

Relationship between antiviral chemoprophylaxis and resident deaths during influenza outbreaks in long-term care facilities during the 2010/11 influenza season in Pennsylvania

Erica E. Smith, MPH^{1,2}, Owen Simwale, MPH¹, Perriane Lurie, MD, MPH¹, Stephen Ostroff, MD¹

1. Pennsylvania Department of Health, Bureau of Epidemiology, Harrisburg, Pennsylvania; 2. Centers for Disease Control and Prevention/Council of State and Territorial Epidemiologists (CDC/CSTE) Applied Epidemiology Fellowship Program, Atlanta, Georgia

Introduction

- Influenza causes morbidity and mortality among long-term care facility (LTCF) residents
 - LTCFs: skilled nursing, rehabilitation, assisted living, personal care homes
- Influenza outbreaks in LTCFs
 - 1 or more cases of laboratory-confirmed influenza (any testing method) in an LTCF resident
 - Control of LTCF influenza outbreaks is especially challenging
- Antiviral treatment and post-exposure chemoprophylaxis are recommended for cases and contacts during LTCF outbreaks
- 80% of seasonal influenza-related deaths occur among the elderly

Background

- Pennsylvania long-term care facilities
 - Nursing homes: 669 facilities
 - Inspected and licensed by PA Department of Health
 - Personal care homes: 1,261 facilities
 - Personal care services, assistance and supervision to ≥ 4 residents
 - Inspected and licensed by PA Department of Public Welfare
- These totals exclude facilities in Philadelphia

Study Purpose

To evaluate the relationship between reported resident deaths and antiviral treatment and chemoprophylaxis during LTCF influenza outbreaks.

Methods

Outbreak Reporting

- A standard data collection worksheet is used to assess:
 - Facility characteristics (facility type, number of residents)
 - Outbreak size and duration (total ill residents, onset and resolution dates)
 - Severe outcomes (resident hospitalizations and deaths)
 - Laboratory confirmation (rapid and confirmatory influenza testing)
 - Antiviral treatment and/or prophylaxis among residents and staff
 - Influenza vaccination among residents and staff

Data Analysis

- Evaluated outbreaks reported September 2010 to April 2011
- Excluded outbreaks if final summary reports or laboratory confirmation were unavailable
- Analysis was performed using SAS 9.2
- Odds ratios were calculated using logistic regression

Results

Table 1. Characteristics of Pennsylvania long-term care facilities reporting outbreaks during the 2010/11 influenza season (N = 179)

Facility Type*		Reported Outbreaks	
		N	%
Facility Type*	Skilled nursing	137	77%
	Rehabilitation	43	24%
	Assisted living	16	9%
	Personal care home	24	13%
Geographic Region	Southwest	41	24%
	Northcentral	35	21%
	Southeast	34	20%
	Southcentral	24	14%
	Northeast	17	10%
	Northwest	17	10%
	Number of Residents	1-49	18
50-99		38	22%
100-199		86	51%
200-499		24	14%
500 or more		4	2%
Number of Employees	1-49	26	15%
	50-99	19	11%
	100-199	73	43%
	200-499	39	23%
	500 or more	14	8%

*Not a mutually exclusive category

Table 2. Reported illness and severe outcomes during influenza outbreaks in Pennsylvania long-term care facilities

Proportion of Residents Ill	Reported Outbreaks	
	N	%
0.0-2.2%	40	25%
2.2-6.6%	41	25%
6.7-14.5%	41	25%
14.6% or more	41	25%
Only 1 ill resident	27	16%
Any resident hospitalizations	119	66%
Any resident deaths	22	12%

Table 3. Reported use of treatment and prophylaxis for ill and well residents and employees of Pennsylvania long-term care facilities

	Reported Outbreaks	
	N	%
Any antiviral treatment given to ill residents	160	91%
Any antiviral treatment given to ill employees	21	28%
Any antiviral prophylaxis given to exposed residents	77	49%
Any antiviral prophylaxis given to exposed employees	20	13%

Figure. Influenza outbreaks reported during the 2010/11 influenza season in Pennsylvania long-term care facilities, by county (N = 168)

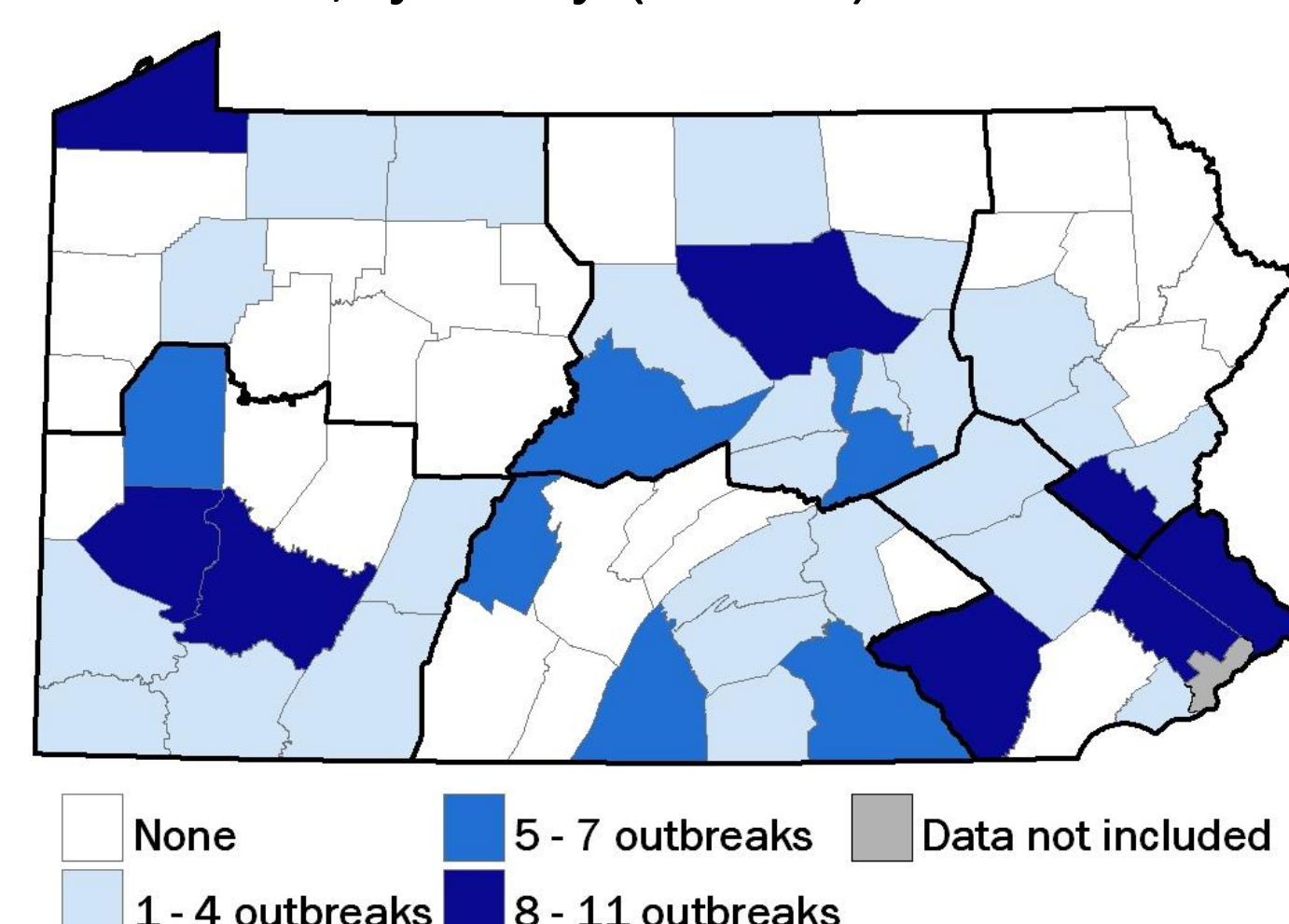


Table 4. Unadjusted odds of severe outcomes during outbreaks in facilities reporting treatment and/or prophylaxis of residents

		Any Resident Hospitalizations		OR*	95% CI
		Yes	No		
Facility Treated Ill Residents	Yes	108	52	1.6	(0.5, 4.7)
	No	8	6		
Facility Prophylaxed Exposed Residents	Yes	51	26	1.0	(0.5, 2.0)
	No	51	27		
		Any Resident Deaths		OR*	95% CI
		Yes	No		
Facility Treated Ill Residents	Yes	21	139	**	**
	No	0	14		
Facility Prophylaxed Exposed Residents	Yes	15	62	3.5	(1.2, 10.3)
	No	5	73		

*unadjusted, ** undefined

Summary

- During the 2010/11 influenza season, 199 influenza outbreaks were reported; 20 (10%) outbreaks were excluded
- 179 included outbreaks occurred in 158 facilities
 - Represents 2,235 total ill residents
 - Median ill residents per outbreak = 7 (range 1-136)
 - Mean percent ill residents per outbreak = 11% (range 0.3%-59%)
 - During about 16% of all outbreaks, only a single case was reported
- Treatment and Prophylaxis
 - Treatment was provided to ill residents in 91% of outbreaks
 - Prophylaxis was provided to exposed well residents in 49% of outbreaks
 - Oseltamivir was used most commonly for treatment (98%) and prophylaxis (90%)

Discussion

- Facilities reporting resident deaths were more likely than those not reporting deaths to have provided prophylaxis to well, exposed residents, perhaps as part of ongoing outbreak control measures
- This finding may be a marker for outbreak severity, as timing of prophylaxis could not be assessed

Limitations

- Data were only available from LTCFs that reported outbreaks
- All data represent point prevalence; timing of treatment/prophylaxis in relationship to illness and other outcomes are not recorded
- All data were collected in aggregate
- Data from Philadelphia, the largest population center in PA, were not included in this analysis

Conclusion

- Systematic data collection during influenza outbreaks in long-term care facilities allows identification of trends and evaluation of intervention strategies
- Facilities where resident deaths are reported may be more likely to provide prophylaxis to exposed, well residents

Acknowledgements

- We would like to acknowledge Allison Longenberger, Maria Moll, Kumar Nalluswami, Aimee Palumbo, Lauren Torso, Kirsten Waller, and Andre Weltman for their contributions to this study
- We also thank the Department of Health staff in each jurisdiction from which outbreaks were reported

Erica E. Smith, MPH
 CDC/CSTE Applied Epidemiology Fellow
 c-erismith@pa.gov
 (717) 787-3350

This study was supported in part by an appointment to the Applied Epidemiology Fellowship Program administered by the Council of State and Territorial Epidemiologists (CSTE) and funded by the Centers for Disease Control and Prevention (CDC) Cooperative Agreement Number 5U38HM000414