

Using Mortality Data for Public Health Surveillance

Paul D. Sutton, Ph.D.

Mortality Surveillance Team Lead

Board of Scientific Counselors

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Current Surveillance Projects

- ❑ **Validation of Rare Vaccine Preventable Disease Deaths**
 - CDC/National Center for Immunization and Respiratory Diseases (NCIRD)
 - VPD deaths shared with NCIRD within 4-5 weeks of NCHS receiving information from the state.

- ❑ **Pneumonia and Influenza Mortality Surveillance**
 - CDC/NCIRD/Influenza Division
 - Counts of total deaths and P&I deaths available within 24 hours of the record being received and coded by NCHS.

Current 122 Cities System

❑ **Incomplete reporting**

- About 25% of all deaths
- Increasingly difficult to get reports from some cities

❑ **Inconsistent reporting**

- Not all jurisdictions follow the case definitions (e.g. some only report underlying cause of death)
- Certificate review automated or semi-automated in some jurisdictions, manual review in other jurisdictions.

❑ **Deaths reported by week the death was registered**

- Lag between date of death and registration/report is unknown and varies from place to place

❑ **Deaths reported only by place the death occurred**

- Place of death not necessarily the same as place of residence

Future Vital Statistics based Influenza Mortality Surveillance

❑ Improvements

- Reported by date of death
- Automated and consistent process for certificate review based on coded cause of death information
- Deaths available by place of occurrence and residence

❑ Potential new capabilities

- More focused regional, state, or local surveillance may be possible
- Ability to switch from weekly to daily reporting in a pandemic

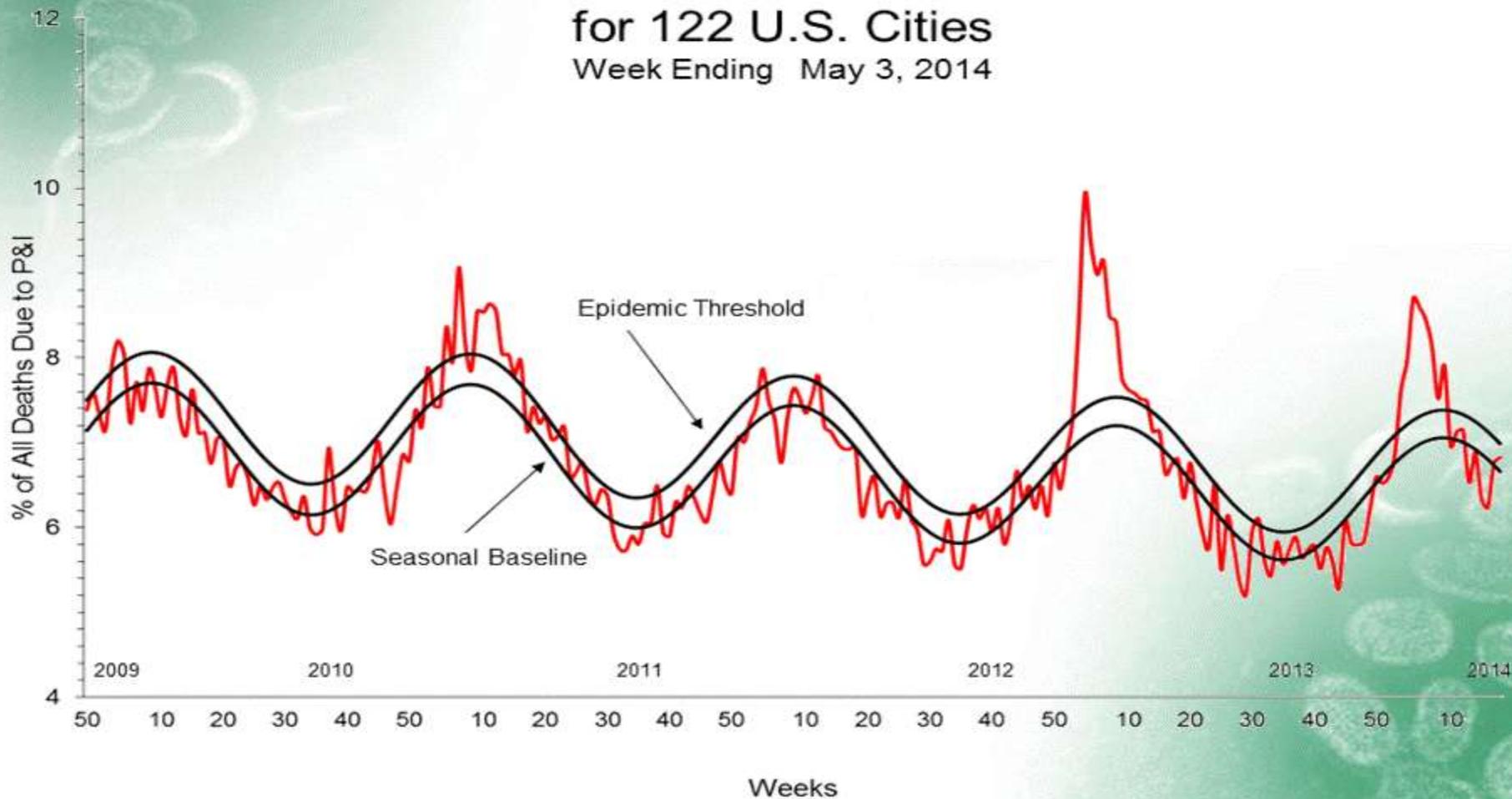
Projects

- ❑ **Parallel surveillance for 2013-14 influenza season**
 - Real-time comparison of vital statistics and 122 city based influenza mortality surveillance
- ❑ **Reporting lag evaluation**
 - Difference between date of death and the date NCHS receives the cause of death
- ❑ **Compute new baselines**
 - Seasonal baseline
 - Epidemic threshold -- 1.645 standard deviations above the seasonal baseline

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Pneumonia and Influenza Mortality for 122 U.S. Cities

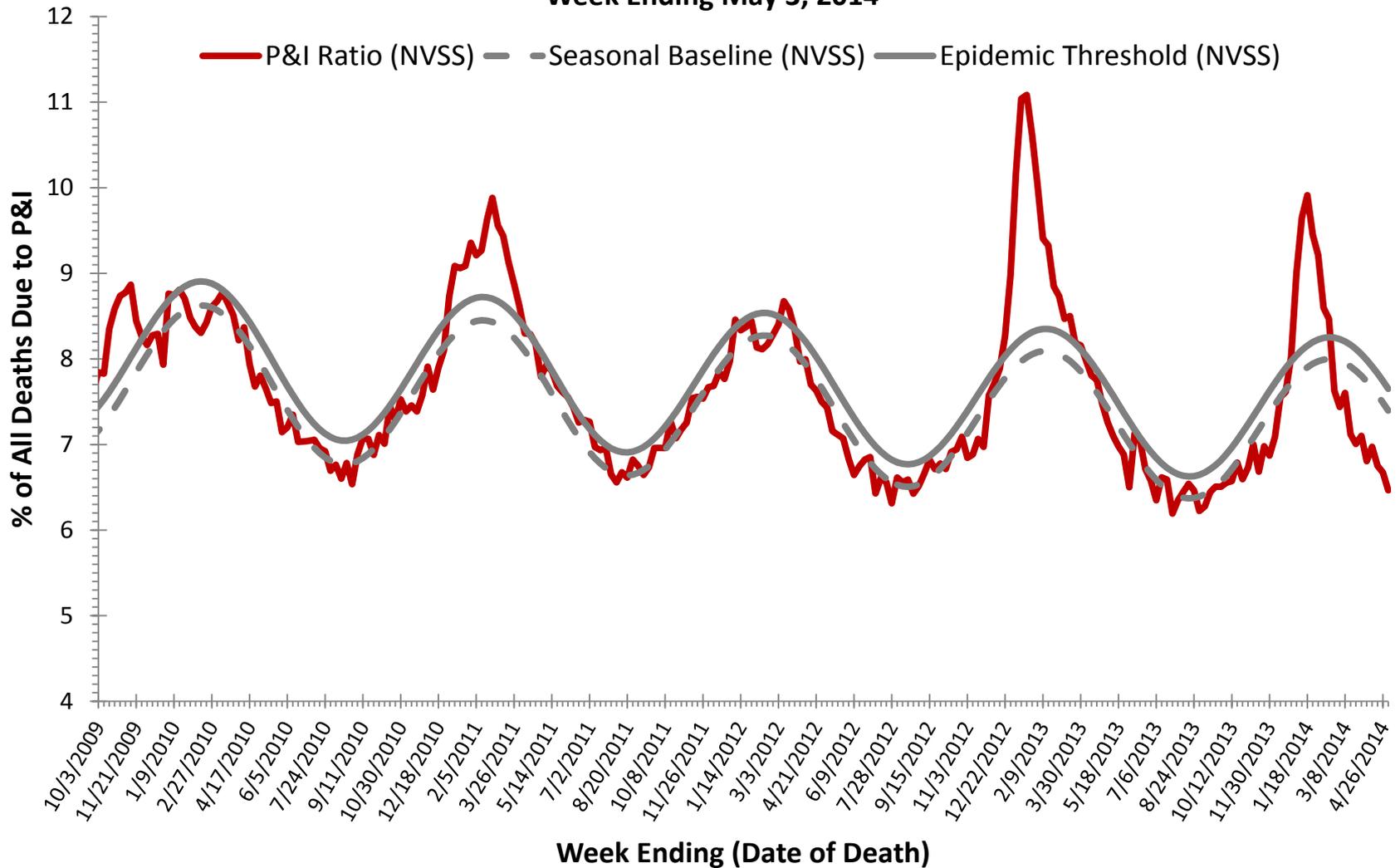
Week Ending May 3, 2014



Pneumonia and Influenza (P&I) Mortality Surveillance

From the National Vital Statistics System (NVSS)

Week Ending May 3, 2014



What is it Mortality Surveillance Data?

Final Data	Surveillance Data
Based on final/best version of each death record	Based on most recent version of each death record
Based on all deaths	Based some percentage of all deaths
Data files are static	Data is continually changing as new records and updates are received
Data released as annual files	Data is shared on an ongoing bases with federal public health surveillance partners

Mortality Data NCHS had Received and Coded as of Yesterday (5/12/2014)

Date of Death (Week Ending)	Count	% of Expected*
05/10/2014	609	1%
05/03/2014	6,698	13%
04/26/2014	15,092	30%
04/19/2014	18,312	37%
04/12/2014	20,635	41%
04/05/2014	22,202	44%
03/29/2014	24,051	48%
03/22/2014	26,093	52%
03/15/2014	27,482	55%
03/08/2014	28,631	57%
03/01/2014	29,655	59%
02/22/2014	33,315	67%

* Assumes 50,000 deaths per week.

Mortality Data Warehouse and Data Cubes

- ❑ **Updated nightly with most recent data and updates**
- ❑ **Mortality Review Cube**
 - Available to DVS staff only
 - Large number of variables including literal text
 - Using Excel PivotTables users can slice and dice data very easily
 - Users can also drill through to individual records
- ❑ **Mortality Surveillance Cube**
 - Available to DVS staff and CDC Surveillance Partners (within the CDC firewall)
 - Customizable views... users can only access what they have been given permission see
 - Users can not drill through to individual records

Pneumonia & Influenza Mortality Surveillance Quick Demo

The screenshot displays the Microsoft Excel interface with a PivotTable titled "Pneumonia & Influenza Mortality Surveillance". The PivotTable is filtered by "Country_Res" (All) and "Country_Occ" (United States). The PivotTable Field List on the right shows the following fields:

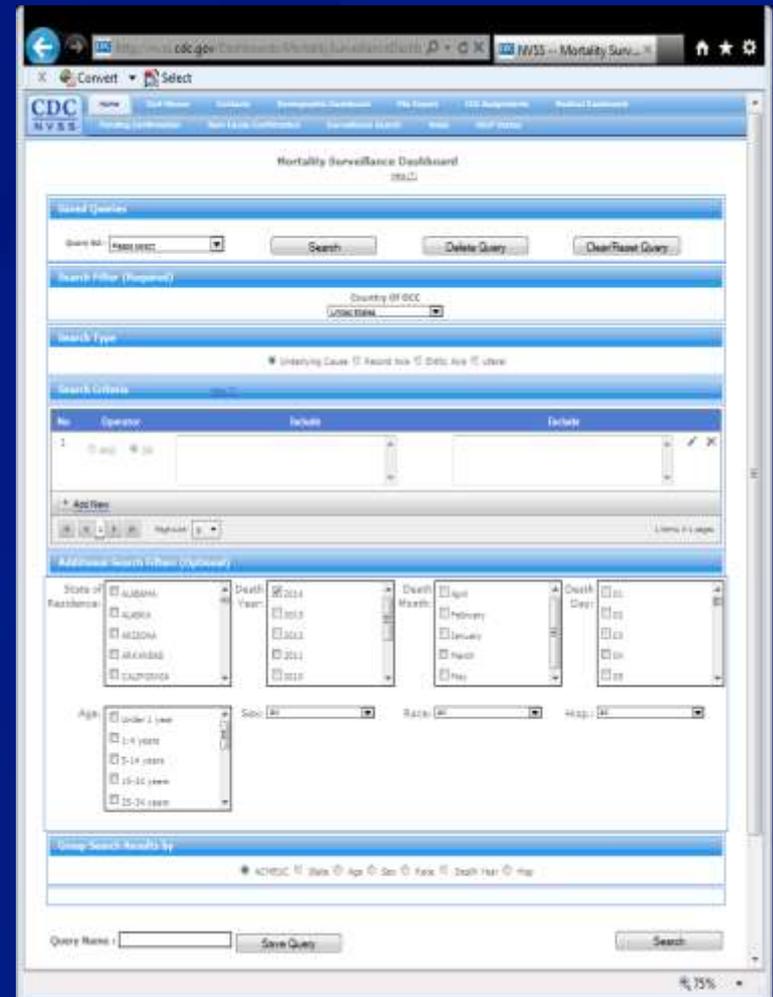
- Fact Death:** Death Count, Influenza Count, P&I Ratio, Pneumonia Count
- Age Years:** Age Recode 24, Age Recode 24 Description
- Jurisdiction Occ:** Country_Occ, Jurisdiction_County_Occ

The PivotTable is configured with "Country_Res" and "Country_Occ" as Report Filters, "Week Ending Date" as Row Labels, and "Death Count", "Pneumonia Count", "Influenza Count", and "P&I Ratio" as Values.

Row Labels	Death Count	Pneumonia Count	Influenza Count	P&I Ratio
2014/05/10	196	10	0	5.1020
2014/05/03	4083	250	3	6.1964
2014/04/26	13504	894	12	6.7091
2014/04/19	17507	1170	10	6.7402
2014/04/12	20128	1385	9	6.9257
2014/04/05	21749	1446	15	6.7176
2014/03/29	23298	1625	21	7.0650
2014/03/22	25015	1723	22	6.9758
2014/03/15	26483	1854	32	7.1215
2014/03/08	28087	2074	53	7.5729
2014/03/01	29333	2101	74	7.4149
2014/02/22	33038	2406	110	7.6155
2014/02/15	37418	3000	162	8.4505
2014/02/08	38939	3141	205	8.5929
2014/02/01	40551	3456	274	9.1983
2014/01/25	42175	3657	326	9.4440
2014/01/18	43214	3911	372	9.9111
2014/01/11	45558	4020	371	9.6383
2014/01/04	46202	3870	290	9.0039
2013/12/28	46977	3591	184	8.0358

Surveillance Search Web Application (for internal DVS use)

- Allows much more complex queries of real-time surveillance data than is possible with data cubes and PivotTables
 - Underlying Cause (ICD-10 codes)
 - Record Axis
 - Entity Axis
 - Multiple Cause (ICD-10 codes)
 - Literal Text



An Example of a Literal Text Search: Creutzfeldt-Jakob Disease

- ❑ **Search terms:** jakob, jacob, creutz, crutz, critzfield, cjd, spongiform, spongiform, spongeform, sponaiform, prion, gerstman, gertsman, straussler, strausler, scheinker, familial insomnia, familial fatal insomnia, FFI, TSE, GSS

- ❑ **Results:**
 - 300-350 deaths annually matching this search
 - 60 deaths in 2014 matching this search as of 5/9/2014
 - Of the 60 deaths identified 1 would not have been detected based on a simple search of the multiple cause ICD-10 codes

Developing Surveillance Partnerships

- ❑ **Creutzfeldt-Jakob Disease (CJD)**
- ❑ **Respiratory Syncytial Virus (RSV)**
- ❑ **Suicides**

Challenges and Opportunities for National Mortality Surveillance

❑ **Timely data**

- Culture Change
- Electronic Death Registration Systems (EDRS)
 - Goal is to have 80% of all deaths reported to NCHS within 10 days of the date of death
 - Opportunity to improve data quality

❑ **Robust National Mortality Surveillance IT Infrastructure**

- Automation
- Robust tools for analysis, visualization, and dissemination

❑ **Building and Maintaining Surveillance Partnerships**

- Improved and/or more efficient surveillance
- Investment in the larger National Vital Statistics System

Mortality Surveillance Indicators Project: Objectives

- ❑ Identify key causes of deaths that require real-time public health surveillance.
- ❑ Evaluate the reliability and validity of the selected mortality estimates derived from the near real-time mortality surveillance data.
- ❑ Determine optimal frequency, format, and mechanisms to timely disseminate the selected mortality estimates.
- ❑ Pilot the process to identify and address barriers and challenges to build a feasible, reliable, and timely system for rapid mortality surveillance.

Mortality Surveillance Indicators Project: Proposed Indicators

- 1. Influenza**
- 2. Suicide**
- 3. Firearm-related deaths**
- 4. Drug poisoning deaths**
- 5. Poisoning deaths**
- 6. Homicide**
- 7. Asthma among people <35 years**
- 8. HIV/AIDs**
- 9. Deaths for infants <1 year**
- 10. Unintentional fall age 65+**
- 11. Heart disease**
- 12. Stroke**
- 13. Alzheimer's**
- 14. Diabetes**

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For more information please contact

Paul D. Sutton

3311 Toledo Road, Hyattsville, MD 20782

Telephone: (301) 458-4433

E-mail: PSutton@cdc.gov

The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.