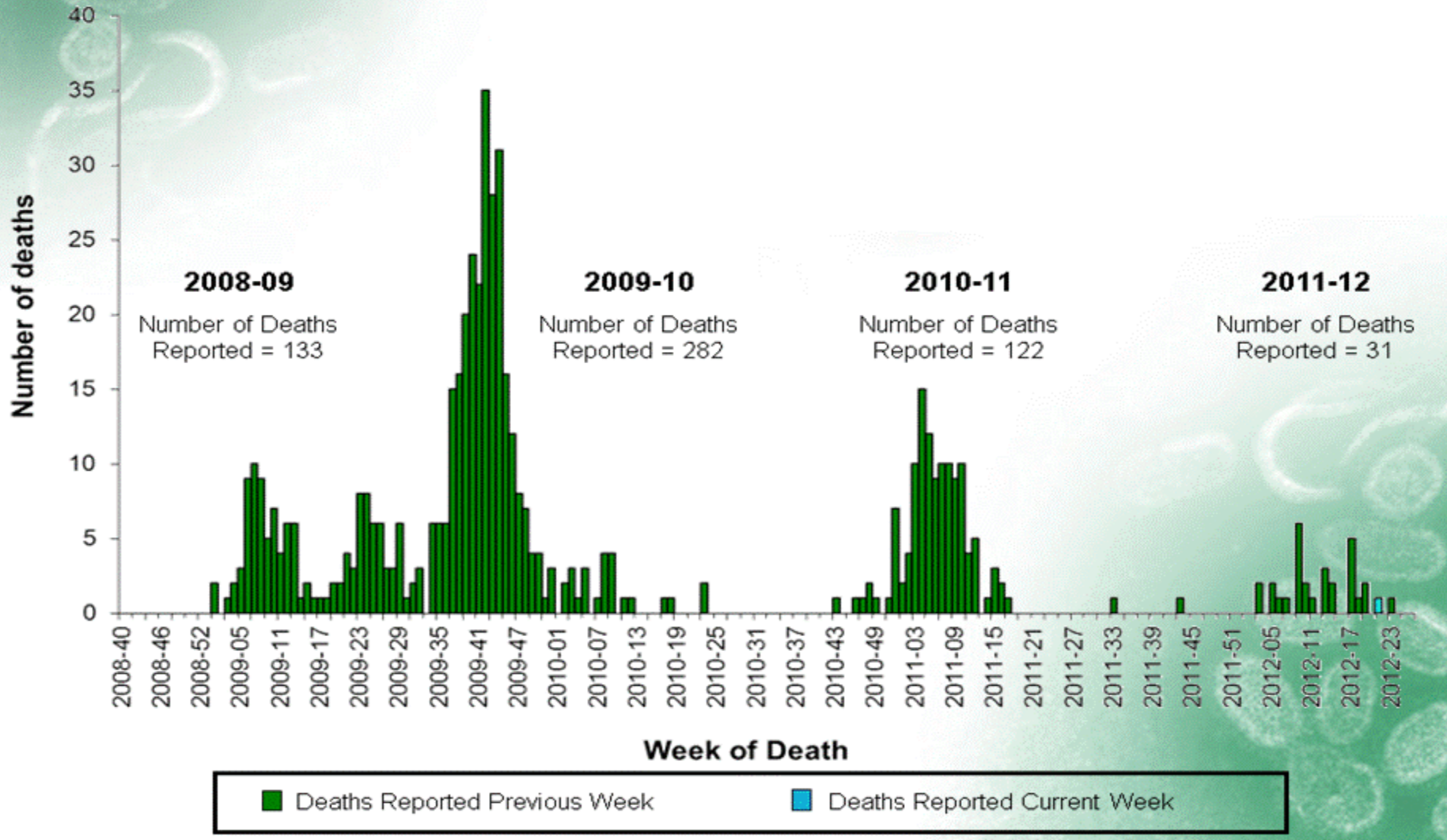


FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

CDC

Number of Influenza-Associated Pediatric Deaths by Week of Death: 2008-09 season to present

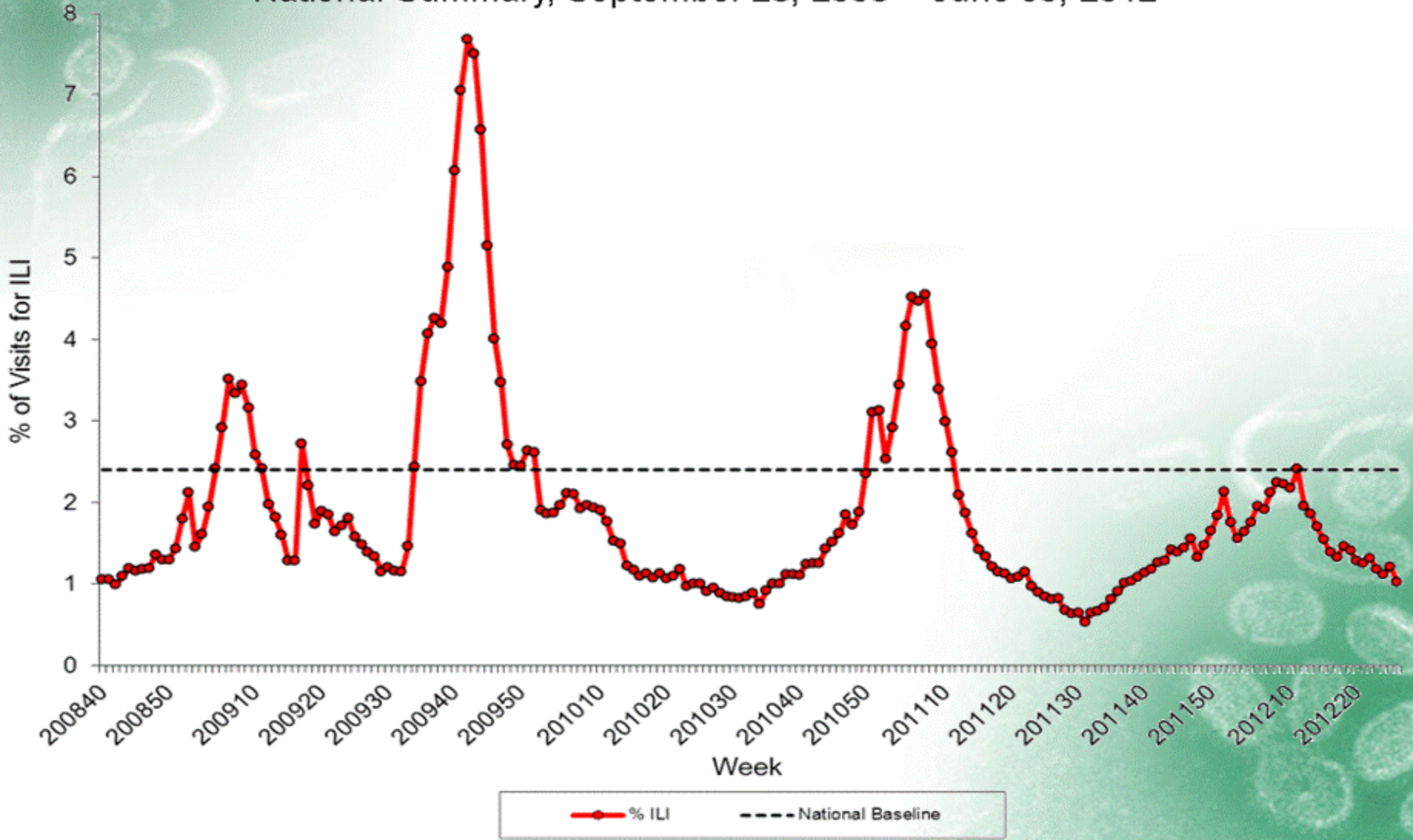


FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, September 28, 2008 – June 30, 2012



Influenza Diagnostic Tests

	Time	ID Viral Type	ID Viral Subtypes	Sensitivity	Comments
Culture	3-10 days	Yes	Yes	Gold Standard	Not widely available
Rapid Cell Culture	1-3 days	Yes	Yes		
RT-PCR Reverse Transcriptase Polymerase Chain Reaction	1-6 hrs	Yes	Yes	86-100%	Gold Standard
DFA or IFA Direct or Indirect Fluorescent Assays	1-4 hrs	Yes	No	47-97%	Require technical expertise to perform
RIDT Rapid Influenza Diagnostic Test	≤ 30 mins	Varies	No	10-70%	"+" test: rule in flu "-" test: unable to rule out flu
Serology	2+ wks	NA	NA	Lack of standard	Generally not recommended Paired testing 2-3 wks apart "+" test: ≥ 4 fold increase

Flu Vaccine Facts

* Safe, most effective way to prevent influenza
* Requires yearly vaccination
* Prevent transmission to patients, coworkers and families
* 3 strains of viruses (2 A & 1 B) identified by the FDA, WHO, CDC and others as to most likely to cause illness
* Becomes effective 2 weeks after receiving vaccine

Flu Vaccine Facts

Effectiveness

* Healthy immune system → more effective
* When well matched:
  * 50-90% effective in healthy adults <65 year olds
* When less well matched:
  * 47-77% effective
  * 90% effective in preventing hospitalization in healthy adults
* Elderly & people with chronic medical condition:
  * 30-70% prevent pneumonia or hospitalization
* Nursing home residents
  * 50-60% from pneumonia or hospitalization
  * 80% from death

Benefits of HCP Vaccination

* Herd immunity
* Higher vaccination level → lower risk of nosocomial flu cases
* Vaccinated hospital HCP were less likely to report influenza-like-illness than unvaccinated HCP → reduced absenteeism
* Staff vaccinations in nursing home
  * 5 vaccinations→ prevent one ILI (influenza like illness)
  * 6 vaccination → prevent 1 ILI practitioner consultation
  * 8 vaccinations → prevent 1 death
  * 20 vaccination → prevent 1 ILI hospital admission

Side Effects of Flu Vaccines

Flu Shot (TIV)

Inactivated Viruses

Indicated for anyone ≥ 6 months

* Soreness, redness, or swelling at injection site
* Fever (low grade)
* Aches
* Occurs right after the shot and lasts 1-2 days

[32] Centers for Disease Control and Prevention (CDC). Seasonal Influenza. http://www.cdc.gov/flu/about/qa/flushot.htm#cantheflu. Updated July 27, 2011. Accessed August 15, 2011.

Side Effects of Flu Vaccines

FluMist

* Runny nose
* Headache
* Sore throat
* Cough
* Wheezing**
* Vomiting**
* Muscle aches**
* Fever**

Live Attenuated (Weakened) Viruses
Indicated for non-pregnant women ages 2-49

Intranasal flu vaccine being administered to a child.
(Source: MedImmune Inc.)

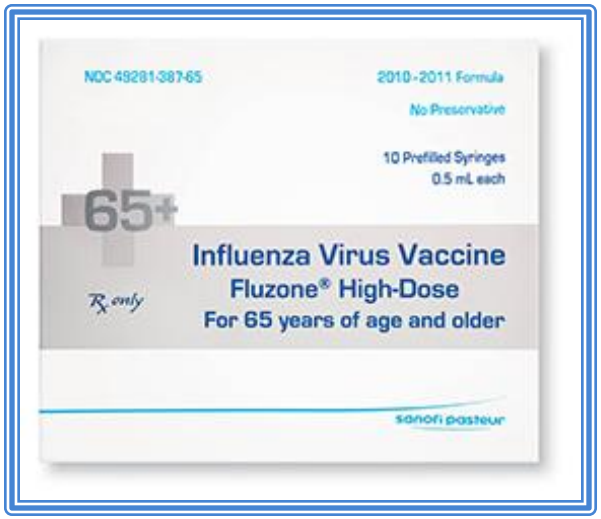
**in children

Intradermal Flu Vaccine (ID)

* "Fluzone Intradermal®" became available in 2011-2012
* Smaller dose of antigen (40% less)
* Smaller needles (0.06 in or 1.5 mm)
* Preservative-free (no thimerosal)
* Indicated for ages 18-64
* Common SE: mild
  * Redness, swelling, toughness, pain, and itching at the injection site (subsides within 3-7 days)
  * Headache, muscle ache, and tiredness

Fluzone High-Dose (IM)

* Approved in 2009
* Contains 4x's amount of antigen
* For Ages 65 and over
* Higher immune response
* Safety profile similar to seasonal TIV
* Common adverse events:
  * Pain, redness and swelling at the injection site
  * Headache, muscle aches, fever and malaise



Who Should Not Receive Flu Vaccine

* Severe allergy to chicken eggs
* Severe reaction to an influenza vaccination
* Developed Guillain-Barré syndrome (GBS) within 6 weeks of getting an influenza vaccine (less than 1 in a million)
* Children less than 6 months of age
* People with moderate-to-severe illness with a fever (they should wait until they recover to get vaccinated)

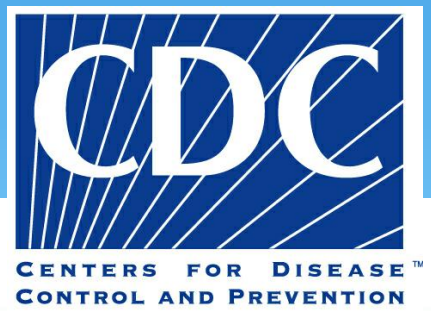
Reasons for Flu-Like Symptoms After Vaccination

"Prior Bad Experience"

* Exposed to flu virus right before or within 2 wks of vaccination
* Sick from other (non-flu) viruses
* Exposed to a different flu virus not included in the vaccine
* Some do not develop protection from vaccination related to weakened immune systems

Reasons for Influenza Vaccination

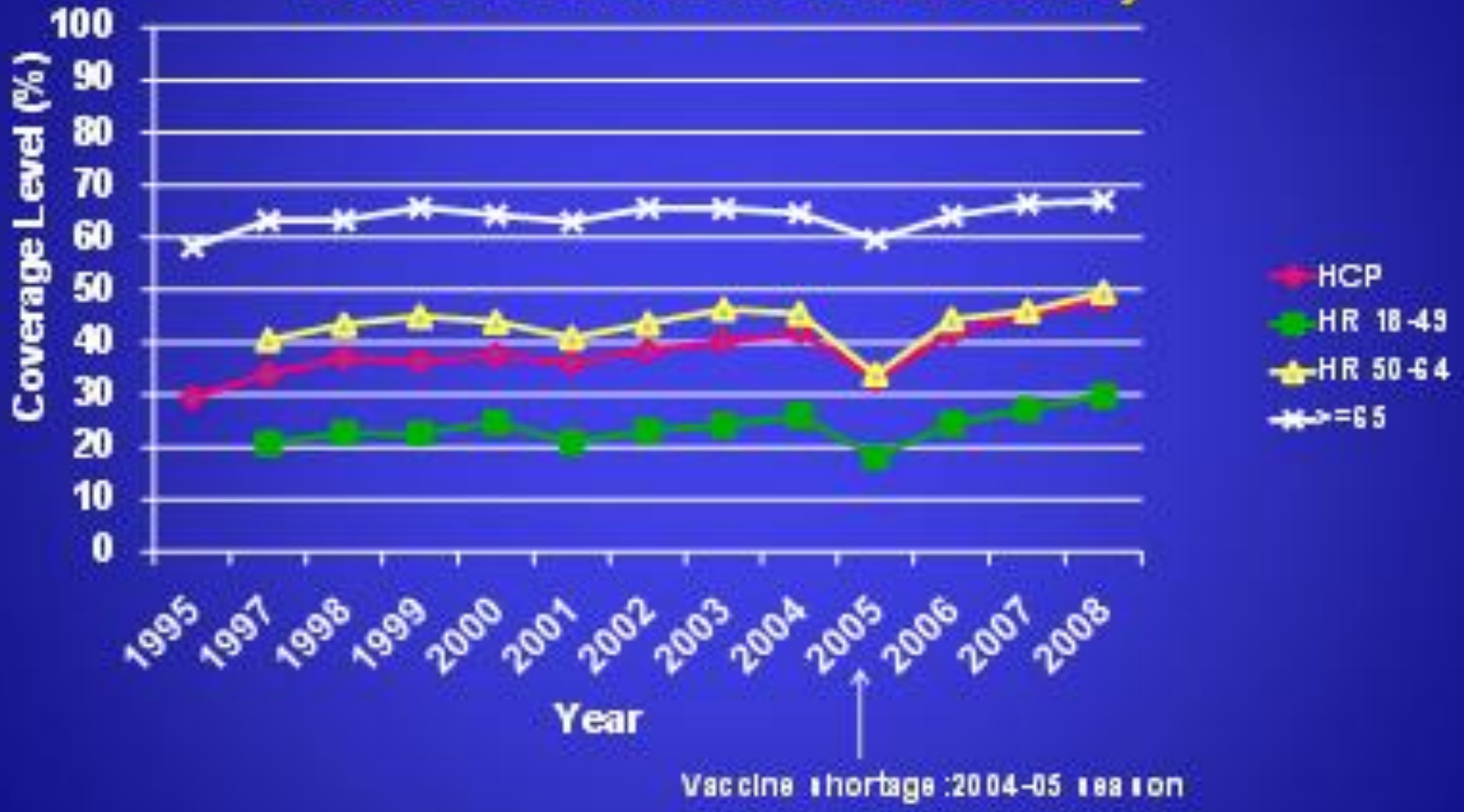
* Protection from flu
* Stop the transmission of flu
* Limitation in diagnostic testing
* Antiviral resistance
* Pandemic situation- may not have enough medications to go around



ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES

American Medical Directors Association

Self-Reported Influenza Vaccination Coverage Levels Among Selected Priority U.S. Populations, 1995-2008, National Health Interview Survey



Source CDC.
http://www.cdc.gov/flu/professionals/vaccination/pdf/vaccinetrend.pdf

Flu Vaccine Recommendation For HCP Since 1984

Goal HCP Vaccination Rate	Actual HCP Vaccination Rate
Healthy People 2010 Objective **60%**	<50% before 2008 52.9% 2008-2009 61.9% 2009-2010
Health People 2020 Objective **90%**	63.5% 2010-2011

Regulations

* **The Joint Commission** requires all critical access hospital, hospital, and long-term care accreditation programs to provide influenza vaccine to all staff, volunteers, and independent licensed practitioners (2007).
* **CMS** requires acute care hospitals to report HCP immunization rate as part of the Hospital Inpatient Quality Report Program beginning in Jan. 2013.
  * 2% payment reduction if failed to report

UF

UNIVERSITY of FLORIDA

College of Nursing

DNP Project

Setting

* State University student health center located in the southeastern U.S.
  * # of employees: ≈115
  * Student population: ≈41,000
  * Annual visits to the health center: ≈78,000
* A champion in raising awareness of the importance of influenza vaccination for the university students and staff since 2000

Purpose of Study

* QI project aimed to increase HCP influenza vaccination rate
* Questions:
  * What is the baseline HCP influenza vaccination rate?
  * What are facilitators for vaccine uptake?
  * What are barriers to vaccine uptake?
  * What interventions are most likely to improve HCP vaccination rate?
  * How effective are planned interventions to improve HCP vaccination rate?

Evidence Based Practice

PICO Statements

* P: Patient, Population, or Problem
  * Increase HCP influenza vaccination rate
  * Measure HCP influenza vaccination rates
  * Identify perceived facilitators and barriers to vaccine uptake
* I: Intervention
  * Plan and implement specific interventions to increase vaccination rate
* C: Comparison
  * Before and after intervention
* O: Outcome
  * HCP influenza vaccination rate
  * Intervention effectiveness

Method

* Target population:
  * All employees (paid or unpaid) ages 18-64
* Cross-sectional descriptive study design
* Pre-intervention survey: Assess baseline vaccination rate & perceptions
  * Development of survey instrument: Spring semester of 2009 (Plan)
  * IRB proposals: approved by 2 universities March 2009 (Plan)
  * Survey administration: May 1 – June 1, 2009 (Do)

Method (con't)

* Analyzed pre-intervention survey data (Study)
* Planned interventions (Plan)
* Presented information & recommendations to administrators for approval (Plan)
  * June to August, 2009
* Implemented interventions (Act)
  * Aug. 2009 through 2010 influenza season

Method (con't)

* Post-intervention survey
  * Modified post-intervention survey to reflect changes (Plan)
  * Submitted addendum to IRB: Approved in Oct. & Nov. 2009 (Plan)
  * Administered survey between Jan. 4 and Feb. 4, 2010 (Do)
* Data analysis for post-intervention survey & compared with pre-intervention survey data (Study)
* Recommendation and dissemination of results (Act)

Survey Instruments

	Pre-Intervention	Post-Intervention
Demographics	Yes	Yes
Influenza vaccination status	2007-2008 2008-2009	2008-2009 2009-2010
19 Facilitators variables	Yes	Yes
21 Barrier variables	Yes	Yes
Knowledge & attitudes	Yes	Yes
Effectiveness of interventions	x	Yes
Impact of 2009 H1N1 epidemic	x	Yes

Surveys were designed with permission from Dr. Anne Cowan & from Dr. Kristin Nichol & Dr. Kim Lipczynski and pilot tested

Pre-Intervention Survey Results

Demographics

Administered May 1 – June 1, 2009

	Pre-Intervention Survey
Response rate	*N* = 91 (78%)
Age 45-64	*n* = 53 (59%)
Caucasian	*n* = 58 (69%)
Female	*n* = 79 (88%)
Clinical staff	*n* = 57 (67%)
Worked 30+ hrs per wk	*n* = 83 (93%)
30+ hrs of direct pt contact per wk	*n* = 42 (48%)

Pre-Intervention Survey Results

* Vaccination rates:
  * 2007-2008 = 72.2%
  * 2008-2009 = 75.6%
* All vaccinated respondents reported receiving a TIV (flu shot)
* 96% (65/68 people) vaccinated received a flu vaccine at work

What are some of the main reasons that would prompt you to receive a flu vaccine?

Facilitators

(check all that apply)

* Flu vaccine is recommended
  * By experts in the field (i.e. CDC)
  * By my supervisor/administrator
  * By my healthcare provider
  * By my co-workers
  * Others
* Influenced by others who received flu vaccination
  * Supervisor/administrator
  * Healthcare providers
  * Co-workers
  * Family members
  * Other _____
* I consider myself at risk (due to age, health, sick friends or family)
* Protect myself and my family from the illness
* Protect patients from illness
* The vaccine will reduce absenteeism at work
* The vaccination process/procedure/location is (are) convenient.
* The vaccine is free and provided by my employer
* High healthcare workers vaccination rate shows high quality of care for the patients/it is part of the quality improvement (QI) process at work
* Required by work
* Others, please specify

Pre-Intervention Survey Results

	Facilitators
1	Desire to protect self/family (66%)
2	Free vaccine (65%)
3	Vaccine is recommended by experts (58%)
4	Vaccination process is convenient (48%)
5	Desire to protect patient (45%)
6	Recommended by my healthcare provider (41%)

What are the main reasons that you, personally, might NOT get a flu vaccine?

Barriers

(check all that apply)

* No reason, I get it regularly
* Not required/not needed/healthy
* Only for older adults/seniors
* Not concerned about getting flu/won't happen to me
* Limited contact with high risk patients
* Shortage of flu vaccine
* Not in priority group/others need it more
* Vaccine not effective/doesn't cover all strains of flu
* Too busy/forgot
* Not convenient/too much trouble
* Prior bad experience
* Cost too much
* Concerned that vaccine will make me sick/side effects of vaccine
* Dislike needles
* Allergy to flu vaccine/allergy to egg
* Against my religion
* My health care provider has not recommended that I receive the vaccine
* Don't know when the best time to get the vaccine
* The vaccine is not available to me
* I receive the vaccine in the previous flu season(s); therefore, I don't need it
* Other, please specify

Pre-Intervention Survey Result

	Barriers
1	Concerned about vaccine side effects (22%)
2	Not in priority group/others need it more (13%)
3	Not required/not needed/healthy (11%)
4	Too Busy/forgot (9%)
5	Prior bad experience (9%)
6	Shortage of flu vaccine (8%)

Evidence Based Practice

Level of Evidence	CDC, ACIP, HICPAC Recommendation Use in Combination
IA	**Flu vaccine** to all HCP annually
IB	**Free** flu vaccine & **convenient** process
IB	**Educate** on benefits of vaccine & risks/sequelae of illnesses
IB	**Monitor** flu vaccination & declination at regular intervals **Provide feedback** to staff
II	Obtain signed **declination form**
II	Use vaccination rates as an indicator for **healthcare quality and safety**

Intervention #1

Education on Influenza & Vaccine

Variables Influenced Behavior

* Recommended by experts & their HCP
* Protect self, family & pt
* Concerned about SE
* Prior bad experience
* Not needed/healthy
* Not in priority group/ others need it more

Intervention

* Delivered by a recorded PP presentation
* Available on the intranet
* Voluntary participation
* Employees watched on their own time

Intervention #2 & 3

Free & Convenient

Variables Influenced Behavior:

* Vaccine is free
* Vaccination process is convenient
* Too busy

#2: Continue to provide free influenza vaccine

#3: More convenient vaccination procedure

* Old procedure: appt. with employee health nurse
* New procedure: mobile cart
  * Available on each floor
  * Available any time during operating hours

Intervention #4

Declination Form

Adoption of a declination form

* Required for employees who did not receive a flu vaccine at work
* Self-reporting of vaccine status
* Better tracking of vaccine uptake by employees

Survey Results

Demographics

	Pre-Intervention Survey	Post-Intervention Survey
Response rate	*N* = 91 (79%)	*N* = 62 (53%)
Age 45-64	*n* = 53 (59%)	*n* = 48 (77%)
Caucasian	*n* = 58 (69%)	*n* = 40 (66%)
Female	*n* = 79 (88%)	*n* = 53 (86%)
Clinical staff	*n* = 57 (67%)	n = 41 (71%)
Worked 30+ hrs per wk	*n* = 83 (93%)	*n* = 58 (94%)
30+ hrs of direct pt contact per wk	*n* = 42 (48%)	*n* = 30 (48%)

*80% of respondents in the post-intervention survey also participated in the pre-intervention survey

Survey Results

HCP Vaccination Rate

	Pre-Intervention Survey 2009	Post-Intervention Survey 2010
Vaccination rate: The year before the survey	72.2% (2007-2008)	70.7% (2008-2009)
Vaccination rate: The year of the survey	75.6% (2008-2009)	77.4% (2009-2010)
% Change	3.4%	6.4%
Statistics	*Chi Square Test* (n = 90) p = .001	Fisher Exact Test (n = 58) p = .001
Received at work	96% (65 out of 68)	96% (47 out of 49)

100% of those received an influenza vaccine received a TIV

Survey Results

Facilitators

Top 6 of 19 Variables

	Pre-Intervention Survey	Post-Intervention Survey
1	Desire to protect self/family (66%)	Desire to protect self/family (71%)
2	Free vaccine (65%)	Free vaccine (63%)
3	Vaccine is recommended by experts (58%)	Vaccine is recommended by experts (63%)
4	Vaccine process is convenient (48%)	Vaccine process is convenient (52%)
5	Desire to protect patient (45%)	Reduce absenteeism (47%)
6	Recommended by my healthcare provider (41%)	Desire to protect patient (45%)

Survey Results

Barriers

Top 6 of 21 Variables

	Pre-Intervention Survey	Post-Intervention Survey
1	Concerned about vaccine side effects (22%)	Concerned about vaccine side effects (19%)
2	Not in priority group/others need it more (13%)	Dislike needles (10%)
3	Not required/not needed/healthy (11%)	Not required/not needed/healthy (8%)
4	Too Busy/forgot (9%)	Too busy/forgot (8%)
5	Prior bad experience (9%)	Shortage of flu vaccine (8%)
6	Shortage of flu vaccine (8%)	Vaccine not effective (6%)

Discussion & Implication

Consistent With Existing Literature

Barriers

* Fear of SE
* Insufficient time
* Inconvenience
* Cost of vaccination
* Fear of needles
* Perceived low risk for influenza infection

Facilitators

* Protect self, family, patient
* Free vaccination
* Convenient vaccination process

Survey Results

Intervention Effectiveness

Intervention	Rating of 4 or 5*	Correlation with Vaccine Uptake in 2009-2010
Free Vaccine	89%	$r = .557$, $p = .001$
Convenient Process	80%	$r = .321$, $p = .016$
Education	59%	$r = .047$, $p = .404$
Declination Form	40%	$r = .159$, $p = .209$

*Likert scale rating 1 (ineffective) to 5 (effective)

Discussion & Implication

Consistent With Existing Literature

* Implementation of concurrent, multi-faceted interventions are more effective than single modality
* Free & Convenient: Providing free vaccination with convenient vaccination location and procedure were highly associated with increased vaccination rates
* Education: Not necessarily ensure vaccine uptake
  * Only half of the respondents completed the education program
  * Suggest: Face-to-face encounters & opportunity to ask questions
* Declination Form: not predictive of vaccination rates, but associated with higher vaccination rate in institutions that required one

FLUVIEW

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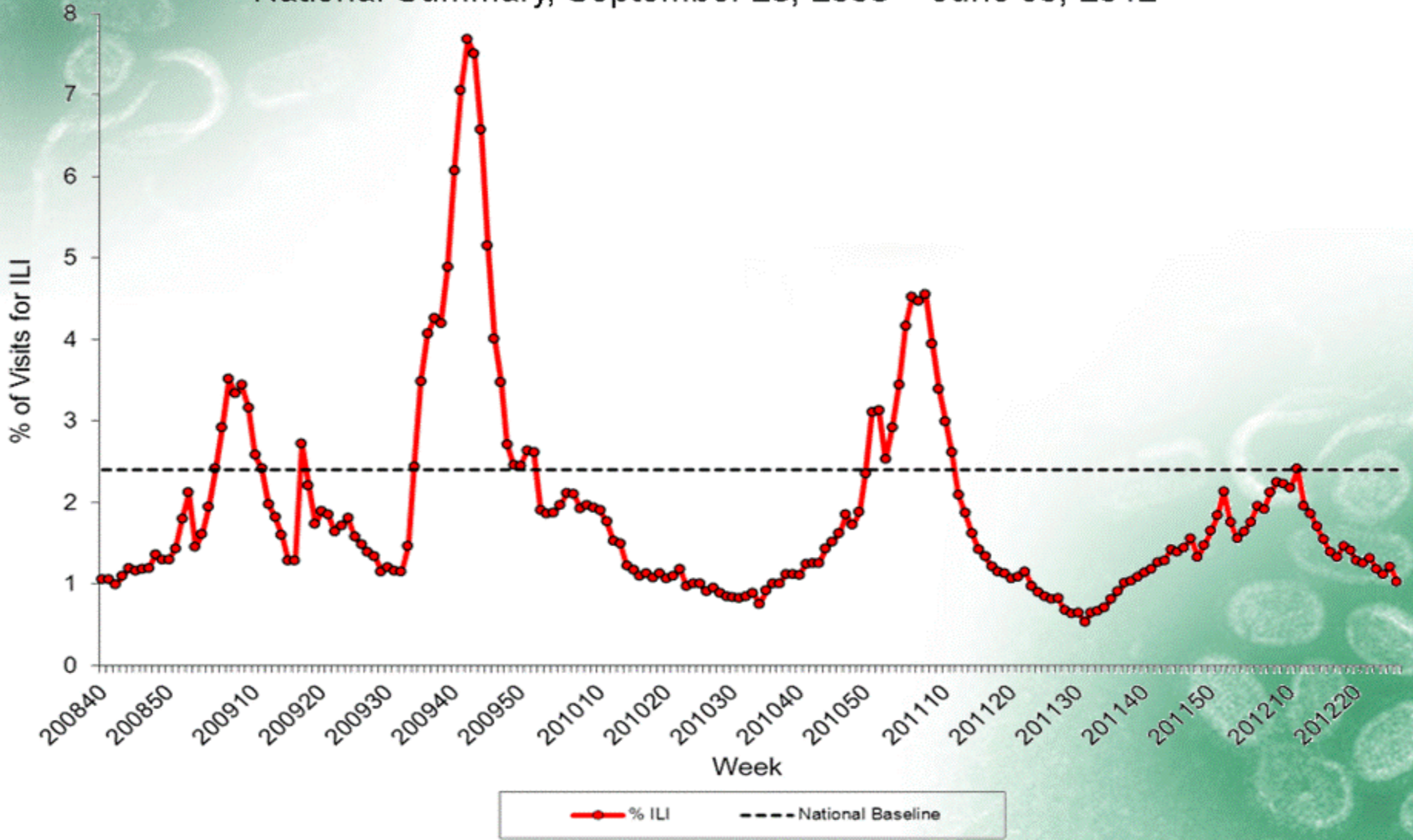
CENTERS FOR DISEASE CONTROL AND PREVENTION

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, September 28, 2008 – June 30, 2012



2009 H1N1 Epidemic

An Unanticipated Event

* Potentially Increased Vaccine Uptake
  * Fear of influenza infection
  * Desire to be protected from influenza infection
  * Felt more pressure to be vaccinated

2009 H1N1 Epidemic

An Unanticipated Event (Con't)

* Potentially Decreased Vaccine Uptake
  * 2 influenza vaccines (2009-2010 season): Seasonal trivalent & 2009 H1N1 monovalent vaccines
  * Resources diverted for the manufacturing of 2009 H1N1 vaccine
  * Shortage for seasonal influenza vaccine
    * HCPs declined vaccines so higher risk patients may have access
    * Harris (2010) estimated 7% HCP named unavailability of vaccine as a reason for not receiving a seasonal vaccine
  * 2009 H1N1 was the dominating circulating subtype
    * Not covered by seasonal trivalent influenza vaccines

2009 H1N1 Pandemic

The novel H1N1 flu affected my decision:

1. To receive a SEASONAL flu vaccine: *n* = 9, 18%
2. Not to receive a SEASONAL flu vaccine: *n* = 5, 6%
3. My decision to receive Seasonal flu vaccine is not affected by the novel H1N1 flu: *n* = 38, 76%

Limitations

* Self reported vaccination and opinions
* Small sample size and poor response rate on the post-survey (n = 62, 53%)
* Selection bias: convenient samples
* Difficult to assess the true impact of the 2009 H1N1 pandemic on the outcomes

Summary

* Influenza causes significant morbidity & mortality
* Expert recommend for **ALL** HCP to be vaccinated
* Health People 2020 goal for HCP vaccination is 90%
* QI project → increased vaccination uptake
* Facilitators & barriers to HCP vaccine uptake were consistent with literature
* Most effective Interventions: Free & Convenient
* QI project over a span of 18 months

Future Implications

* Available: Offer free vaccine to all HCP regardless of their job title or pay status
* Accessible: Offer convenient vaccination process
  * Time, mobile cart, no need to leave their work station
* Education:
  * Part of the employees' work assignment
  * Face-to-face sessions & ability to ask questions
  * Targeted for knowledge level & vaccination history
* Understanding specific characteristics associated with vaccine uptake & declination
* May need to entertain mandatory vaccine policy

References

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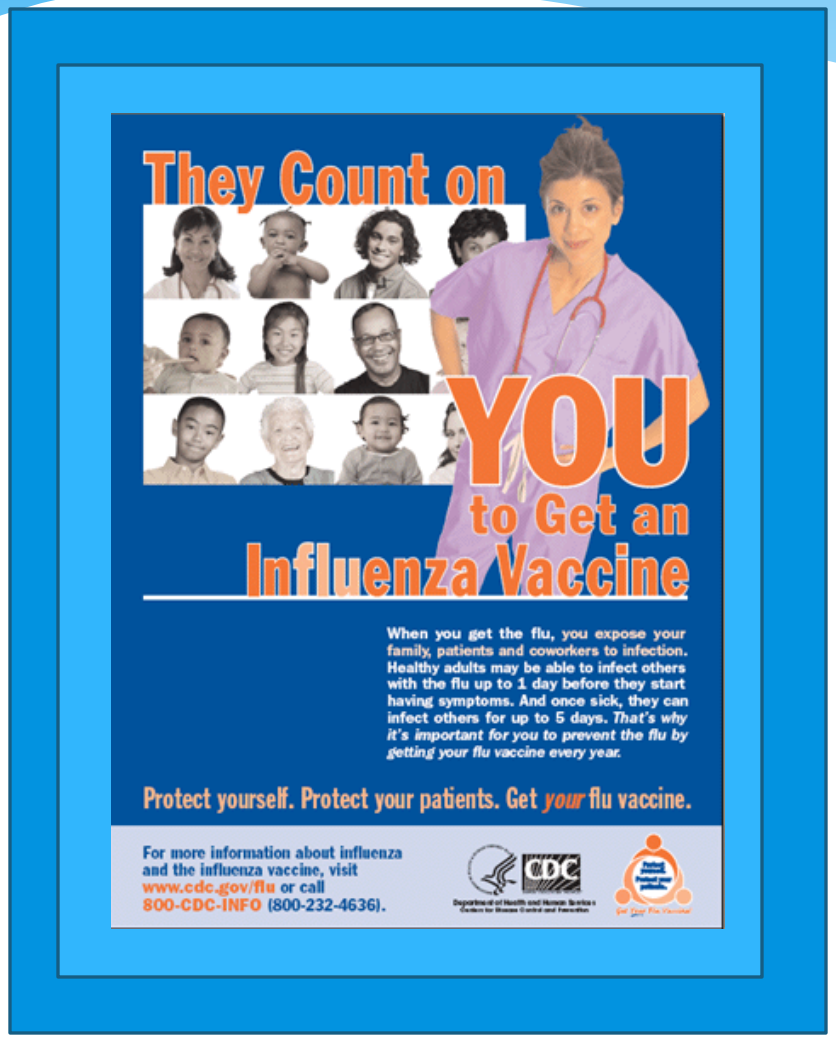


VACCINATE

AGAINST

FLU

Thank You!

Extra Slides

2012-2013 Vaccine

* On February 23, 2012 the WHO recommended that the Northern Hemisphere's 2012-2013 seasonal influenza vaccine be made from the following three vaccine viruses:
  * an A/California/7/2009 (H1N1)pdm09-like virus (same in 2011-2012 vaccine)
  * an A/Victoria/361/2011 (H3N2)-like virus (different than 2011-2012 vaccine)
  * a B/Wisconsin/1/2010-like virus from the B/Yamagata lineage of viruses (Different than 2011-2012 vaccine)

Characteristics of 2009 H1N1 Influenza

April 15, 2009 to April 10, 2010

Deaths

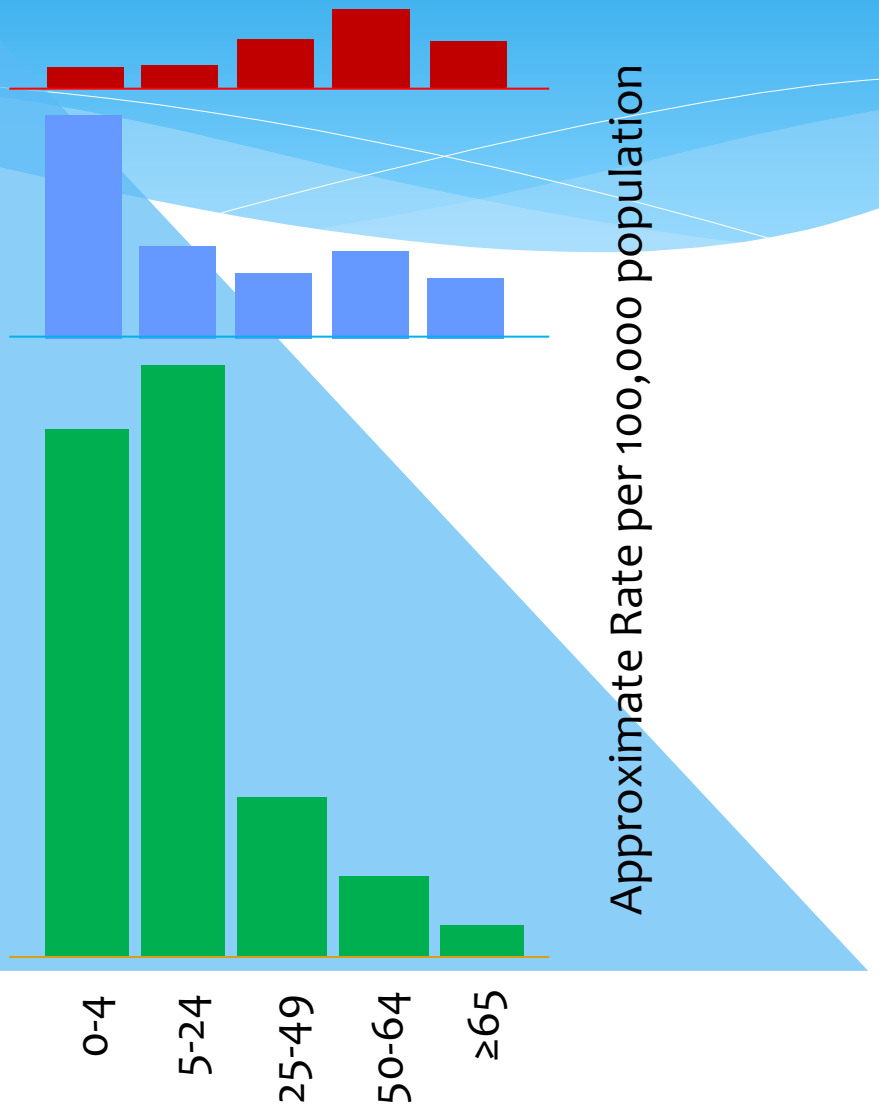
12,470

Hospitalizations

274,000

Cases

61,000,000



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