

# Surveillance, Epidemiology and Forecasting of Flu in Taiwan

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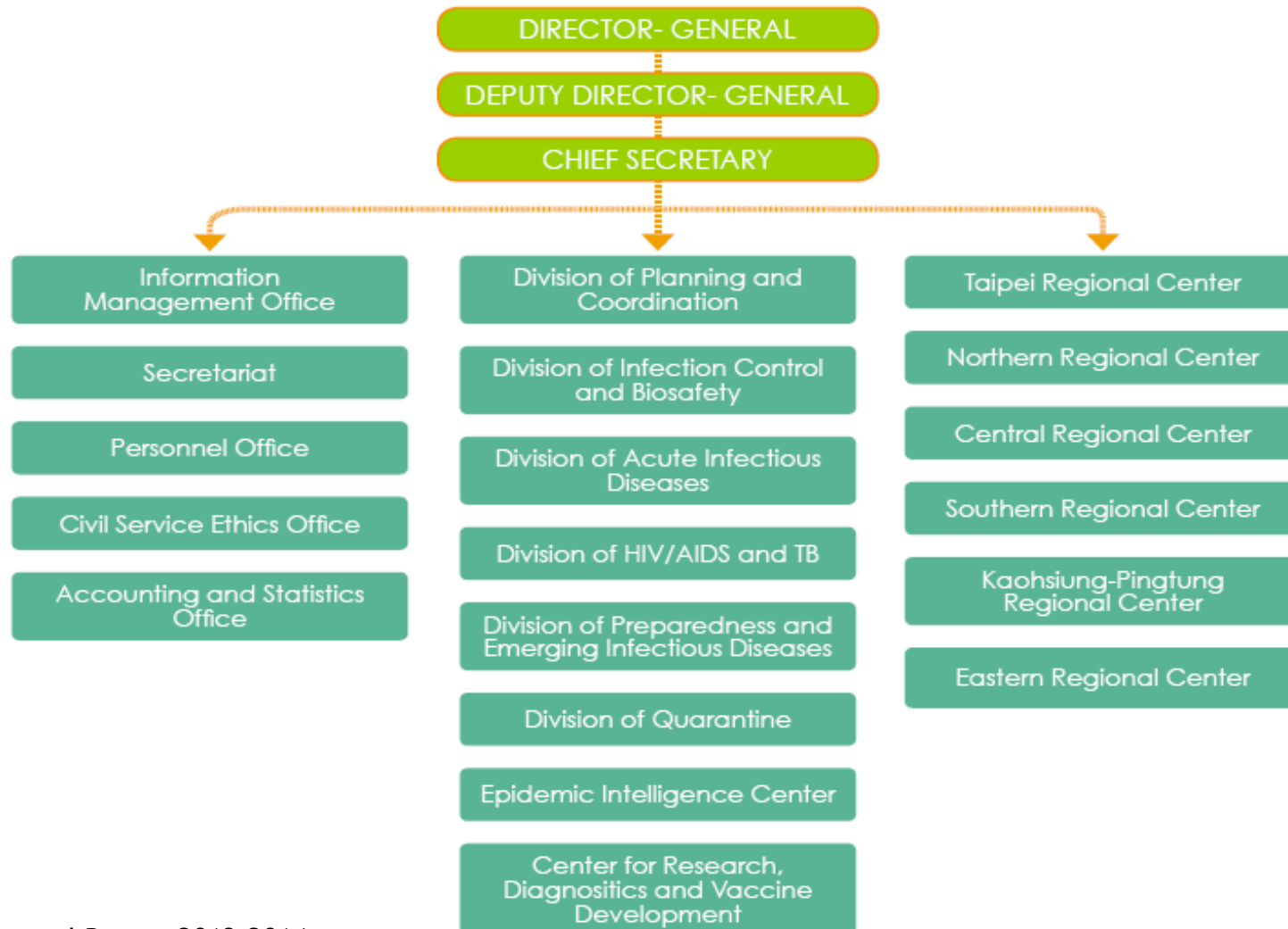
# Outline

- ▶ Introduction of the Taiwan Centers for Disease Control (Taiwan CDC)
- ▶ Existing Project of Taiwan CDC and PITT
- ▶ Study Projects during the Fellowship Period
- ▶ Future Plans
- ▶ Feedback on the Fellowship Program

# Where is Taiwan?



# The Organization of the Taiwan Centers for Disease Control (Taiwan CDC)



# Existing Project of Taiwan CDC and PITT

## ▶ Project Tycho<sup>®</sup> at Taiwan CDC (TCDC)

- Linking databases between US and TW and provide relevant codebooks and database scheme
- Restoring historical surveillance data and supplementing adjunct information

## ▶ Tycho Members in Taiwan CDC

- Team leader: Dr. Jen-Hsiang Chuang, Deputy Director-General of TCDC
- Members: Dr. Yu-Lun Liu, Wan-Jen Wu and other members in TCDC

# Study Projects during the Fellowship Period

- ▶ Integrate modeling methods on disease surveillance, such as influenza and dengue, and apply the empirical Bayes (EB) approach that have been developed by Dr. Rosenfeld's group to forecast infectious disease epidemics in Taiwan.
- ▶ Comparative analysis of influenza epidemiology and surveillance in multiple countries.

# “Flexible Modeling of Epidemics with an Empirical Bayes Framework”

PLOS Computational Biology. 2015

Logan C. Brooks<sup>1</sup>, David C. Farrow<sup>1</sup>, Sangwon Hyun<sup>2</sup>, Ryan J. Tibshirani<sup>2</sup>, Roni Rosenfeld<sup>1</sup>

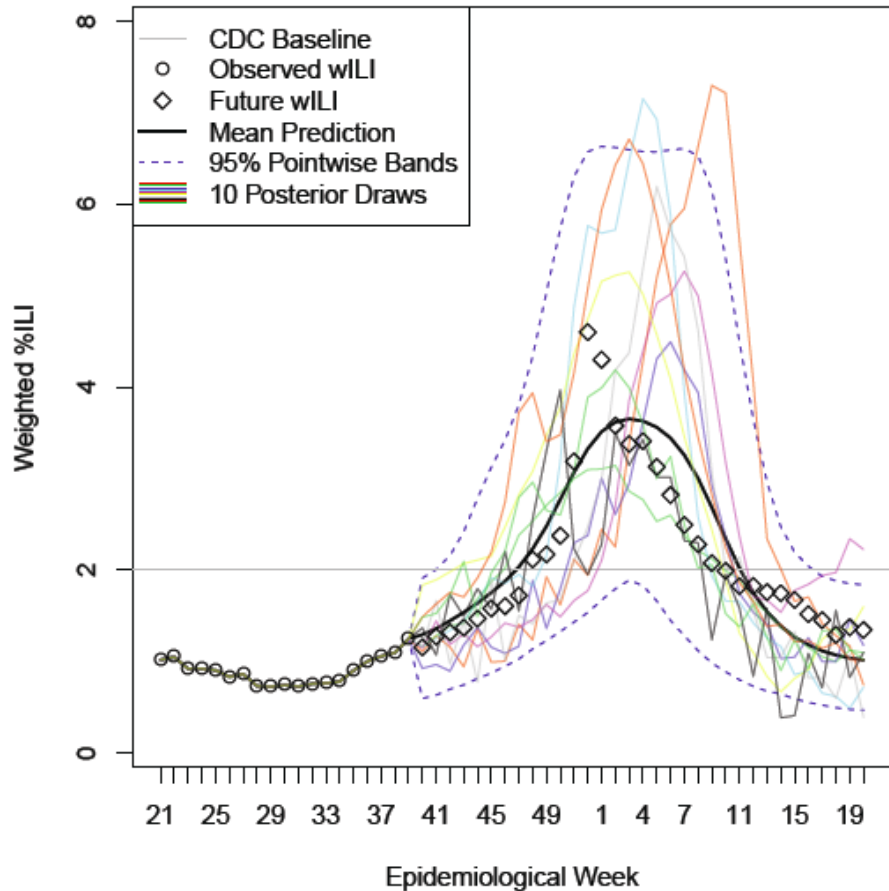
- ▶ Developed by Dr. Rosenfeld and his group (DELPHI Group)
- ▶ Novelty of this approach:
  - Semiparametric, flexible
    - Nonmechanistic (e.g., no compartmental/agent model)
    - Doesn't depend on strong assumptions (e.g., linear model)
    - Flexible to apply to different diseases/units
  - Uncertainty measures
    - Not only point estimates, but also a probability distribution over the forecasting target values
    - Able to form credible intervals

<sup>1</sup>Computer Science, Carnegie Mellon University

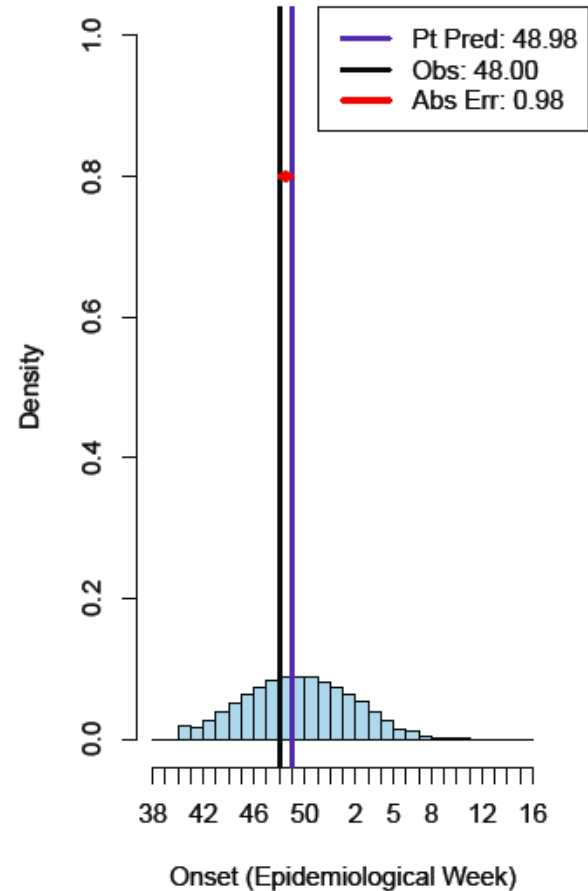
<sup>2</sup>Statistics, Carnegie Mellon University

# 2013–2014 National Forecast, Week 41, Data through Week 39

National wILI Forecast



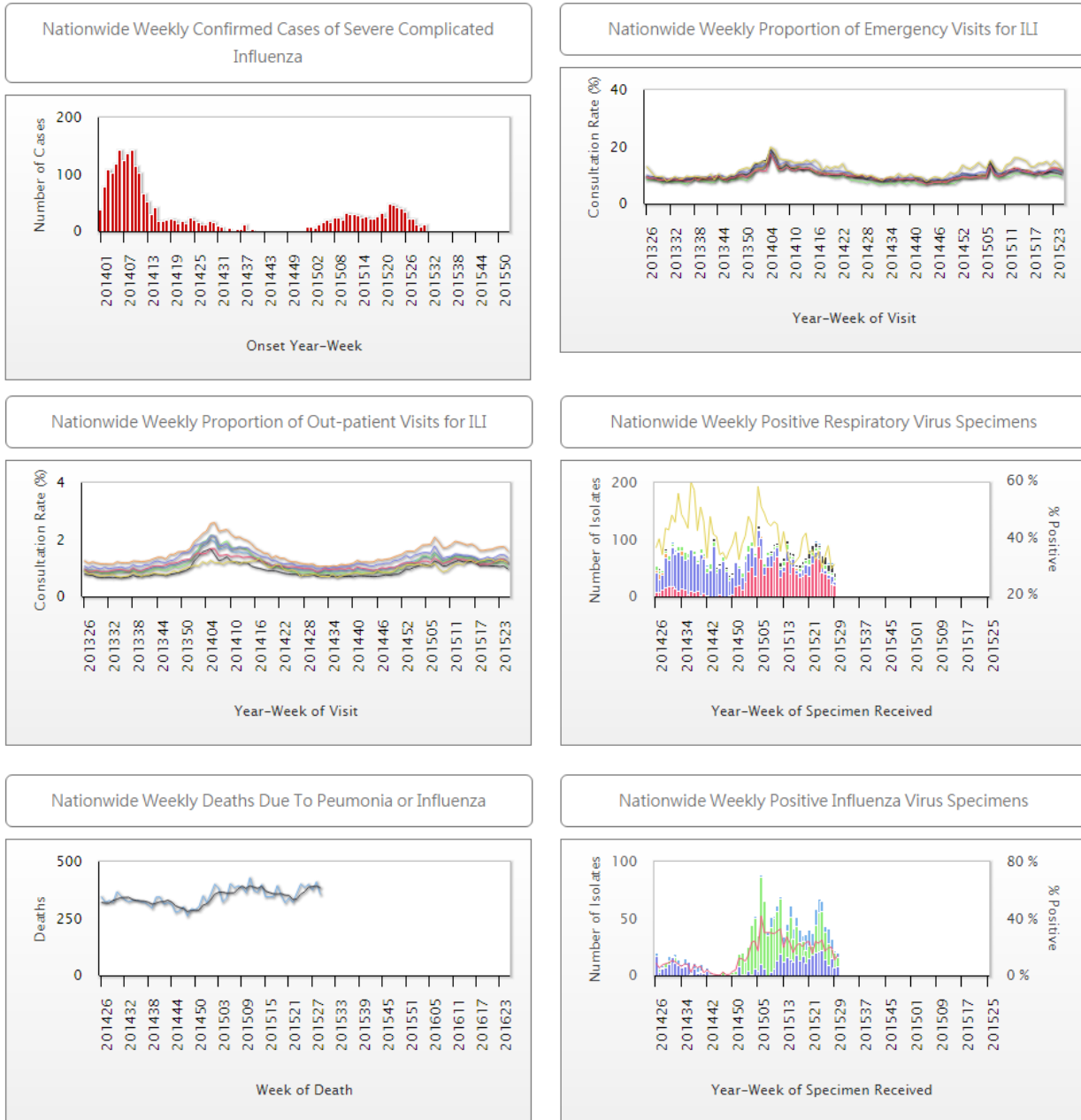
National Onset (Epidemiological Week)







## Influenza Surveillance Systems in Taiwan



# Forecasting Influenza in Taiwan: Current Progress

- ▶ Data Source: National Health Insurance Claim Data
- ▶ Coverage: More than 99% of the entire population in Taiwan (23 million)
- ▶ Data type: Outpatient visits and consultation rates of influenza-like illness (ILI) on weekly basis
- ▶ Data periods: From week 14, 2008 to present
- ▶ Preliminary status: Data preparation

# Current Progress of Comparative Analysis on Influenza Surveillance in Multiple Countries

- ▶ Searched information regarding to influenza surveillance systems and data availability of different countries, including Taiwan, China, the United States, Australia, Canada, South Africa, New Zealand, Singapore, Hong Kong and the United Kingdom through government websites, reports and literature reviews.
- ▶ Systematically summarized and tabulated information according to defined specific surveillance categories (as shown in the table below), including Taiwan, China, the United States and Singapore.

Mandatory Notification System	Virologic Surveillance	Hospitalization-based Surveillance	Outpatient Surveillance	Emergency Department Surveillance	Mortality Surveillance	Outbreak/Cluster Surveillance	Activity Level Categorization	Pharmacy Surveillance
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# Future Plans

## ▶ The rest of the fellowship

- Continue to summarize and tabulate information regarding the influenza surveillance systems and data availability in multiple countries
- Keep working on literature review on epidemiology of influenza in multiple countries
- Continue the work on forecasting influenza in Taiwan

## ▶ Beyond

- Use the EB method to forecast influenza in Taiwan on an ongoing basis
- Use the EB method to forecast dengue in Taiwan on an ongoing basis

# Feedback on the Fellowship Program

- ▶ Golden opportunity to gain knowledge and experience on forecasting, and could apply to future work on disease surveillance in Taiwan
- ▶ Valuable program not only provides academic knowledge but also includes cultural activities
- ▶ Provides an additional way to strengthen international cooperation
- ▶ Different meetings offer chances to understand study interests and experiences of the faculty at PITT and CMU
- ▶ Faculty, staff and people at PITT and CMU are all friendly and kind

**Thank you for your attention!**

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