

# Flu Amid the Pandemic

**John A. Sellick, Jr., DO, MS, FACP, FIDSA, FSHEA**

**Professor of Medicine**

**Division of Infectious Diseases**

**Hospital Epidemiologist**

**KALEIDA Health**

**Veterans Affairs Western New York Healthcare System**



Jacobs School of Medicine  
and Biomedical Sciences

University at Buffalo



Kaleida Health



UB|MD

INTERNAL MEDICINE  
PRIMARY & SPECIALTY CARE

# Disclosure

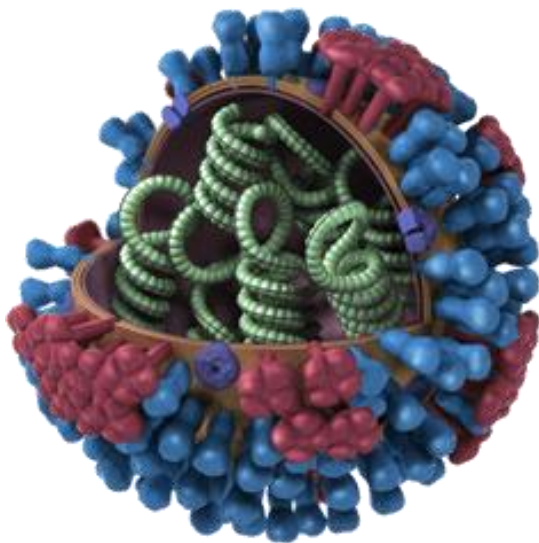
- I have no actual or potential conflict(s) of interest in relation to this presentation.

# Influenza Virus

- Another crummy little RNA virus
  - Avian origin
  - Likely human infections for hundreds of years
- 3 types based on RNA:
  - A – humans, animals
    - endemic/epidemic/pandemic
  - B – humans only
    - endemic/epidemic, Ø pandemic, ? less severe
  - C – humans, swine
    - endemic, mild

# Influenza Virus

- 8 segmented genome
  - Each segment codes important structural or functional proteins



Hemagglutinin



Neuraminidase



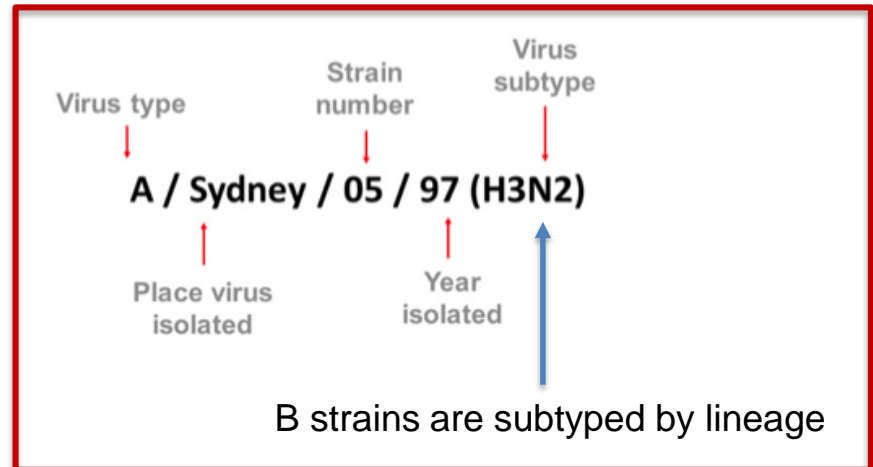
M2 Ion Channel



RNP

HA or H – attachment to cell

NA or N – release of progeny from cell surface

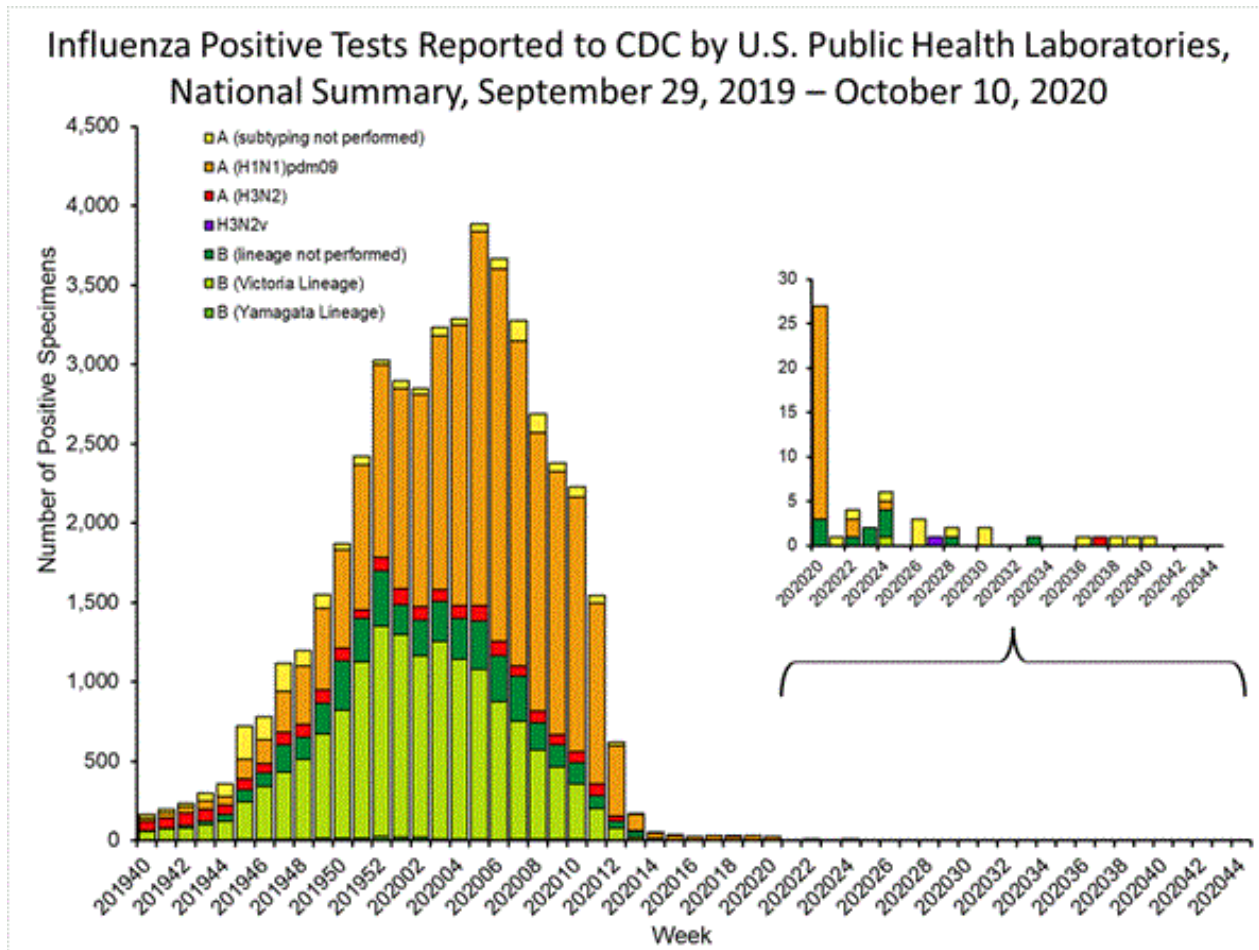


B strains are subtyped by lineage

# Influenza A = Unpredictable!

- Seasonality (Nov/Dec – March/April)
  - 1918 & 2009 H1N1 did not get the memo
- Change in HA & NA
  - Gradual mutations – “**drift**” – A (or B)
  - Major re-assortment of genome segments – “**shift**” – A only
- Influenza A pandemics occur when “new” H or H/N types, to which little of the population have antibodies, emerge
- Challenge for vaccinology

# What's circulating now?

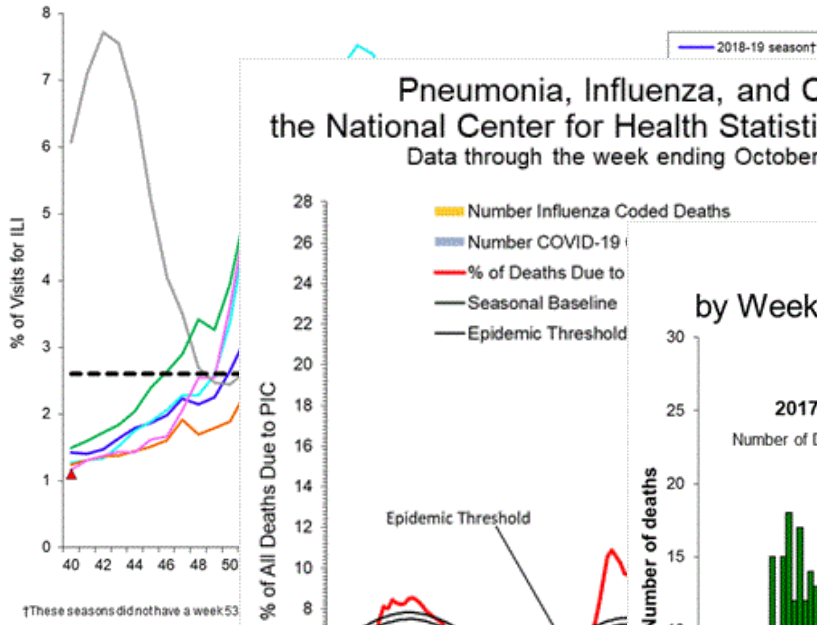


# Societal/Medical Importance

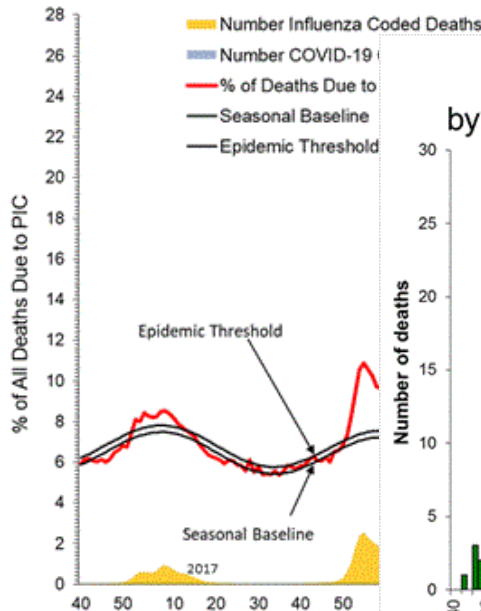
- Absenteeism
  - 3 – 4d in bed
  - 5 – 6d restricted activity
  - 3d lost school/work
- Healthcare utilization
- Morbidity/mortality

# By the Numbers

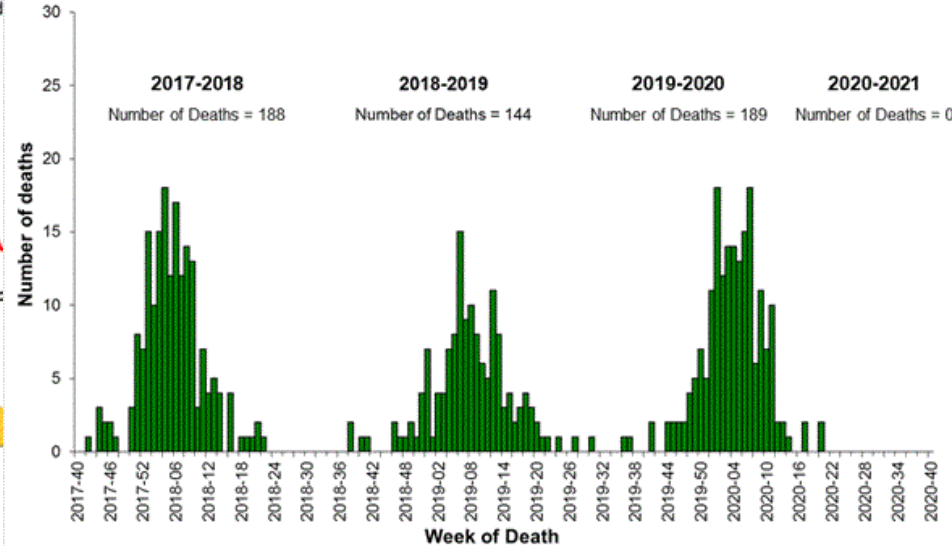
Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2020-2021 and Selected Previous Seasons



Pneumonia, Influenza, and COVID-19 Mortality from the National Center for Health Statistics Mortality Surveillance System Data through the week ending October 3, 2020, as of October 8, 2020



Influenza-Associated Pediatric Deaths by Week of Death, 2017-2018 season to 2020-2021 season

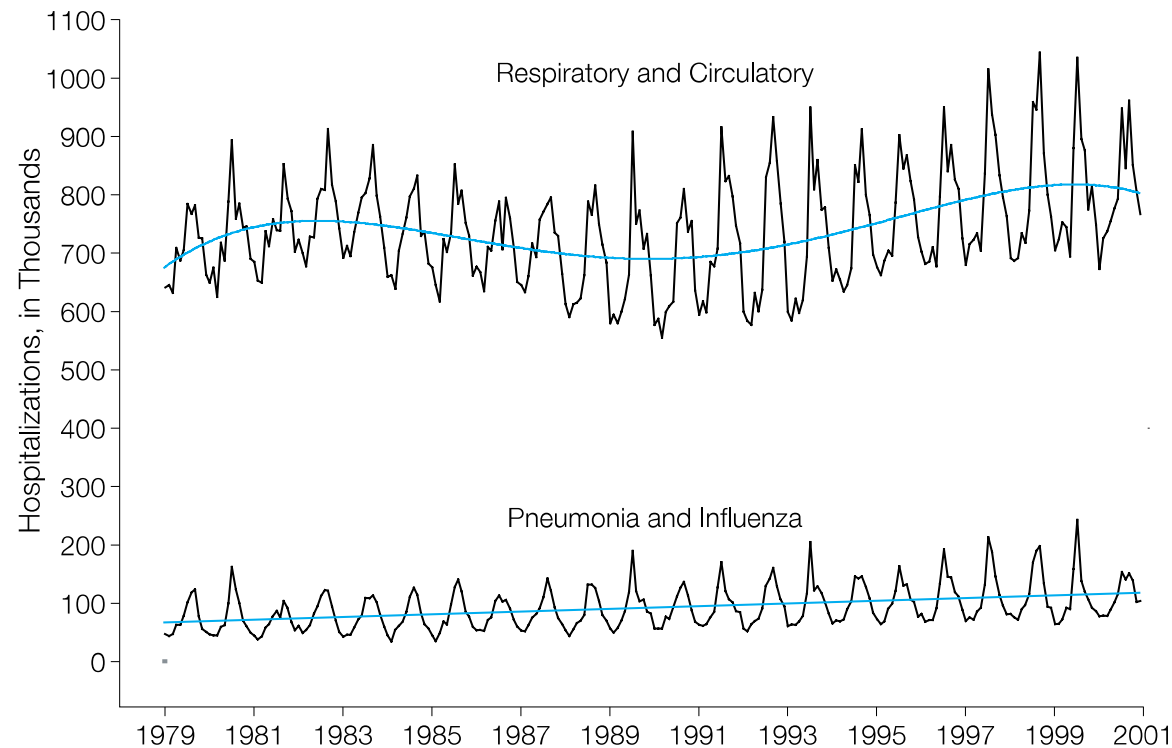


■ Deaths Reported Previous Weeks    ■ Deaths Reported Current Week



# Hospitalizations

**Figure.** Monthly Numbers of Hospitalizations by Primary Discharge Type From the 1979-1980 Through 2000-2001 Respiratory Seasons



Thompson, W. W. et al. JAMA 2004;292:1333-1340.

# Influenza Clinical Features

- Systemic signs/symptoms early; sudden
  - Fever, chills, arthralgias, myalgias, cephalgia
- Cough, sore throat follow
- Incubation period 1 – 5 days
  - **Shed virus 24° before symptoms**
  - Attack rate 5 – 20%
- Fever lasts 3 – 7 days
- Pneumonia
  - Influenza – progressive worsening
  - Bacterial – 7-14 d later, “improving”

# Diagnosis

- Clinical evidence during high prevalence
  - Worked until this year!
- Clinically difficult to distinguish influenza from COVID–19
- Holy Grail: multiplex PCR
  - Generally for ED/clinical lab use (at present)
  - Supply constraints & cost, training
- Rapid antigen & other molecular tests
  - Some better than others; not as good as PCR

# Diagnosis (2)

## Outpatient Clinic or Emergency Department Patients with Acute Respiratory Illness Symptoms (With or Without Fever)\*

Does the Patient Require Hospital Admission?

YES

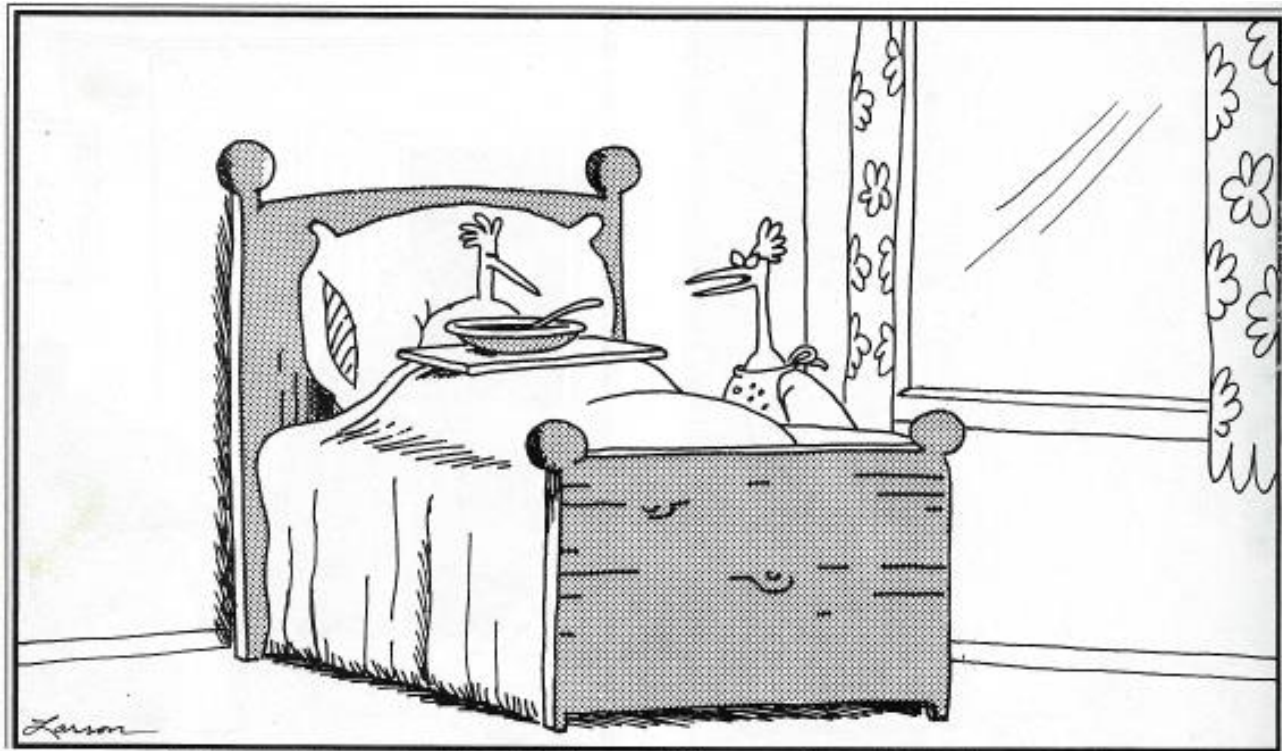
1. Specimen collection
  - Implement recommended infection prevention and control measures and collect respiratory specimens for influenza and SARS-CoV-2 testing.<sup>1</sup> (Two different specimens may need to be collected if multiplex testing is unavailable).
2. SARS-CoV-2 and Influenza Testing
  - a) Order multiplex nucleic acid detection assay for influenza A/B/SARS-CoV-2,<sup>2,3</sup> OR
  - b) If multiplex nucleic acid detection assay is not available, order SARS-CoV-2

NO

- Follow recommended infection prevention and control measures<sup>1</sup>
1. SARS-CoV-2 Testing

Test for SARS-CoV-2 by nucleic acid detection<sup>2,3</sup>; OR if not available, by SARS-CoV-2 antigen detection assay.<sup>5</sup>
  2. Influenza Testing and Treatment
    - a) Test for influenza if results will change clinical management or for infection control decisions (e.g. long-term care facility resident returning to a facility, or a person of any age returning to a congregate

# Treatment



"Quit complaining and eat it! ... Number one, chicken soup is good for the flu—and number two, it's nobody we know."

- Not everyone needs antivirals...but ok to use
- Antibiotics **only** if bacterial infection present

# Antiviral Drugs (A & B)

- Neuraminidase Inhibitors
  - Oseltamivir (*po*), zanamivir (inhaled), peramivir (IV, single dose)
  - Best if taken early (<48 hrs of onset)
  - Shorten illness by ~1–3 days
  - *May* prevent complications
- Transcription Inhibitor
  - Baloxavir (*po*, single dose)
  - **Acute, uncomplicated, outpt ONLY**
  - Increased ®

# Who *should* be treated?

- Hospitalized, severe disease
- High risk patients
  - Age: < 2 years old,  $\geq$  65 years old
  - Chronic medical conditions (not isolated HTN)
  - Immunosuppression, including HIV infection
  - Pregnant/postpartum ( $\leq$  2 wks after delivery) women
  - $\leq$  19 years old receiving long-term ASA/salicylates
  - American Indians/Alaska Natives
  - Extreme obesity (BMI  $\geq$  40)
  - Residents of nursing homes/chronic care facilities
- **Oseltamivir x 5d – consider even if >48 hrs**

# Who should get *prophylaxis*?

- Targeted, to prevent ®
  - Unimmunized, higher risk for complications and a close contact of a case during the infectious period
  - Poor response to vaccine or unable to be vaccinated
  - Institutional outbreaks ( $\geq 2$  cases), along with other measures
- **Oseltamivir or zanamivir** only, 7–14d
  - Baloxavir not studied or indicated



# Prevention



- Non-pharmacologic interventions (NPI)
  - Hand hygiene
  - Distancing, exclusion
  - Mask use
- Immunization

# Immunization

- Multiple vaccines now available:
  - Egg grown, cell grown, recombinant
  - IM, quadrivalent (most)
    - A/H1N1 + A/H3N2 + B/Victoria lineage + B/Yamagata lineage
    - 1 has adjuvant, 1 is high-dose:  $\geq 65$  yrs old
  - IM, trivalent with adjuvant:  $\geq 65$  yrs old
  - Intranasal, quadrivalent live attenuated

# Immunization (2)

- Annual reformulation due to shift/drift
  - Composition based on late prior season
  - Some cross–protection – if similar HA & NA
- Vaccine effectiveness ~48%\*
  - Prevention of laboratory proved influenza hospitalization and medical visits
- Decreased mortality
- Financial impact of illness/absenteeism

\* – since 2009, excluding major mismatch for 2014-15 season vaccine

# Immunization (3)

- Start giving as soon as available
  - October is good (many years)
- Missed opportunities
  - Routine or specialty visits
  - Hospitalization
  - Waiting for a specific vaccine
- **Don't overthink which vaccine to use: just give one!**

# Immunization (4)

- Precautions/contraindications
  - Immediate hypersensitivity to eggs
  - **Prior** Guillian–Barre syndrome that occurred  $\leq 6$  wks from an influenza vaccine
    - Benefit still may outweigh risk
  - LAIV only for ages 2 – 49 years old
    - Not for **immunosuppressed/contacts, pregnant women**, chronic medical conditions, cochlear implants, CSF leaks, 2 – 17 years old who are receiving aspirin/salicylate, 2 – 4 years old who have asthma or history of wheezing in the past 12 months

# Immunization (5)

- Common side effects
  - Pain/erythema at injection site
  - Fever, arthralgia, myalgia
  - URI symptoms with LAIV

# Targeted Groups

- **EVERYONE**  $\geq 6$  months old!
  - Mandatory immunization for HCWs
- Prepare for the “vaccine hesitant”
  - You CANNOT get flu from the flu shot.
  - You will not get mercury poisoning.
  - Tamiflu<sup>®</sup> is not as good as you think.
  - There are egg protein free vaccines.
  - “I never get flu” does not predict the future.
  - GBS more likely after influenza than vaccine.

# References

- CDC
  - <https://www.cdc.gov/flu/professionals/index.htm>
  - [https://www.cdc.gov/mmwr/volumes/69/rr/rr6908a1.htm?s\\_cid=rr6908a1\\_w](https://www.cdc.gov/mmwr/volumes/69/rr/rr6908a1.htm?s_cid=rr6908a1_w)
  - <https://www.cdc.gov/flu/vaccines-work/vaccineeffect.htm>
- IDSA
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- NYSDOH
  - <https://www.health.ny.gov/diseases/communicable/influenza/surveillance/>