

Ready or Not, Here They Come

Managing Influenza and Norovirus Outbreaks in PALTC

David A. Nace, MD, MPH, CMD
Associate Professor & Clinical Chief
Division of Geriatric Medicine
University of Pittsburgh

UPMC Influenza Work Group

Chief of Medical Affairs
UPMC Senior Communities

naceda@upmc.edu



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University of Pittsburgh

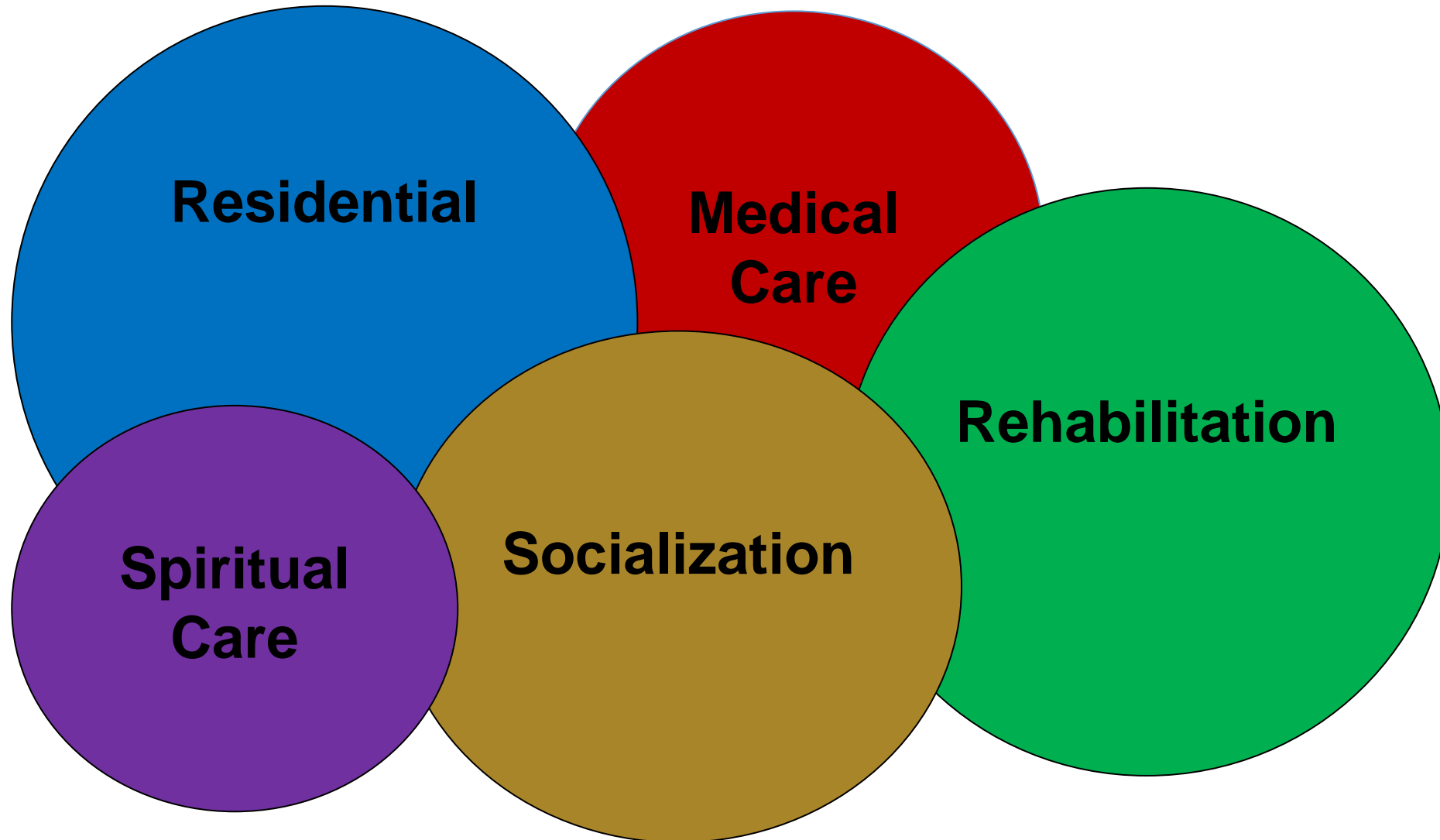
Speaker Disclosures

Dr. Nace has no conflicts of interest related to this presentation.

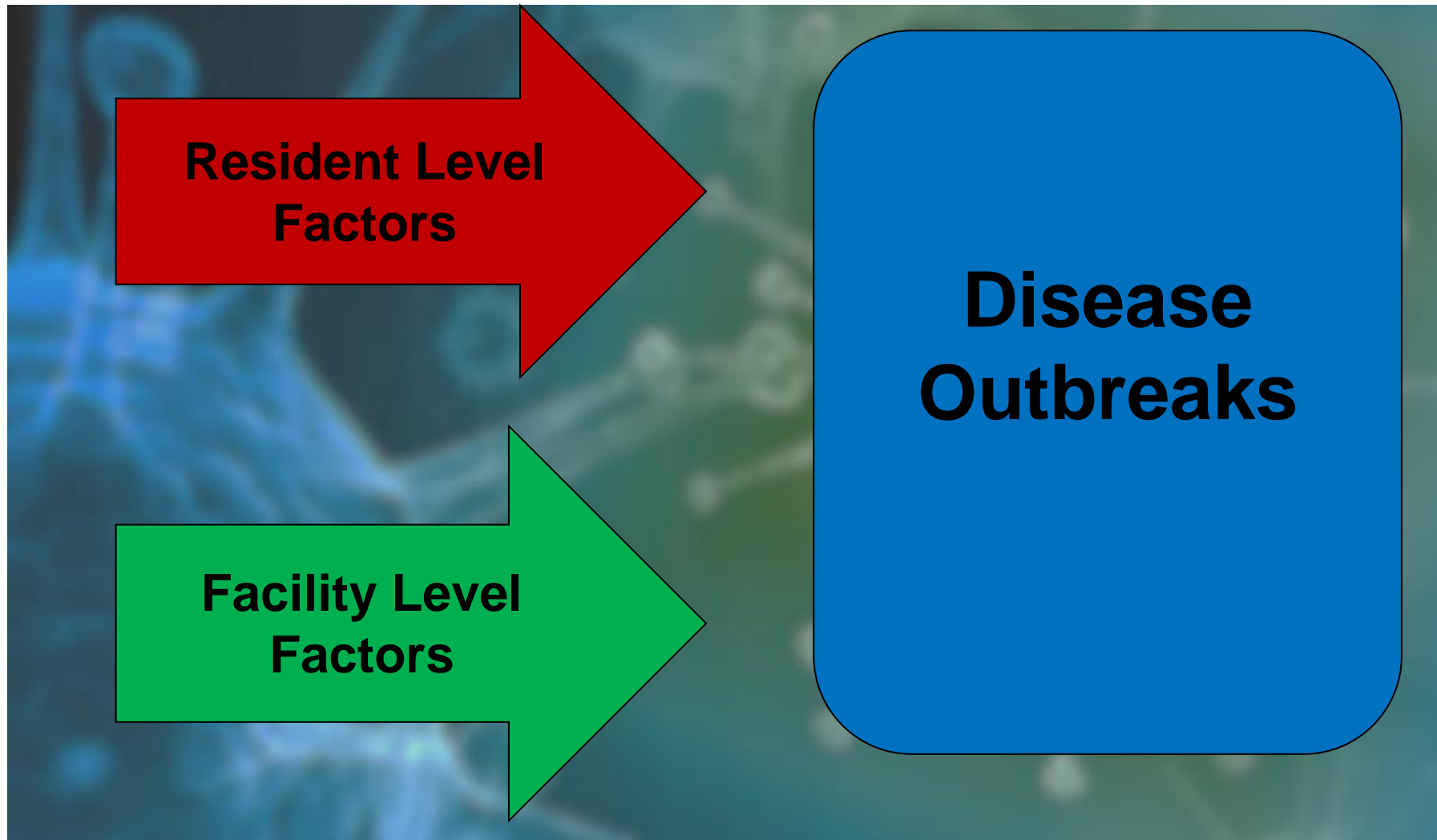
Objectives

- Identify common causes of outbreaks in post-acute and long-term care (PALTC) settings.
- Discuss pearls in the management of the two most common types of outbreaks in PALTC.

Nursing Facilities Roles



Why LTC Outbreaks Occur



Frail LTC Residents at High Risk

- Frailty and Age
 - *Immuno-senescence*
 - *Functional impairment*
- Comorbid illness
- Medications that impact immune function
 - *> 60% of residents on 9 or more meds*
- Poor nutritional status
- Indwelling devices
- Close contact
 - *ADL Care*
 - *Social contact*



Facility Factors

- Staffing
 - *Composition/skills*
 - *Turnover*
- Poorly developed surveillance processes
- Limited technology and resources
- Limited diagnostic capabilities
- Competing pressures
- Limited clinician presence
- Poor documentation

Nursing Home Staff Turnover

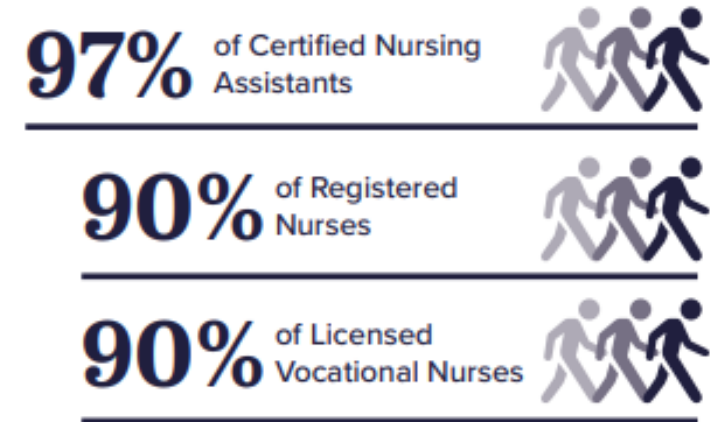
2018 Turnover Rates

HCS 2018-2019 Nursing Home Salary & Benefits report¹

	2018	2017
RNs	33.9%	35.7%
LPNs/LVNs	28.5%	30.8%
CNAs	41.9%	

Figure 2

Direct Care Staff Turnover Rates in Texas Nursing Homes²

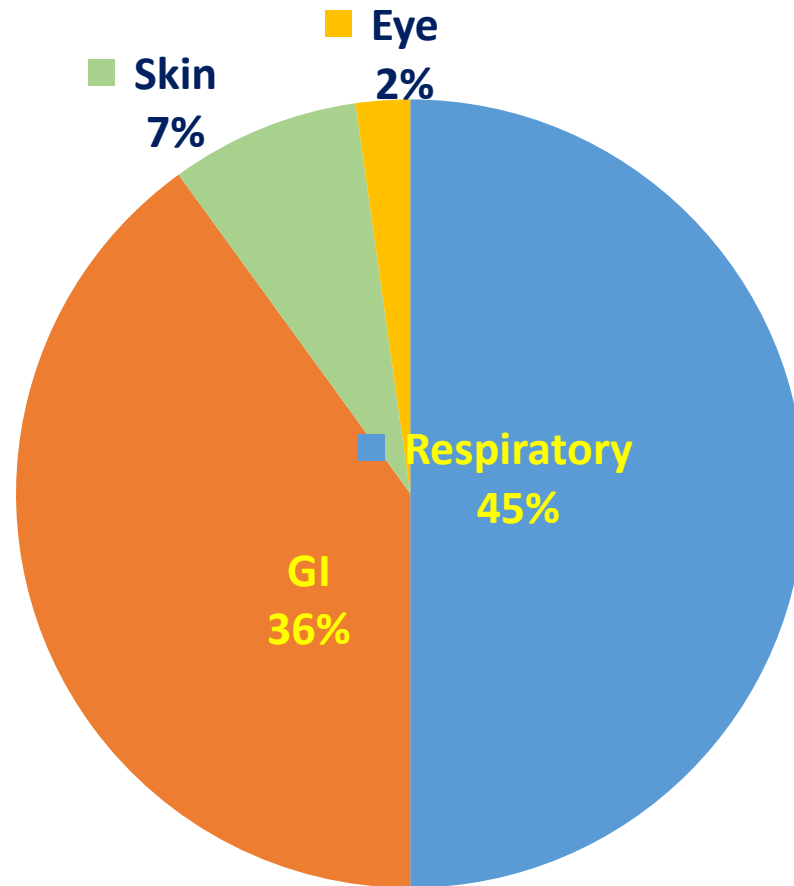


¹<https://skillednursingnews.com/2018/08/nurse-turnover-dropping-snfs-wages-continue-ticking-upwards/>

²https://txhca.org/app/uploads/THCA_Crisis-Report_April-2018-Final.pdf

Common Outbreaks

LTC Outbreaks by Affected Sites



- English literature review, elderly care facilities
- 1966-2008
- 207 articles identified
- **Underestimates outbreaks**
 - Detection bias
 - Reporting bias
 - Publication bias

Respiratory Outbreaks

Nursing Home Outbreaks Despite Vaccination

Hong Kong, 2013-2014

	NF
Residents in Facility	191
Mean Age	82 (58-102) yrs
Vaccine Coverage Rate	85%
Cases ILI	48
Attack Rate	25%
Attack Rate Vaccinated	25%
Attack Rate Unvaccinated	28%
Influenza Related Hospitalizations	37.5% (18/48)
Influenza Related Deaths	0

Nursing Home Outbreaks Despite Vaccination

Navarre, Spain 2012

	NF 1	NF 2	NF 3
Residents	66	22	523
Mean Age	80.3 (42-97)	81.2 (59-97)	86.4 (62-104)
2010/2011 Vaccine Coverage Rate	97%	91%	82%
Cases ILI	44	4	15
Attack Rate	67%	18%	2.9%
Attack Rate Vaccinated	66%	20%	2.6%
Attack Rate Unvaccinated	100%	0%	4.1%
Influenza Related Hospitalizations	2	1	0
Influenza Related Deaths	1	1	0

Nursing Home Outbreaks Despite Vaccination

Wisconsin 1992-1994

Variable	1992-1993	1993-1994
Influenza Type	B	A
Total Residents	690	670
Age	76 (± 10)	76 (± 10)
Male	80%	78%
Residents Vaccinated (%)	86%	89%
Nursing Staff Vaccinated (%)	56%	46%
Cases	104 (15.5%)	68 (9.8%)
Vaccination Rate Among Cases	85%	90%

Nursing Home Outbreaks Despite Vaccination

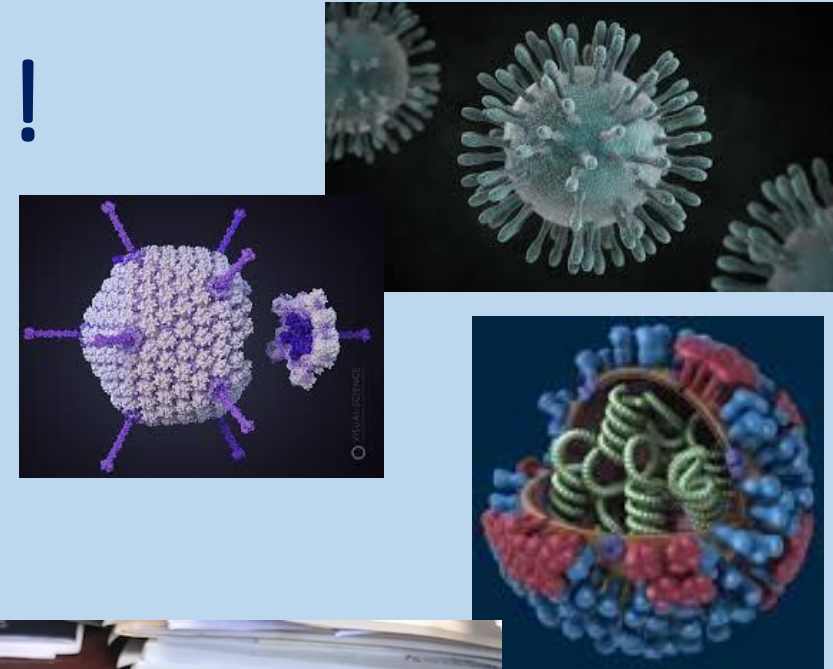
Rochester, MN 1996

Variable	Residents	HCW
Number	62	67
% Vaccinated	95%	72%
Age	87 (± 4)	-
Attack Rate	44% (n=27)	24% (n=16)
Vaccination Rate Among Cases	96% (n=26)	52% (n=9)

Kuhle CL, et al. An influenza outbreak in an immunized nursing home population: Inadequate host response or vaccine failure? *Annals Long-Term Care* 1998;6(3):72.

All That Coughs Is Not Flu!

- Respiratory Viruses Linked to LTC Outbreaks
 - Influenza A, B
 - RSV
 - Human Metapneumovirus (hMPV)
 - Parainfluenza 1, 2, 3
 - Coronavirus
 - Adenovirus
 - Rhinovirus
- Bacteria
 - Strep pneumoniae
 - Legionella species



Regional Prevalence of 8 Respiratory Viral Pathogens in LTCF

Year (Number subjects Tested)	RSV	Flu A	Flu B	hMPV	CoV OC43	CoV 229E	Para- 3	Para- 2
1 (99)	10	12	4	11	7	9	5	1
2 (149)	9	11	4	22	3	4	4	4
3 (134)	6	1	11	16	13	27	6	4
Total (382)	25	24	19	49	23	40	15	9
Percentage of Tested	6.5	6.3	5.0	12.8	6.0	10.5	3.9	2.4

- 33 LTCF Boston
- 3 year study of Vitamin E supplementation
- Paired viral sera

Falsey AR, et al. J Am Geriatr Soc 2008;56:1281-1285.

Human Metapneumovirus

West Virginia / Idaho, 2011-2012

W VA	WV	ID	Total
Total Residents	83	80	163
ILI Cases	28	29	57
Attack Rate	34%	36%	35%
Mean Age	84 (54-99)	84 (51-97)	-
Hospitalized	4 (14%)	5 (17%)	9 (16%)
Died	4 (14%)	2 (7%)	6 (11%)
Staff Symptomatic	32%	9%	-
LRTI	26 (93%)	19 (66%)	79%
Xray Confirmed PNA	69%	37%	56%
Median Duration Illness (D)	21 (3-43)	4.5 (1-14)	-

Pearls for Managing an Influenza Outbreak in LTC

1. Recognize There Is An Outbreak

- Outbreaks vs “colds going around” or “just pneumonia”
 - *Always ask/consider if others are ill with similar symptoms*
 - *Are any staff having respiratory symptoms*
- Defining respiratory outbreak
 - CDC Influenza Like Illness (ILI) = 2 or more respiratory cases in 72 hours
 - **1 lab confirmed case of influenza***

*Depending on the type of test used. i.e. rapid vs PCR

<http://www.cdc.gov/URDO/outbreak.html>

“In certain situations *a single case* of unexplained respiratory disease may need to be evaluated as a possible outbreak because of the *potential need for immediate public health intervention* (e.g., suspect pulmonary anthrax, plague, SARS, MERS, hantavirus pulmonary syndrome).”

This definition includes influenza in nursing facilities.

<http://www.cdc.gov/URDO/outbreak.html>
State Operations Manual

2. Rule Out Influenza – Test For Flu

Which of the Following Tests is Preferred When Determining Whether There is an Outbreak?

- A. Influenza titers
- B. Rapid influenza test
- C. Influenza viral culture
- D. Influenza nasal swab for PCR
- E. I have absolutely no clue

Influenza Testing

- Influenza polymerase chain reaction (PCR) is the gold standard
 - “Influenza A & B RNA, Qualitative Real-Time PCR”
 - Quest diagnostic code = 16086 (Flu A & B only)
 - Quest diagnostic code = 91989 (Flu A & B and RSV)
 - LabCorp diagnostic code = 186221
 - Viral transport media (e.g. M4 media – check with lab)
 - Turnaround time = 24-48 hours – *check with lab*
 - Low false positive rates, very low false negative rates



Influenza Testing

- Rapid (bedside) - tests not reliable
 - High false positive rates when there is low circulating flu
 - High false negative rates when circulating flu rates are high
- Viral cultures – take too long
 - 7-10 days
- Viral titers – antibody levels
 - No clinical value – can't tell if actual infection
- Enzyme Immuno-Assay (EIA) test – less accurate than PCR

3. Implement Droplet Precautions

- All ill residents should be placed immediately into droplet precautions even before testing is completed
 - Keep resident in their room
 - All persons entering the room should wear a mask
 - Pull the curtain if the resident is in a shared room
 - If the resident must leave the room, she/he should wear a mask
- Treat double rooms as if both residents were infected – i.e., gown and glove when entering the room regardless if which resident
- Hand Hygiene!
- Cough Etiquette!



3. Implement Droplet Precautions

- Duration of droplet precautions is **7 days** from symptom onset or 24 hours after resolution of fever – whichever is longer
- Duration for droplet precautions is not related in any way to the start of antiviral medications.
- You may admit patients with influenza as long as you are able to maintain the person in droplet precautions
 - Isolated room, or
 - Cohorted with resident who has same type of flu

4. Immediately Conduct Surveillance

- Create a **working case definition**
 - CDC ILI = “cough and fever” or “sore throat and fever” – may miss PALTC cases
 - Two or more of fever, cough, sore throat, dyspnea, pneumonia
 - GI symptoms not likely to be flu related
- Go patient by patient using your case definition
 - Evaluate for symptoms
 - Create a line listing
- Complete an **outbreak tracking sheet**
- **Daily surveillance** for new cases

Facility _____

RESIDENT _____
 EMPLOYEE _____

TYPE OF OUTBREAK:
 Respiratory _____
 C-diff _____
 other GI _____
 influenza _____
 Scabies _____
 other _____

^ = disease onset
 X = died
 C = culture sent
 C+ = culture positive
 A = Abx tx started
 V = antiviral started
 H = hospitalized
 "..." = ongoing symptoms
 R = Case resolved

Month = _____
 Year = _____

Days of the Month

NAME/ID	ROOM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31									

Note Results of Any Pathogen Testing:

5. Administrative Steps

- Assign a champion (*e.g. incident commander*)
- Establish baseline & daily **huddles** at a set time
- Keep notes
- Use a facility specific **Outbreak Checklist** (*see toolkit¹*)
- Post **signage** at entry points to building and/or units
 - Notifying visitors of outbreak
 - Reminding of hand hygiene and cough etiquette
 - Discouraging ill visitors or at risk visitors from visiting
- **Notification letters** to residents returning from the hospital or being admitted
- Notify receiving facility if a resident is transferred

¹https://www.health.pa.gov/topics/Documents/Diseases%20and%20Conditions/Flu/LTCFtoolkit11%2012%202018_FINAL.pdf

6. Room Placement – Private Rooms or Cohorting

Is This Really Possible?

- May Not Be Possible
 - Few private rooms
 - Limited “open” rooms which can be made into a private room
 - Can’t efficiently move a resident to another room – *the resident’s home*
- May Contribute To Spread Of Outbreak
 - Limited PALTC Data on Moving Residents
 - Moving may increase resident / HCW exposure & spread
 - HCW may be asymptomatic, thus residents already exposed
 - May increase HCW exposure risk

7. Social Distancing

- Ill residents should not eat in the dining room
 - In room dining
- Ill residents should not go to group activities
 - In room activities
- Ill residents should not go to the beauty salon
 - Hair dryers may be the most efficient way to spread droplets
- Limit visitation
 - Generally cannot exclude all visitors
- Consider **cohorting ill residents for therapy** when large number
 - Last session of day
 - Terminally clean equipment after session



8. Antiviral Use

- Indicated for treatment of cases (5 days)
 - Regardless of days from symptom onset
- Indicated for prophylaxis to prevent secondary cases and reduce complications (10 days)
- Dose adjustment for renal function
- **Medical Director** may & should take responsibility to implement & prescribe (F501)
 - Multiple prescribers = chaos
 - Other providers often have no experience with this
 - <http://www.amda.com/managementtools/Medical%20Director%20rolesresponsibilitie.pdf>
 - https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_ltcf.pdf
 - <https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm>

Prevalence of Chronic Kidney Disease in NF

- McClellan WF, et al. J Am Med Dir Assoc 2010;11:33-41
- Cr Clearance estimated using MDRD*
- 82 NF
- 794 residents

	Percent
Any CKD	49.5%
Stage 3a	23.5%
Stage 3b	19.4%
Stage 4/5	6.5%

**MDRD significantly over-estimates renal function in older adults. Cockcroft-Gault is the standard for older adults.*

Antiviral (AV) Use

- Timing critical
 - Plan antiviral supplies \geq **6 months** in advance
 - Active surveillance to **recognize cases quickly**
 - Systems in place to **get AV administered same day**
 - Prophylaxis can be unit by unit or whole house depending on the circumstance, unit configuration, etc



Flawed Studies Tend to Yield Flawed Results

- Studies suggesting limited benefits of antivirals for outbreak prophylaxis have been flawed
 - Either had substantial delays in implementation, or
 - Were in settings with pandemic H1 activity where there was a high rate of AV resistance, or
 - Incomplete coverage of residents
- Influenza B may be less susceptible to oseltamivir than zanamivir – not true resistance



Influenza Tools

- Standard antiviral order sheet
 - Signed /scanned
 - Dosing guidelines
- Cr Clearance Calculator
 - Initiate October
 - Update frequently

Essential for timely response

INFLUENZA ANTIVIRAL MEDICATION ORDER SHEET

RESIDENT: _____

DATE: _____

ORDERS

Antiviral therapy is to be administered for the following indication:

Prophylaxis Treatment

Antiviral therapy to be administered based on the dosing guidelines below

Oseltamivir (Tamiflu) _____ mg PO / GT (frequency/duration) _____

Zanamivir (Relenza) _____ mg PUFFS (frequency/duration) _____

Physician Signature _____ Date _____

DO SAGE GUIDELINES

OSELTAMIVIR (TAMIFLU) DOSAGE GUIDELINES - (Preferred First Line Agent - When Used for Treatment¹)

[STANDARD DOSE 75 MG TWICE A DAY]

CrCl < 30 75 mg daily for treatment

CrCl < 10 No Data Available

OSELTAMIVIR (TAMIFLU) DOSAGE GUIDELINES - (Preferred First Line Agent - When Used for Prophylaxis¹)

[STANDARD DOSE 75 MG ONCE A DAY]

CrCl < 30 75 mg every other day for prevention

CrCl < 10 No Data Available

ZANAMIVIR (RELENZA) DOSAGE GUIDELINES - (Second Line Agent - When Used For Treatment¹)

[STANDARD DOSE FOR NURSING HOME RESIDENTS = 10 MG (2 puffs) INHALED TWICE A DAY]

Avoid in Patients with Significant Airways Disease No Change in Dose in Patients with Renal Failure

ZANAMIVIR (RELENZA) DOSAGE GUIDELINES - (Second Line Agent - When Used For Prophylaxis¹)

[STANDARD DOSE FOR NURSING HOME RESIDENTS = 10 MG (2 puffs) INHALED ONCE A DAY]

Avoid in Patients with Significant Airways Disease No Change in Dose in Patients with Renal Failure

1) CDC. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2007. *MMWR*, 56(RR06):1-54 July 13, 2007 (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5606a1.htm> - ACCESSED FEBRUARY 11, 2008.)



Discourage antibiotics for viral illness



- **Viral infections often cause pneumonia and LRTI**
 - Unless unstable or superinfection is suspected.
- Understand the typical course of superinfection
- Inappropriate abx continued in **35%** of admissions with flu*

*Ghazi IM, et al. Infect Control Hosp Epidemiol 2016;37(5):583-589.

Sequential A & B NF Outbreaks (Different Units) April 2016

Evergreen Unit				Influenza A					April 2016									
Case	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
9															-			
8															-			
7										AV	-				-			
6										↓								
5										↓								
4										-								
3										-								
2																		
1																		



Redwood Unit				Influenza B					April 2016									
Case	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
										AV								
									↓									
10									-									
9									-									
8									-									
7									-									
6									-									
5									+C									
4									↓									
3 (roommate)									↓									
2									↓									
1																		



Color Key	
	RSV
	Unlikely
	Negative
	Presumed
	Proven

Missed Opportunity



Sample Outbreak Summary Record



Facility – Asbury Heights

Date Outbreak Detected – Wed 4/20/2016

Type of Outbreak – Combined B/A

Date Index Cases

- Thur 4/14/2016 – Influenza B (Redwood Unit)
- Thur 4/21/2016 – Influenza A (Evergreen Unit)

Time From Index B (Redwood) Case Symptoms to Outbreak Declaration – 6 days

Time From Index A (Evergreen) Case Symptoms to Outbreak Declaration – 0 days [2 PM]

Time From Outbreak Declaration to Prophylactic Antiviral Start B – 9.5 hours [10:30 AM to 8 PM]

Time From Outbreak Declaration to Prophylactic Antiviral Start A – 6 hours [2PM to 8 PM]

Tamiflu Started Redwood = 4/20 8 PM

Tamiflu Started Evergreen = 4/21 8 PM

Last New Case on Redwood = 4/21

Last New Case on Evergreen = 4/22 (11-7 shift)

Total Proven Cases on Redwood = 4 (All B)

Total Proven Cases on Evergreen = 4 (All A)

Total Presumed Cases on Redwood = 10

Total Presumed Cases on Evergreen = 9

Ruled Out Cases on Redwood = 6

Ruled Out Cases on Evergreen = 5

Case Fatalities – 0

Case Hospitalizations – 0

Case ED Visits – 0

Additional Respiratory References

- Kodama F, Nace DA, Jump RLP. Respiratory syncytial virus and other noninfluenza respiratory viruses in older adults. *Infect Dis Clin N Am* 2017;31:767-790.
- Spires SS, Talbot HK, Pope CA, Talbot TR. Paramyxovirus outbreak in a long-term care facility: The challenges of implementing infection control practices in a congregate setting. *Infect Contr Hosp Epidemiol* 2017;38(4):399-404.
- Ursic T, Miksic NG, Lusa L, Strle F, Petrovec M. Viral respiratory infections in a nursing home: a six-month prospective study. *BMC Infect Dis* 2016;16:637 DOI 10.1186/s12879-016-1962-8



Influenza Outbreaks in Long-term Care Facilities: Toolkit for Facilities

2018/19 Influenza Season

https://www.health.pa.gov/topics/Documents/Diseases%20and%20Conditions/Flu/LTCFtoolkit11%2012%202018_FINAL.pdf

Summary

- Disease outbreaks in LTC are common owing to both resident and facility level factors
- A number of factors conspire to complicate outbreak response efforts in the LTC setting
- The most common outbreaks in LTC involve the respiratory and GI tract and to a lesser extent the skin

Questions?

Thank You!



Contact Information

David A. Nace, MD, MPH, CMD naceda@upmc.edu